

Numbers and distribution of White-fronted and Pink-footed Geese in Flanders (Belgium), 1981–87 in a North West European context

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Introduction

Recently several species of geese wintering in north-west Europe have increased considerably in numbers (Ogilvie 1978; Pirot *et al.* in press). The birds are aggregating in traditional winter haunts or using new feeding areas.

In Belgium, common species wintering are White-fronted Goose *Anser albifrons*, Pink-footed Goose *A. brachyrhynchus* and Bean Goose *A. fabalis*. The Greylag Goose *A. anser* and Brent Goose *Branta bernicla* are mainly passage migrants staying for a shorter time, although a population of feral Greylags is expanding. The Barnacle Goose *B. leucopsis* is only present in small numbers during cold winters. Other species such as the Lesser White-fronted Goose *A. erythropus* are very rare.

The importance of the Belgian wintering haunts has increased rapidly during the last decade. As this has been reported only locally, this paper describes the main feeding areas of geese in Flanders and the

pattern of occurrence of White-fronted and Pink-footed Geese during six winters (1981–82 to 1986–87). The European importance of the Flemish wintering haunts of these geese is also discussed.

Material and Methods

Almost weekly simultaneous counts from the whole Oostkustpolders (the area near Brugge) are available. In the Antwerp region geese were counted mid-monthly between October and March. As the maximum numbers are often missed on these less frequent counts, interpretation of the data is less accurate. In north-east Flanders and the valley of the River Ijzer no coordinated counts were organised but the data collected by several individuals could be used to get an overall picture. From north-east Flanders only data since 1984–85 and mainly from the last two seasons are available.

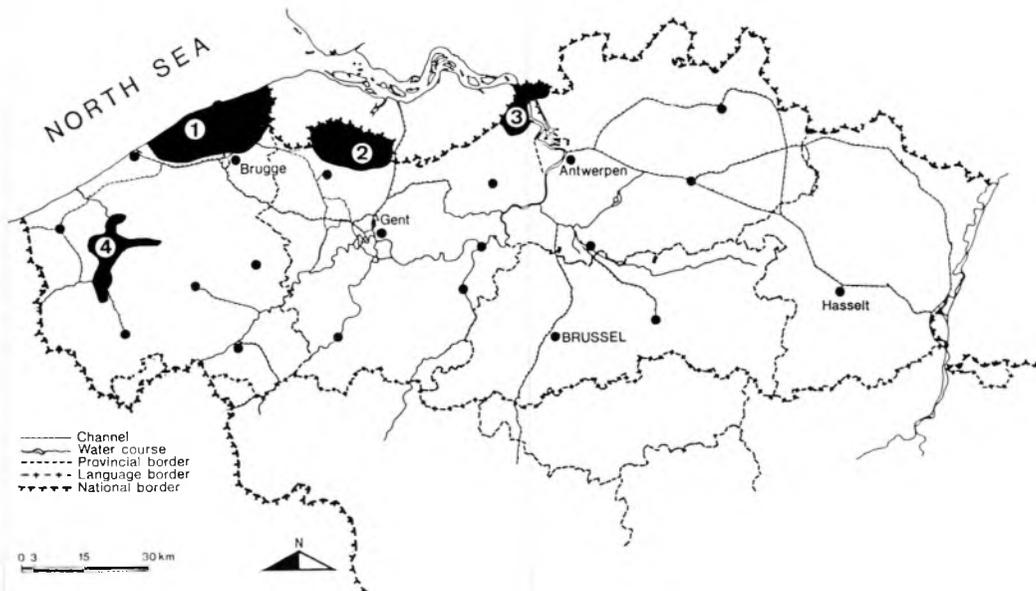


Figure 1. The main wintering areas of wild geese in Flanders (Belgium). 1 = Oostkustpolders; 2 = North-east Flanders; 3 = Ijzervallei; 4 = region near Antwerp.

Results

Wintering areas

Although geese were observed in many places in Flanders, most birds concentrate in four main wintering areas (Figure 1). Two of them, the Oostkustpolders and the region near Antwerp, have been used for some time, whereas the polders of north-east Flanders and the valley of the Ijzer are mainly frequented by geese in severe winters since they were "discovered" in the extreme winter of 1978–79. Then, probably more than 150,000 geese were present in Flanders.

