Numbers and distribution of wild geese in the Netherlands, 1974–1979

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Introduction

Eight species of wild geese, numbering about 900,000 birds, winter in Europe (Ogilvie 1978). Of these, six species, totalling 400,000 geese, spend part of their annual cycle in the Netherlands.

Both climate and geomorphology make the Netherlands in winter an ideal 'goose country'. Due to the Gulf Stream the winters are generally mild (January-isotherms in Figure 1), and snowcover hardly ever lasts longer than a week. Being the extension of the Northwest European Plain, built up largely by the rivers Scheldt, Meuse, Rhine, IJssel and Ems, the countryside is very flat and open. Man has removed all forests from the fertile soils, turning them into grassland for dairy farming and arable land, providing excellent feeding grounds for geese.

Large areas of the western part of the country would be flooded by the sea and rivers if dikes, sluices and pumps did not keep the water out (Figure 1). Geese are largely restricted to this low-lying part of the country and within it by the presence of suitable roosts, such as intertidal mudflats, bare sandbanks, shallow lakes or flooded grasslands.

Although, especially in mid-winter, mixed species flocks do occur, there are marked differences between the species in their phenology (Figure 2) as well as in their spatial distribution (Figure 3). The Greylag Goose *Anser anser* occurs in marshy areas, but feeds in autumn largely on nearby arable land. The Dark-bellied Brent Goose *Branta bernicla bernicla* is a marine coastal species, the Barnacle Goose *B. leucopsis* occurs along the coast where fresh water is available, but also frequents sites farther inland, where it can be seen in mixed flocks with European White-fronted Geese *A. albifrons albifrons*. Here also is the Pink-footed Goose *A. brachyrhynchus*. Even farther inland the Bean Goose *A. fabalis* becomes the dominant species.

The Netherlands temporarily harbours each season the entire Russian (or Barents Sea) population of Barnacle Geese and almost the entire Baltic-North Sea population of White-fronted Geese. So peak counts in the Netherlands usually give a good impression of trends in their populations. For the Bean Goose, however, the Netherlands only harbours a part of a population much more difficult to define. Increases in numbers can be due to temporary shifts because of unfavourable weather conditions elsewhere, as well as to actual increases in population size. Other species populations are fairly well known through internationally co-ordinated counts, but are only partly covered by the Dutch counts.

This paper summarizes the results of the goose counts in the Netherlands from the autumn of 1974 until the spring of 1979. This includes four rather mild winters. During the much colder winter of 1978–79 almost all geese left the northern part of the country in January and February to winter in the south-western part of the Netherlands and in Belgium (E. Kuyken, pers. com.). Also twice as many Bean Geese wintered in the Netherlands, because heavy snow forced those usually wintering in southern Sweden and in the German Democratic Republic (GDR), to move westwards.

The seasonal peak counts for all six goose species have been listed in Table 1. The geese will be treated species by species in the order in which they arrive each autumn.

Greylag Goose. *Jan Rooth*

This palearctic-breeding goose ceased to nest in the Netherlands in 1909. In the early fifties some breeding was observed in and around the Noordoostpolder. In the early sixties they bred again, this time in the extensive reedmarshes in the newly drained polder Oostelijk Flevoland. Because these marshes were doomed to disappear for the sake of agriculture, attempts were made in the late sixties to re-establish

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Table 1. Peak counts of geese in the Netherlands.

	1974–75	1975–76	1976–77	1977–78	1978–79
Anser anser	32,000(Nov)	21,000(Oct)	32,000(Nov)	38,000(Oct)	28,000(Oct)
Branta bernicla	34,000(May)	48,000(May)	54,000(May)	41,000(Apr)	56,000(Apr)
Branta leucopsis	42,000(Nov)	45,000(Jan)	54,000(Jan)	53,000(Jan)	45,000(Mar)
Anser brachyrhynchus	6,500(Nov)	12,500(Dec)	9,000(Jan)	9,000(Nov)	11,000(Nov)
Anser albifrons	103,000(Jan)	112,000(Feb)	188,000(Jan)	183,000(Jan)	129,000(Jan)
Anser fabalis	14,000(Jan)	22,000(Jan)	56,000(Jan)	45,000(Feb)	100,000(Jan)