The Oostkustpolders lie between Oostende, Brugge and the nature reserve: Het Zwin on the Belgian-Dutch border. The polder area near Damme is the traditional winter site (Kuijken 1969) from where the geese spread to the whole polder area in the course of the years (Figure 2) (Kuijken and Meire 1987). In a voluntary agreement with the local hunters no shooting has occurred since 1960 in an area of 450 hectares near Damme, from December onwards. The increase in numbers resulted in a high grazing pressure and risks of agricultural damage in the protected area. In an attempt to disperse the geese, a shooting ban in an

area of 3,000 hectares around Damme was officially declared in 1968–69, extended in 1971–72 to 6,250 hectares. Numbers stabilised and the birds dispersed, reducing agricultural complaints to a minimum. After the invasion of geese during the memorable winter 1978–79, numbers have increased, especially during severe winters. Due to a national ban on shooting geese since 1981–82 the birds are able to disperse over the whole country in search of suitable feeding grounds. At present, next to traditional sites at Damme the main wintering haunts are the polder Speyen near Brugge, the polders between Uitkerke, Nieuwmunster and Wenduine, the polders of Meetkerke and Houtave and the polders near Het Zwin. Secondary feeding places are the polders between Dudzele-Ramskapelle and Zeebrugge, between Oostkerke, Westkapelle and Hoeke and the polders near Vlissegem, Klemskerke, Stalhille and Jabbeke. This whole area is referred to as the Oostkustpolders. In total the area is about 30,000 hectares, of which mainly well established, permanent grasslands are preferred by the geese.

In this whole area the absence of evening flights is very remarkable. The birds stay during the night at the feeding grounds on grasslands. Part of the birds feeding in the

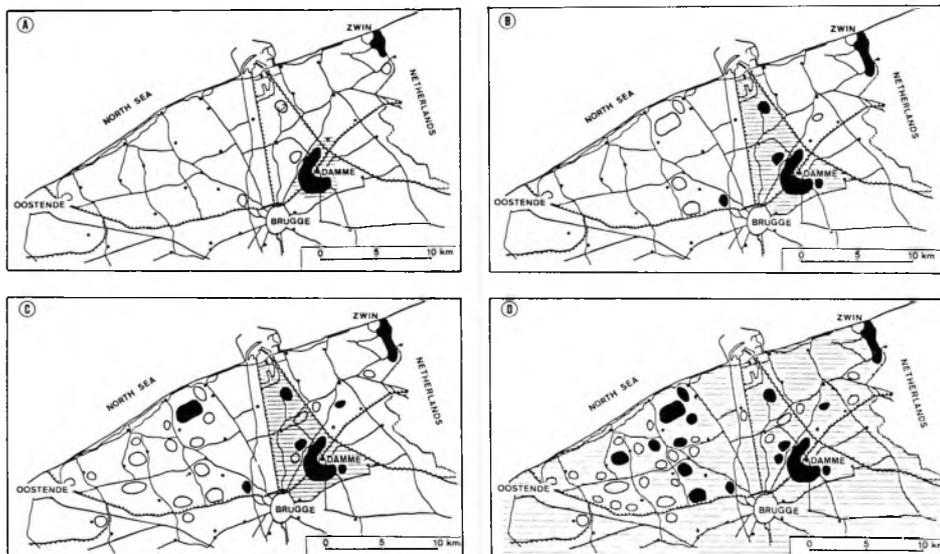


Figure 2. Map of the Oostkustpolders showing the distribution of wild geese during four periods. A = private local protection and local official shooting ban; B = regional shooting ban; C = regional shooting ban including severe winter 1978–79; D = national shooting ban. Hatched area: protected zone (shooting ban), dark areas: main wintering grounds, open circles: secondary feeding grounds.

vicinity of Het Zwin may roost there and on very rare occasions some groups fly to the Westerschelde, which was normal behaviour before 1965 (Suctens 1964).

The polder area along the River Schelde north of Antwerp is the second traditional wintering haunt for geese. Notwithstanding the huge expansion of the harbour of Antwerp, several parts of the major feeding areas are still available. On the left bank of the river, the most important feeding sites are the Arenberg-, Prosper- and Doelpolders and Het Paardeschor, a saltmarsh and polder area near Doel. They form in fact one complex with some Dutch sites, namely the Hedwigepolder and the extensive saltmarsh known as Het Verdrongen Land van Saaftinge. On the right bank of the river the feeding sites are the Kabeljouw polder, the

saltmarsh Het Groot Buitenschoor and the raised land of a BASF plant, all near Zandvliet. They form one complex with the feeding areas near Bath and Ossendrecht in the Netherlands. This area is referred to as the Antwerp region in this paper. In both parts grassland and arable land are visited by the geese.

Two other areas are used by geese since the invasion of 1978-79 and mainly during severe periods. In north-east Flanders the polders between Assenede and Watervliet and to a lesser extent pastureland between Assenede and Eeklo are involved. This area is referred to as NE Flanders. In the valley of the River Yzer the flood-prone wet grasslands in the surroundings of the Blank-aart between Diksmuide, Merkem, Lo-Reninge and Lampernisse, Schore-Leke

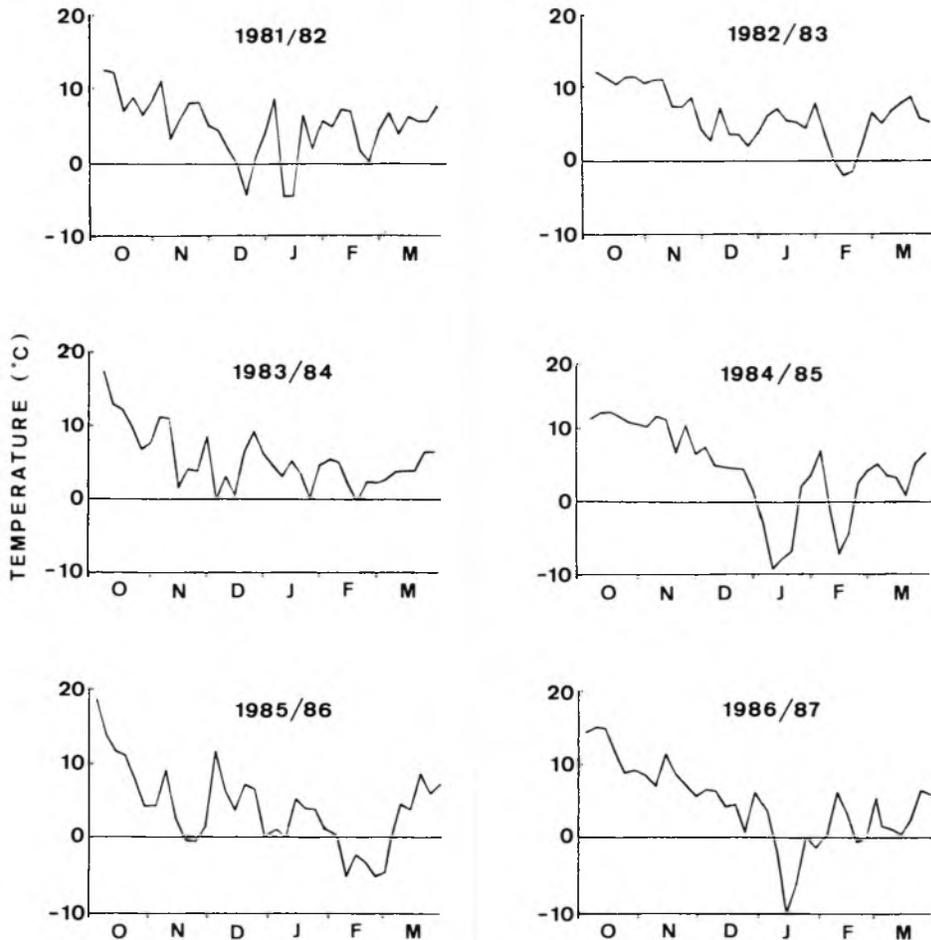


Figure 3. Average temperature (measured at Ukkel, Belgium) per ten day period for the winters 1981-82 to 1986-87.

and Handzame function as temporary feeding areas. This is referred to as the Ijzervallei.

To the east of Antwerp as far as the River Maas (which forms the Dutch-Belgian border) some small wintering spots of mainly Bean Geese (*A. fabalis fabalis*) are found in the Campine region. Little information on these sites is available and they are not discussed in this paper.

Winters 1982–83 to 1986–87

Weather conditions

The average temperature per five day period between October and March is illustrated in Figure 3. The winters 1981–82, 1984–85, 1985–86 and 1986–87 were severe, 1982–83 and 1983–84 rather mild.

During the season 1981–82 a first cold spell started already on 10 December and lasted until 23 December. Heavy snowfall was noted in most of Flanders (except the Ijzervallei) and in the Netherlands. During the second cold spell between 6 and 16 January again heavy snowfall was noted but now the Oostkustpolders were much less affected than the rest of Flanders.

The winter 1982–83 was rather mild with only a colder period between 8 and 22 February. Also 1983–84 was very mild, with a colder period November 18 and some frost but no snow between 13 and 21 February.

The winter 1984–85 was very mild until the end of December, when temperature fell below freezing at night. Just after New Year a cold spell, with minima of -20°C during the night and maxima of less than -10°C during the day, lasted for nearly 20 days. Heavy snowfall covered most feeding areas with up to 20 cm. The thaw set in on 21 January but on 9 February a second spell set in for another 10 days. Snowcover, however, was much less than in the previous period. After 22 February temperatures rose quickly.