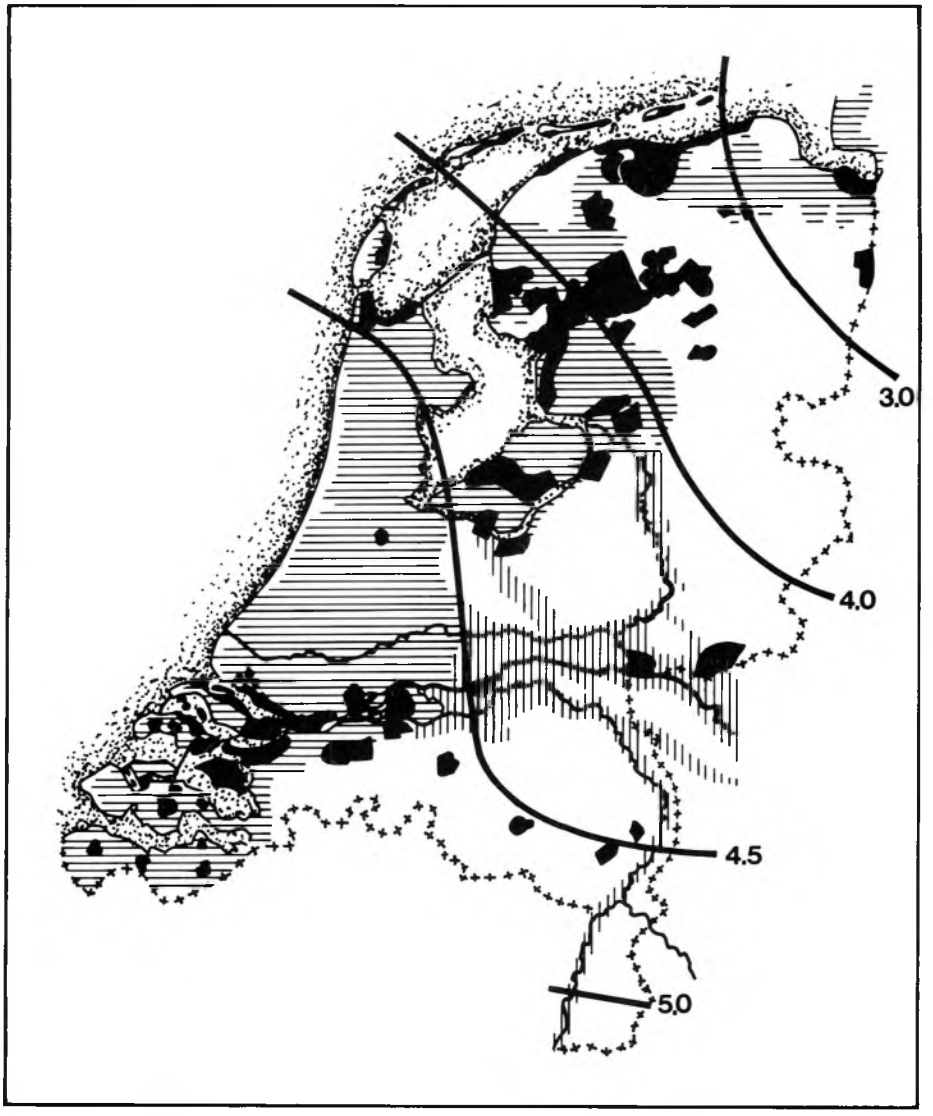

Figure 1. The most important goose haunts (black) in the Netherlands, as well as January-isotherms (°C), and areas liable to flooding if not for the dikes and drainage schemes. Horizontal hatching indicates possible inundation by the sea, and vertical hatching possible inundation by the rivers (Redrawn after Mörzer Bruyns & Westhoff 1951).