In the second severe winter, 1985–86, two cold periods occurred, one in the second half of November and one at the end of December and the beginning of January. February was exceptionally cold with little snowcover.

Finally the winter 1986–87 was mild until 7 January when a cold spell started, lasting until 21 January. Snowcover was relatively important during the first week. The next month was milder with a cold period between 18 and 24 February.

Table 1. Numbers of White-fronted Geese in major wintering areas in Flanders during the winters 1981–82 to 1986–87. The mid-January count and the maximum numbers (and date) per area are given. 1 = Oostkustpolders; 2 = NE Flanders; 3 = Ijzervallei; 4 = Antwerp region.

		Area				Total
		1	2	3	4	
81–82	17/01	20935	?	4100	3158	28193
	max.	24446 (24/01)	?	7200 (10/01)	3158 (17/01)	
82–83	15/01	6210	?	0	1730	7940
	max.	6210 (15/01)	?	0	2558 (12/02)	
83–84	14/01	6331	?	0	1749	8080
	max.	6331 (14/01)	?	0	2570 (11/02)	
84–85	12/01	6400	1275	0	5528	13203
	max.	38261 (26/01)	3000 (25/01)	3625 (27/01)	5528 (12/01)	
85–86	12/01	54925	16774	3095	7841	85635
	max.	54925 (12/01)	16774 (12/01)	8810 (19/01)	7841 (11/01)	
86–87	17/01	16770	9960	30	3595	30355
	max.	26054 (24/01)	10500 (18/01)	2805 (19/01)	5000 (23/12)	

Species account

The peak numbers and the mid-January counts of each winter are given in Table 1 for the Whitefronts and in Table 2 for the Pinkfeet. For comparison with the Dutch data reference is made to Ganzenwerkgroep Nederland (1984) and Gazenwerkgroep Nederland/Belgie (1986, 1987).

White-fronted Goose

The Whitefront is the commonest goose in Flanders. The pattern of occurrence during the six winters is presented in Figure 4 for

Table 2. Numbers of Pink-footed Geese in the Oostkustpolders during six winters 1981-82 to 1986-87. The mid-January count and winter maxima (and date) are given.

Winter	Mid-January Count	Maximum Count No.	Date
81-82	5652	10852	02/01
82-83	3176	4104*	29/12
83-84	4537	7637	24/12
84-85	3632	9820	27/12
85-86	14680	14680	12/01
86-87	9776	12395	27/12

* 550 were present in the Ijzervallei.

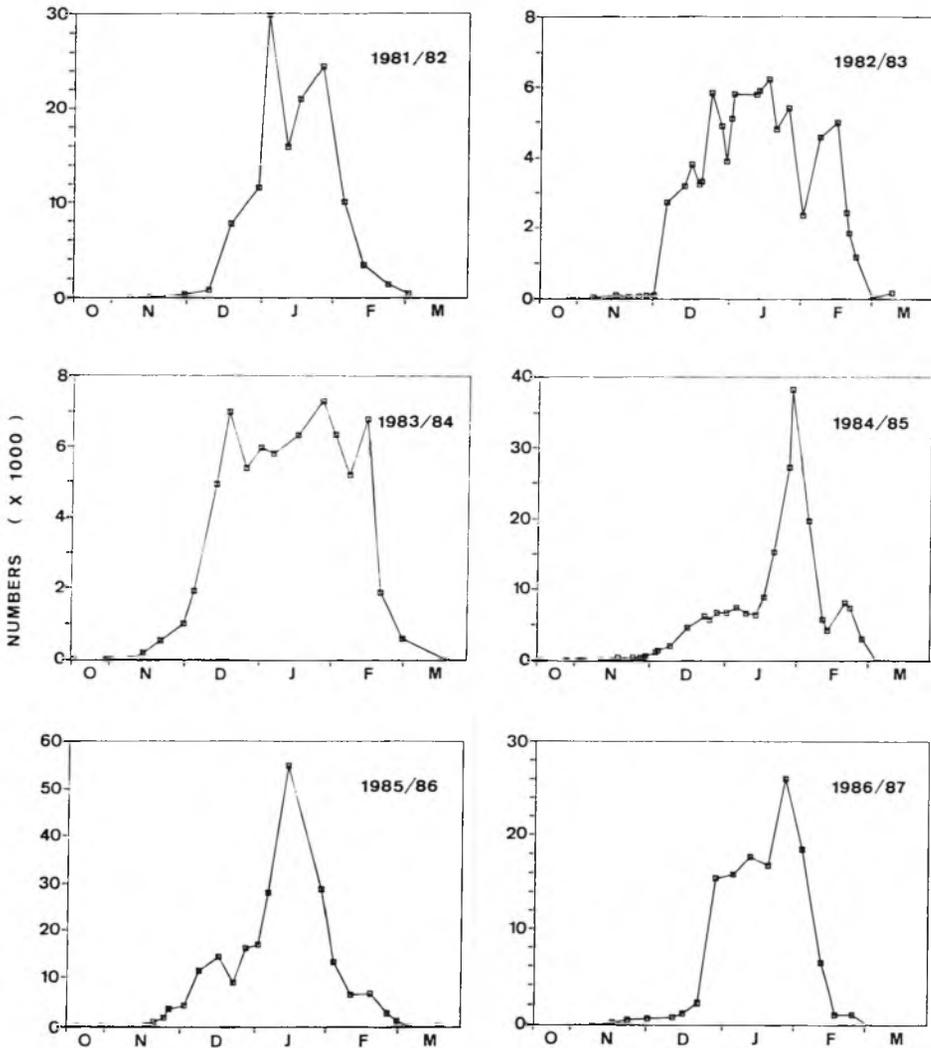


Figure 4. Pattern of occurrence of White-fronted Geese in the Oostkustpolders in the winters 1981-82 to 1986-87.

the Oostkustpolders. An average pattern of occurrence in the Oostkustpolders (Kuijken 1981) is that the first birds arrive by halfway through November, the numbers increase from mid-December onwards to reach the winter peak in mid-January after which birds start to leave, and most have gone by the end of February.

In 1981–82, during the early cold spell in December, most Whitefronts in the Netherlands occurred in the SW parts of the country. Correspondingly, in the Oostkustpolders numbers increased quite rapidly and the winter maximum of about 30,000 White-fronted Geese was reached on 2 January after which numbers declined. Probably many birds dispersed to the Ijzervallei as the winter maximum of 7,200 was reached there on 10 January corresponding with a dip in the numbers at the Oostkustpolders. As the numbers dropped in the Ijzervallei numbers increased again in the Oostkustpolders and peaked on 24 January after which the birds quickly left the whole area. In the Antwerp region the highest count was 3,158 birds on 17 January.

The occurrence of geese during the two mild winters, 1982–83 and 1983–84, corresponded very well to the average pattern. The winter maxima of 6,210 and 7,305 Whitefronts were low, notwithstanding the very high numbers (>300,000) counted in the Netherlands during these seasons. In the Antwerp region maxima in both years were ca. 2,500, but in the Ijzervallei and in NE Flanders no Whitefronts were seen at all.

In the winter 1984–85 the pattern of occurrence was very normal with nearly 9,000 birds on 15 January, despite a cold spell which started on 2 January. Most of the Netherlands was covered with snow. In the Antwerp area 5,528 were counted on 12 January. During a period of thaw, however, numbers rose very rapidly to 38,500 on 26 January. Simultaneously up to 3,721 birds were counted in the Ijzervallei. In NE Flanders rather low numbers (up to 1,500) were seen feeding but mass-migration was observed to the west (at least 6,000 on 27 January), indicating very intense movements from the Netherlands to Flanders. The birds, however, returned very quickly and even in the second cold spell the geese continued to leave Flanders. Few groups were present in the Ijzervallei. A small peak on 17 and 19 February in the Oostkustpolders suggested some spring passage.

In 1985–86, some cold days at the end of November had no obvious effect on the numbers of White-fronted Geese in the Oostkustpolders. They gradually increased to 14,300 birds in mid-December. This rather high count corresponds with the exceptional high numbers in the Netherlands (>273,000) at this time. In the first cold period starting 27 December numbers increased further and the winter maximum was reached on 12 January both in the Oostkustpolders (55,000), NE Flanders (16,800) and the Antwerp region (7,841). In the last area the numbers had been increasing from the beginning of December. By this time the first birds had also arrived in the Ijzervallei, reaching their winter maximum of 8,800 on 19 January. In the Netherlands no less than 394,000 Whitefronts were present. After these peak counts numbers dropped very rapidly in all sites. February was an extremely cold month but numbers continued to decrease quickly in Damme, which all birds had left by the end of February. To the contrary, in NE Flanders and the Ijzervallei numbers remained relatively high until the beginning of March, similar to the situation in the Netherlands. This could indicate a restricted carrying capacity of the main haunts at Damme in late winter.

In the season 1986–87 the numbers of Whitefronts remained very low in the Oostkustpolders until 20 December, followed by a rise to 15,500–17,000 birds between 27 December and 17 January. Peak numbers were reached in the Ijzervallei and NE Flanders on 19 January. In both areas, numbers decreased very quickly in the following week, whereas in the Oostkustpolders the winter maximum was reached only on 24 January with 26,000 Whitefronts. Numbers declined rapidly, only in the Ijzervallei a small second peak was observed on 7 February; all birds left by the second half of February.