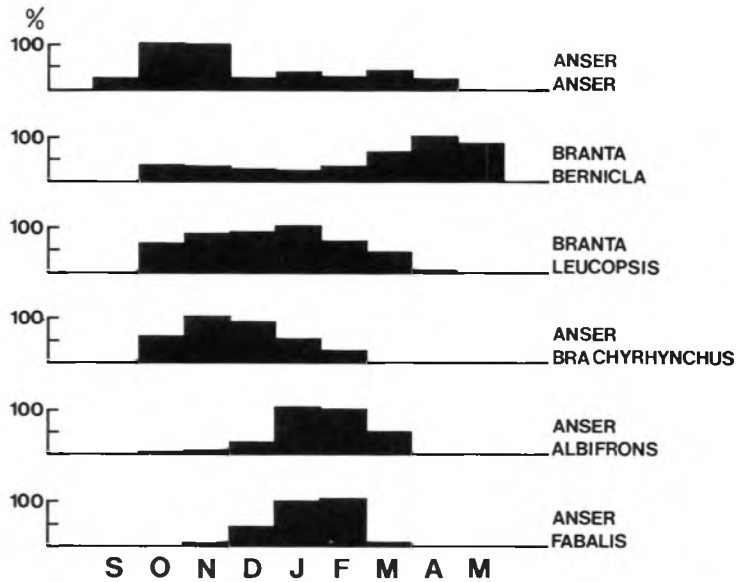

Figure 2. Phenology of the six species of geese occurring in the Netherlands. Monthly means over the period 1974–1978 (four mild winters) are expressed as percentage of the mean seasonal maximum.

this goose as a breeding bird elsewhere. In a permanent marsh area in Friesland these have been successful, and some 70 pairs are now breeding there. A further increase of the Dutch breeding stock has occurred by spontaneous settlements of wild birds. Several tens of pairs now breed in the south-western part of the country, but the majority, some 100 pairs, breed in an extensive marsh, the Oostvaardersplassen, in the most recently drained polder Zuidelijk Flevoland. This is also an important moulting ground for this species in June and July. From observations of migrating flocks, the majority of these moulting birds, up to 2000 (Dubbeldam 1978), probably originates from Schleswig-Holstein, Denmark or possibly even from the German Democratic Republic.

First arrivals are in August, and numbers rise in the course of September to reach a peak in October/November (Figure 2). Ringing recoveries have revealed that most of these birds come from the Norwegian and Danish breeding populations (Rooth 1971). The majority of our autumn birds spend December to February in the Marismas of the Guadalquivir in southern Spain, but up to 10,000 remain in the Netherlands the whole winter through. These may still leave, even in midwinter, if weather conditions deteriorate. Thus in 1978–79 only 3000–4000 Greylags remained in the Netherlands, whereas simultaneous counts in southern Spain revealed the presence of 60,000–80,000 Greylags against 40,000–60,000 during the previous mild winter. During spring migration there is only a slight increase in numbers in March, because the birds, which start to breed in March and April, pass through very quickly. At present the population migrating through the Netherlands is twice as numerous as ten years ago (Rooth 1971).

Before 1970, rushes *Scirpus lacustris* and *S. maritimus* in the fresh to brackish tidal area of the Biesbosch-Haringvliet constituted a very important food for the Greylag Goose. After the construction of a barrage in this south-western estuary in 1970 the tidal movement was virtually nil and the water became fresh. The extensive rush-fields quickly disappeared and the Greylags increasingly fed on waste potatoes and sugarbeet on adjacent arable land.

In the IJsselmeer (the former Zuiderzee) successive draining of several polders temporarily created huge marshy areas where roots of reedmace *Typha latifolia* and leaves of common reed *Phragmites australis* were important foods. In the 1940s the Noordoostpolder (48,000 ha), in the sixties Oostelijk Flevoland (54,000 ha) and in the