Pink-footed Goose

The distribution of the Pink-footed Goose in Flanders is restricted to the Oostkustpolders. It is generally accepted that these birds belong to the Svalbard-population, wintering mainly in SW Friesland. The pattern of occurrence is given in Figure 5. Normally, birds arrive in the first week of November, peak in late December or early

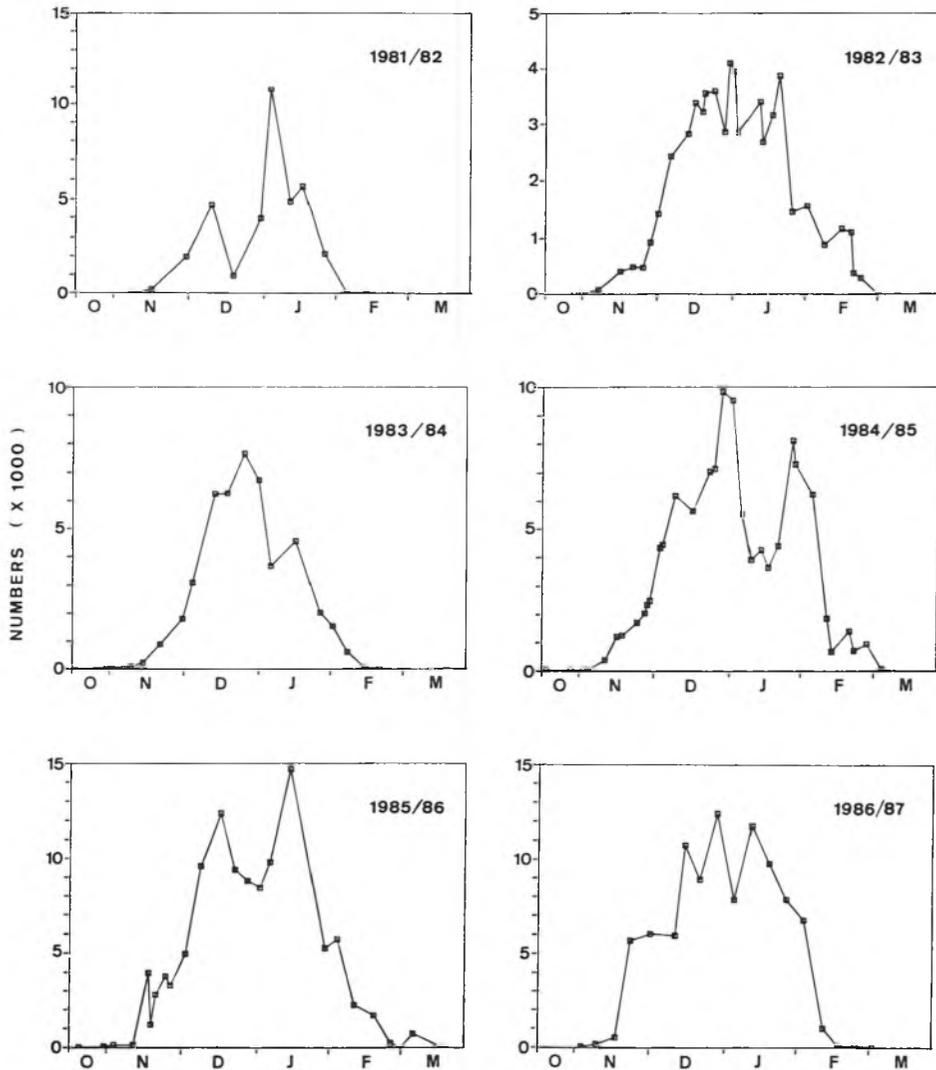


Figure 5. Pattern of occurrence of Pink-footed Geese in the Oostkustpolders in the winters 1981-82 to 1986-87.

January and leave the area before the end of February (Kuijken 1981). Weather conditions, especially snowcover, have pronounced effects on this pattern.

In 1981-82 an early cold spell in December caused the numbers to decrease quickly. Probably birds dispersed westward as several hundreds of Pinkfeet were observed in the Ijzervallei. Most of at least 10,000 left SW Friesland by mid-December, due to heavy snow cover, but they are not accounted for in our observations at that time (940 on 18 December). However, numbers increased again and the winter

maximum was reached in the beginning of January. At the mid-January count the total for the Oostkustpolders and SW Friesland was 17,122 birds, very similar to the maximum of 17,370 counted in SW Friesland on 15 November. Notwithstanding a second cold spell between 5 and 15 January numbers decreased rapidly and by the beginning of February most birds had left.

In 1982-83 and 1983-84 numbers followed approximately the average pattern; maxima were 4,100 on 29 December 1982 and 7,637 on 24 December 1983. Apart from 550 Pinkfeet in the Ijzervallei on 29

December 1982 no other geese were seen there during this season.

During the 1984–85 season numbers of Pink-footed Geese increased quickly and steadily to reach the winter maximum of 9,820 birds on 27 December. During the cold spell, with heavy snowfall, numbers decreased to 3,632 on 15 January. In SW Friesland only up to 1,260 birds were present at that time, indicating that the largest part (ca. 75%) of the population was staying in unknown areas! At the end of the cold period a second peak of 8,100 birds on 25 January was counted after which the geese left the area.

The hard winter 1985–86 showed a very similar pattern but numbers were much larger. On 15 December already a first peak of 12,360 birds occurred, after which numbers dropped to 8,500 by the end of the year. After the cold spell the maximum (a record) was 14,680 Pink-footed Geese on 12 January. As no birds were left in SW Friesland a substantial part of the population was again not counted. Notwithstanding the very cold weather in February numbers dropped quickly.

In the winter 1986–87 numbers rose very quickly to about 6,000 geese in the first half of December, when numbers went further up and showed three peaks of 10,750, 12,395 and 11,775 geese on respectively 14 and 27 December and 10 January. Notwithstanding two cold spells, most birds left by mid-February.

Not only is the distribution of the Pink-feet almost entirely restricted to the Oostkustpolders, even within this area they feed preferentially in some distinct sites, as if they avoid the large concentrations of Whitefronts. No evidence for competition between both species, feeding in the same habitat, has yet, however, been found.

Discussion

The European White-fronted Geese breeding in the Soviet Union have five distinct wintering areas (Phillipona 1972). The Baltic-North Sea population is the best known. During the autumn migration many birds stay in coastal areas of the German Democratic Republic (GDR) and to a lesser extent also in Schleswig-Holstein (Bauer and Glutz 1968). Depending on the weather conditions, 90% to 95% of the population stays in the Netherlands from

mid-December until the end of February. Smaller numbers winter in England (Owen *et al.* 1986), in the Federal Republic of Germany (FRG) (Mooij 1982) and in Belgium. France was of importance in very hard seasons (1955–56; 1962–63; 1978–79) and mainly before the protection in Belgium became effective but since then numbers there have been very low. As the population increased eightfold during the last 15 years new wintering haunts were explored. Not only in the Netherlands were many new sites used but also in the FDR, where especially the Niederrhein became very important in recent years (Mooij 1982; Ganzenwerkgroep Nederland/Belgie 1987). In Flanders the number of wintering birds increased especially in the Oostkustpolders. The growing importance of the Ijzervallei is probably dependent on that situation. The counts indicate an exchange between both sites, and especially when high numbers are present in the Oostkustpolders. The carrying capacity there is probably reached towards the end of the winter, when numbers increase in the Ijzervallei. Presumably the wintering haunts in NE Flanders have a similar function for birds wintering in Zeeuws-Vlaanderen in the Netherlands. In the Antwerp region some exchange of geese with Dutch sites also exists. Very remarkable, however, is the fact that both in NE Flanders, the Ijzervallei and in the entire valley of the Schelde on some days very intense SW migration of geese is seen, often Greylag, but also many thousands of Whitefronts. Probably these birds go to France for a short while or stay in unknown places in Belgium. In the Oostkustpolders most Whitefronts leave by mid-February, whereas in the other Flemish wintering haunts some lower numbers stay until the beginning of March. By mid-March most birds have left the Netherlands as well. This early departure can indicate the limited carrying capacity of the traditional feeding grounds of the Oostkustpolders. This may also indicate that these geese are in good body condition, probably as a result of protection (no disturbance by shooting, selection of optimal feeding sites).

Surprisingly very little recent information on habitat selection and distribution is available. Is there any exchange between the different populations of Whitefronts in Europe, are there any changes in the habitat selection? Obviously many questions

remain to be answered.