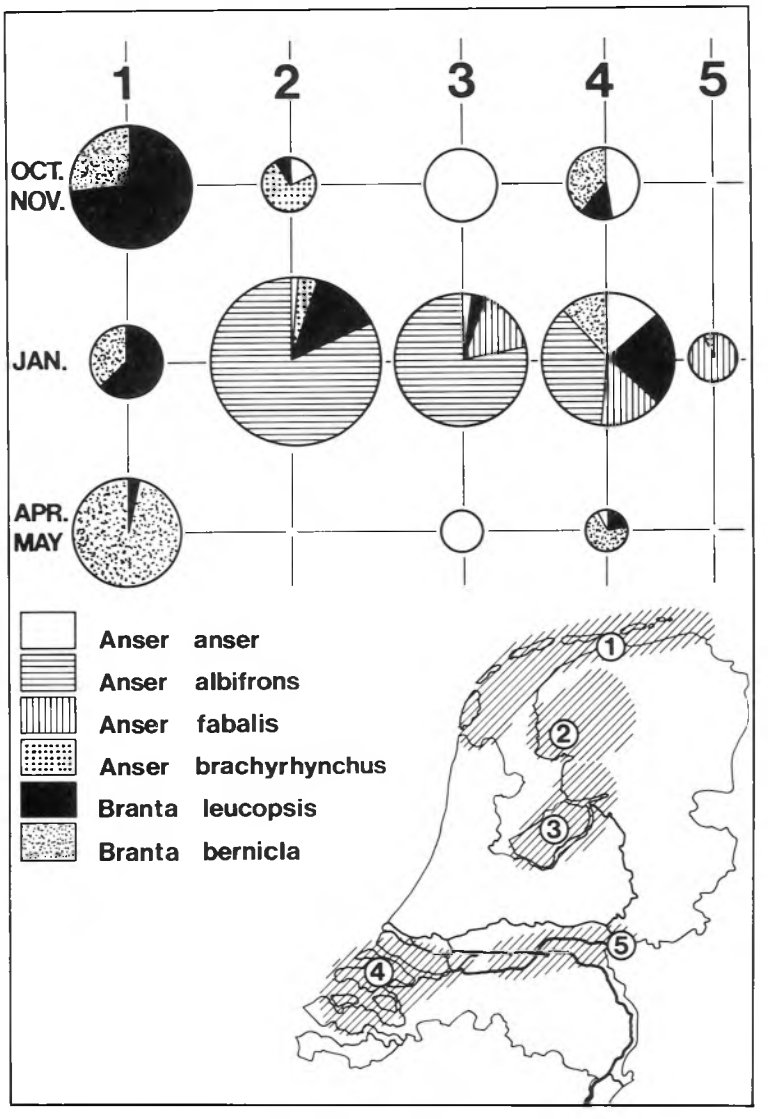

Figure 3. Temporal and spatial distribution of the six goose species occurring in the Netherlands. The various goose haunts (see Figure 1) have been grouped into five main areas: 1) the Wadden area, 2) central and southwestern Friesland, 3) the newly reclaimed IJsselmeerpolders and the IJsseldelta, 4) the Delta area, and 5) the Rhine-Valley. The size of the circles is related to the mean number of geese, counted during a series of four mild winters (1974–1978) in the area concerned. The smallest circle is equivalent to 6,000 geese, the largest to 95,000 geese.

seventies Zuidelijk Flevoland (44,000 ha) were temporarily major haunts for Greylag Geese and huge numbers of dabbling ducks. Eventually these huge marsh areas were turned into farmland, but in the most recently drained polder the large marsh reserve, Oostvaardersplassen, 3600 ha, will be preserved. The addition of a vital buffer zone of 2400 ha is still under discussion. Both breeding and moulting Greylags feed largely within this reserve, but in the autumn, when the species is present in much bigger numbers, feeding flights to adjacent stubble-fields are made.

Dark-bellied Brent Goose. *Barwolt Ebbinge and Anton van Haperen.*

In the Netherlands this goose has been fully protected since 1950. The marked increase in the world population, following their complete protection in Denmark in 1972, has made the Brent a common species along the Dutch coast again. Peak numbers have risen from 5000 in the 1950s (Mörzer Bruyns & Timmerman 1968) to 56,000 in the 19702 (Table 1).

This goose is still a typical marine species, restricted to coastal areas with tidal mudflats emerging at low tide, and water salinity not below 20% (Wolff et al 1967). It is only on farmland adjacent to this natural habitat that the recently developed tradition of 'inland' feeding occurs, especially during mid-winter.

Within the Netherlands two distinct Brent Goose areas can be discerned: the Wadden Sea in the north, and the so-called Delta in the southwest. As can be seen in Figure 4 the former is mainly a spring staging area, whereas the latter is predominantly a wintering area, like the east coast of England or the west coast of France. However, the actual numbers of Brent wintering in both areas of the Netherlands are roughly the same, the January mean for the Dutch part of the Wadden Sea being 8000 over the five-year period concerned, against 7000 for the Delta area. In spring (April/May) the mean number in the Dutch part of Wadden Sea is 45,000 and this comprises only a third of the whole Wadden Sea, which extends from Den Helder in the Netherlands to Esbjerg in Denmark. The entire world population of the Dark-bellied Brent Goose gathers here each spring (St Joseph 1979). From the end of April till the fourth week of May they put on weight before starting off for their Siberian breeding grounds (Ebbinge 1979).

Barnacle Goose. *Martin Lok.*

From several thousands in the early 1950s, Barnacle Geese wintering in the Netherlands have risen to well over 50,000 in the 1970s. Along with this increase in numbers several new areas have come into use, such as the Wadden island Schiermonnikoog in the 1960s and the Lauwersmeer in the 1970s. The latter area came into being after the closure of the Lauwerszee in 1969, resulting in a unique combination of massive glasswort *Salicornia* fields on the still saline plains and fresh water in the remaining gullies, which proved to be very attrac-

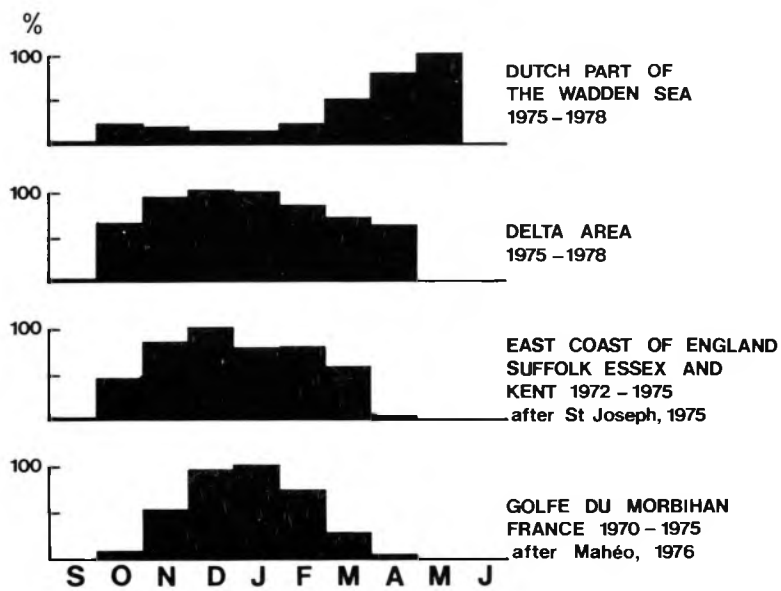

Figure 4. Brent Goose phenology in two Dutch areas, in England and in France. Monthly means, expressed as percentage of mean seasonal maximum for the area concerned.

tive to Barnacle Geese. In the 1970s this one autumn staging area harboured almost the complete Barents-Sea population, the numbers formerly halting farther east in Schleswig-Holstein being reduced considerably (Busche 1977). The 3300 ha of *Salicornia* in 1972–73 (Ebbinge *et al.* 1975) have been reduced by the gradual desalination and by developmental activities to only several hundreds of hectares. As a result the Barnacle Geese now shift to surrounding grasslands much earlier in the season. Other vast *Salicornia* fields were formed after the closure of the Grevelingen in the Delta in 1971, but these fields attracted less than 2500 Barnacle Geese, the water remaining saline.

Mass immigration usually takes place in the second week of October, but the first birds arrive at the end of September (Figure 2). Before the Lauwersmeer area became such an important autumn staging area the majority did not arrive until well into November.

Figure 3 shows that in the autumn the majority is concentrated in the Wadden Sea (area 1), to spread later to the central and southern parts of the province of Friesland (area 2), and to their southernmost wintering place in the Delta (area 4). More detailed information about this area is given in Figure 5, which also indicates its extreme importance as a refuge in cold winters like 1978–79. During this particular winter even here snow and ice made the grass and winter-wheat temporarily inaccessible to the geese. Then Barnacle Geese were observed to feed on Brussels Sprouts, still standing above the snowcover.

It is remarkable that, despite being our southernmost Barnacle Goose area, the Delta still harbours up to 1000 Barnacle Geese as late as April. Except for Schiermonnikoog all other Barnacle Goose areas in the Netherlands have been deserted by then.

Simultaneous counts in the Netherlands and in the Federal Republic of Germany (FRG) cover the whole Barents-Sea population. Figure 6 shows that over the last twenty years the mean increase has been 6% annually. This trend was broken in the end of the 1970s, largely as a result of two very poor breeding seasons in succession in 1977 and 1978 (see Table 2). The peak number counted in the Netherlands in March 1979 (Table 1), only a little lower than the complete population census in the preceding autumn (48.000), indicates that the cold winter of 1978–79 did not cause

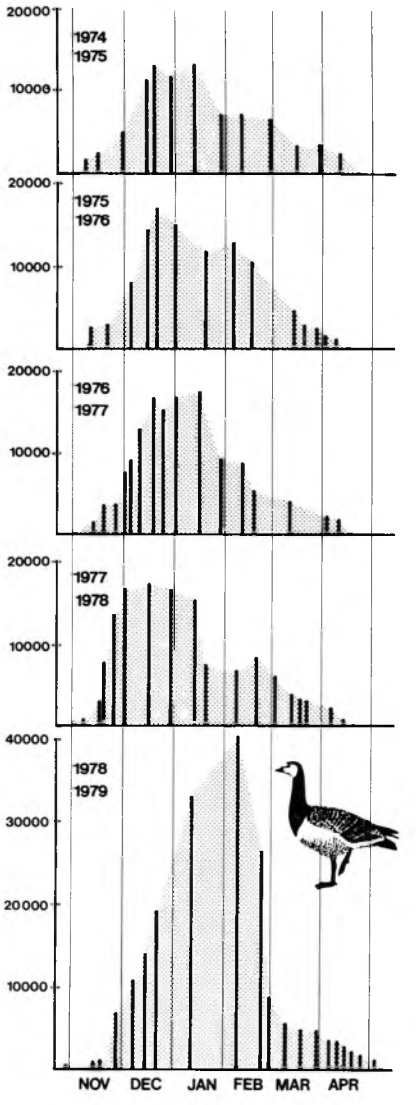

Figure 5. Numbers of Barnacle Geese in the Dutch Delta area.

Table 2. Percentage first year birds in the Barnacle Goose (Barents-Sea population).

1974:	6%
1975:	35%
1976:	15%
1977:	5%
1978:	1%

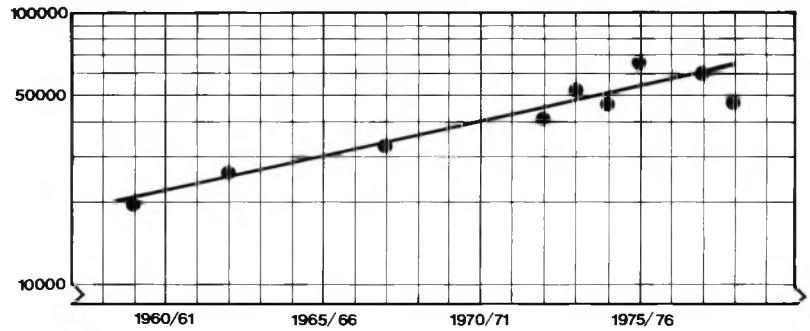

Figure 6. Size of the Barents-Sea (or Russian) population of Barnacle Goose (after Boyd 1961, Timmerman 1976, Ebbinge 1975 and unpubl., and Lok 1980).

excessive mortality. Since the breeding results in 1979 and 1980 were good again (both had 20–25% first-year birds in the winter population), the increasing trend may well be resumed but insufficient counts have been gathered to confirm this.

Pink-footed Goose. *Arend Timmerman.*

The Dutch wintering Pinkfeet all originate from the Spitsbergen population, averaging about 16,000 in the 1970s (Timmerman 1977). In the Netherlands it is a typical autumn species (see Figure 2) with peak numbers in November. In the 1970s these represented on average 60% of the Spitsbergen population, the remainder staying in Denmark and Schleswig-Holstein. Contrary to the Greylag Goose, the majority of our Pinkfeet do not migrate farther south in midwinter, but return as early as January to Germany and Denmark.

Virtually all Pinkfeet in the Netherlands are concentrated in the southwestern part of Friesland (area 2 in Figure 3), where there are vast areas of open grassland interspersed with many shallow lakes serving as roosting places. The Pink-footed Goose is a scarce winter visitor in the Delta, despite the regular wintering of 1000–1500 Pinkfeet in the adjacent Belgian goose haunt near Damme.

During the cold winter of 1978–79 most Pinkfeet moved on to Belgium, to reappear in Friesland in March with up to 6000 individuals, an unusually high number for that time of the year.

Peak counts for the last 30 years have been collected in Figure 7. Until the severely cold winter of 1955–56 the Pink-footed Goose was virtually absent in the Netherlands, but since then a fairly sudden increase to the level still present today occurred. Simultaneously numbers decreased on important Pinkfoot haunts in Niedersachsen, such as the area around the Jadebusen and Emsland (Atkinson-Willes 1961). This suggests that the increase in the late 1950s in the Netherlands was due to a shift in wintering site, rather than to an actual increase in the size of the Spitsbergen population (Timmerman 1977).

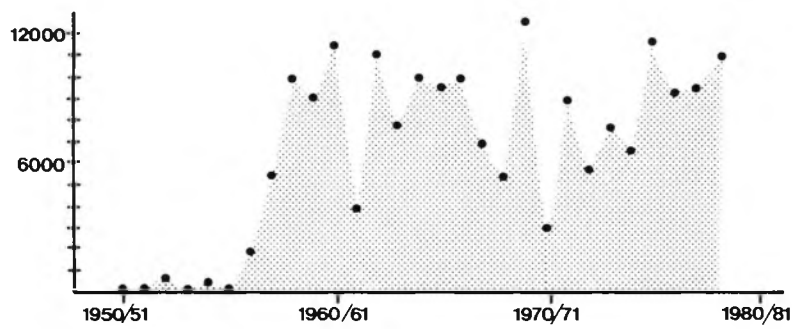

Figure 7. Peak counts of Pink-footed Geese in the Netherlands 1950–1980.

European White-fronted Goose. *Jules Philippona.*

For the Netherlands the Whitefront is a real winter-goose. They do not arrive in substantial numbers until well into December, usually when unfavourable weather conditions force them to leave their autumn staging areas in the GDR and Poland (see Figure 2). Even when the weather in the GDR remains exceptionally mild in December, the majority still migrates to the Netherlands.

The majority of the so-called Baltic-North Sea population of this species spends the actual winter in the Netherlands. The remaining 10% winters in Belgium (the Damme reserve) and in southern Britain, mainly at the Wildfowl Trust's reserve at Slimbridge. The most important haunts for the Whitefront in the Netherlands are in central and southwest Friesland (area 2 in Figure 3), in the IJsseldelta and the newly created IJsselmeerpolders (area 3), along the former Hollands Diep-Haringvliet estuary and along both sides of the Westerscheldt estuary (area 4).

In very mild winters fairly high numbers may stay in the GDR, e.g. 38,500 (or 17% of the whole population) in 1977–78. Well co-ordinated counts in the GDR, the FRG, the Netherlands, Belgium and Britain have resulted in reliable estimates for the size of this population (Figure 8). The marked increase in numbers since 1970 is not caused by a higher reproductive output, since the fraction of first-year birds in the wintering population has not changed correspondingly (see Figure 8). Restrictions on hunting are much more likely to have caused this increase. In 1970 spring hunting in the USSR was no longer permitted (Rutschke 1976), and hunting in the Netherlands became much more restricted, because geese were only allowed to be shot from half an hour before sunrise till 10 a.m. Another possible cause for the present increase in numbers might be the enhanced food situation in their main staging and wintering areas in the GDR and the Netherlands. Although intensified agriculture undoubtedly has created a much bigger food supply for the geese, it is not known whether food was limiting numbers before the present increase started.

The cold winter of 1978–79 drove many Whitefronts to the Delta and even more to Belgium. As a result the peak count in the Netherlands was much lower than in the previous two seasons. After this cold winter substantial numbers stayed until the end of March, and smaller flocks even until well into April, but usually the majority leaves between the end of February and mid-March.

Bean Goose. *Leo van den Bergh.*

Like the Whitefront, the Bean Goose is a typical mid-winter goose in the Netherlands (Figure 2). Two races of this species

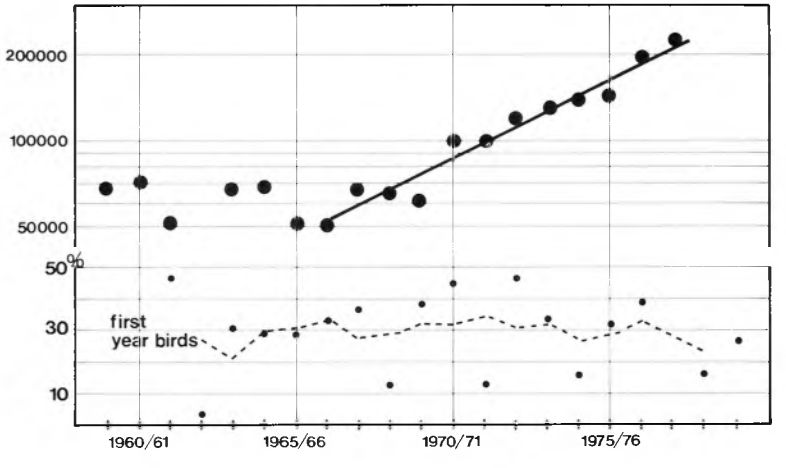

Figure 8. Size of the Baltic-North Sea population of the White-fronted Goose (upper panel) and their annual breeding success (lower panel) as measured by the fraction of first-year birds in the winter flocks. The dashed line follows the three-year running means.

occur in the Netherlands: the smaller tundra-breeding Russian Bean Goose *A. f. rossicus* and the larger taiga-breeding European or Western Bean Goose *A. f. fabalis*. Although considerable individual variation exists, the extremes of the two races are quite distinct. In the Netherlands the Russian Bean Goose is the commoner of the two races, and typically feeds on waste potatoes and sugarbeet on arable land. They gradually change to grassland-feeding as the season proceeds.

The European Bean Goose typically occurs in quite small flocks on the few remaining moorlands in the Netherlands. Especially in severe winters many more of these 'yellow-bills' come to the Netherlands, particularly from Sweden. Then they can be found in many places including small patches of grassland bordered by hedgerows, and often near brooks or small rivers. Instead of the usual peak number of about 2000, at least 18,000 of them were present in February during the cold winter of 1978–79.

Numbers of the smaller Russian Bean Goose also increase during severe winter weather, since birds usually wintering in Poland and the GDR are then forced to move farther westwards. This phenomenon, together with the increased number of European Bean Geese, doubled the peak number of Bean Geese in the Netherlands in 1978–79.

Part of the huge numbers of Bean Geese, well over 200,000 in 1979–80, spending the autumn in the GDR also migrate later on in the season to Hungary (E. Rutschke, pers. com.), and smaller flocks winter in the Alsace, in central France and central Spain. This makes it very difficult to discern discrete populations within this species.

Their main distribution within the Netherlands is shown in Figure 3. Important areas are the Delta (area 4), the newly created IJsselmeerpolders (area 3), among them especially the Noordoostpolder, and last but not least the Rhine Valley, along the Dutch-German border (area 5). The last area is a typical Bean Goose wintering place. At the end of February the onset of spring migration brings its peak numbers. It also serves as a stopping place for Bean Geese returning from the Delta area, as revealed by subsequent observations of individually marked birds (neck-banded in the GDR) in both areas. The north-eastern part of the country (see Figure 1) also regularly holds several thousands of Bean Geese during the winter.

Acknowledgements

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Summary

A flat, low-lying coastal country with generally mild winter conditions, the Netherlands is ideal 'goose-country'. Six species of geese, totalling about 400,000 birds, regularly visit it. The Greylag Goose *Anser anser* breeds in small numbers, though it is most abundant in the autumn. The other five species are typically arctic-breeding geese, the Dark-bellied Brent Goose *Branta bernicla bernicla* and the Barnacle Goose *B. leucopsis*, the Pink-footed Goose *A. brachyrhynchus*, the European White-fronted Goose *A. albifrons albifrons* and the two races of Bean Goose *A. fabalis fabalis* and *A. f. rossicus*.

Peak numbers occurring during a five-winter period from 1974 to 1979, including four mild and one cold winter are listed. Each species has its own characteristic phenology.

Except for the Pink-footed Goose all other species have shown a marked increase in numbers during the last decade. This general increase in numbers is mainly caused by restrictions on hunting, coming into force since 1970.

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