The Svalbard population of Pinkfeet has increased considerably during the last 30 years. From 1931 to about 1959 the population was less than 10,000 birds. From about 1959 to 1961 the population level rose to 15,000–18,000 birds, in 1978 to 1980 the population increased further to 27,000–29,000 and it has since stabilised around 25,000 birds (Madsen 1982, 1984, 1987). The winter distribution of the species has also changed considerably. On autumn migration birds may stop for a short time on Bear Island (M. Owen pers. comm.) or Nordland (Madsen 1987) but arrive from mid-September onwards in Denmark, where the whole population may be concentrated in a few sites by mid-October. Changes in the farming practice in Filso since 1981 causes many geese to move on directly to the Netherlands, flying across the North Sea, and thus by-passing the FRG (Madsen 1987). Previously the FRG was an important wintering area but draining, ploughing up pastures, increasing tourist and hunting activities caused the numbers of Pink-footed Geese to decrease dramatically (Prokosch 1984). Since the severely cold winter of 1955–56, SW Friesland became a very important wintering area (Lebrét *et al.* 1975; Ganzenwerkgroep Nederland 1984; Ganzenwerkgroep Nederland/Belgie 1986, 1987). As a result of the disturbance in Denmark, in recent years birds arrive earlier and numbers increase quickly from October onwards. Also in the area near Damme, the southernmost wintering haunt, the tendency for earlier arrival has been noted since 1981. Early records of this wintering haunt are scarce, but Lippens (1963) gives shooting records from Knokke since 1936. Regular counts in the area near Damme started in the winter 1959–60. The average winter peak up to the winter 1972–73 was about 570 birds. After 1973–74 numbers have increased steadily, especially after the very cold winters 1978–79 and 1981–82. In recent winters up to 12,000–14,000 Pink-footed Geese were present, a twentyfold increase in numbers, much more than the threefold increase of the Svalbard population.

The mid-winter distribution of this species remains rather puzzling. As long as daily mean temperature remain below freezing only few Pink-footed Geese winter in Denmark. Depending on weather conditions most birds concentrate in SW Fries-

land and Flanders. Schilperoord (1984), however, showed that during the whole winter considerable numbers of Pink-footed Geese must stay in unknown places. The data presented in the present paper further confirms that at certain times more than half of the population is not counted. The discrepancy between the counts shows up in two ways. Firstly, during most of the winter, numbers in Denmark, the Netherlands and Belgium are much lower than the peak numbers in autumn and spring in Denmark. Secondly, on some occasions during the winter a large proportion of the birds in SW Friesland and Belgium can be lost for a short time. Several explanations are possible. Counts in Denmark could be somewhat overestimated as a result of large concentrations, a number of Pinkfeet may 'disappear' among the far more numerous White-fronted Geese (Ebbinge *et al.* 1984), birds may visit unknown places or migrate to the Wash in England (Ganzenwerkgroep Nederland/Belgie 1987). The first two explanations are less realistic. The Wash is indeed an important wintering haunt for Pinkfeet (Owen *et al.* 1986) but the analysis of ringing recoveries shows a migration towards France in cold periods (Holgersen 1958) and a very limited exchange between the continent and Great Britain (Ebbinge *et al.* 1984). Lippens (1963), however, mentioned that when there is bad weather in SE England he several times observed groups of Pinkfeet coming from over the sea and flying NE along the Belgian coast, so some exchange could occur. This species seems indeed to be very mobile.

Spring migration starts quite early. By mid-February most birds leave the Oostkustpolders as well as SW Friesland and from the end of March to the beginning of May the whole population is concentrated in Denmark. Rodenäs-Vorland (FRG) and Hojer (Denmark) used to be very important in spring but after circa 1,700 ha of littoral habitat were reclaimed in 1979 Pinkfeet numbers dropped sharply (Prokosch 1984; Madsen 1987). From Denmark birds move on to some islands in Norland where probably the entire population stops for 3–5 days (Rikardsen 1982). From here the geese probably fly immediately to Svalbard (Madsen 1987).

The present importance of Flanders, and especially the Oostkustpolder, for wintering geese is most probably due to protection (shooting ban). Disturbance is indeed

found to be a very important factor influencing the distribution of geese (Owen 1973; Madsen 1985). Forshaw (1983) attributed the considerable increase in numbers of Pinkfeet in Lancashire also to a combination of protection measures.

The presence of 30 to 50% of the Svalbard Pinkfeet population in the Flemish polder area illustrates the great responsibility of preserving the appropriate feeding grounds. As a result of European agricultural policy, old seminatural grasslands in particular have been improved by drainage or converted into arable land. This will have direct consequences, especially for the Pinkfeet, but also for many other species of meadowbirds and wildlife in general.

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Summary

This paper deals with the numbers of Whitefronts *Anser albifrons* and Pinkfeet *A. brachyrhynchus* wintering in Flanders (Belgium) during the period 1981–87. Four important wintering haunts are described. The Oostkustpolders and the Antwerp region are visited each winter by geese, whereas the Ijzervallei and NE Flanders, both discovered by the geese during the very severe winter 1978–79, are used only during severe winters. The dispersion of geese in the Oostkustpolders during the last 25 years in relation to protection measures is examined. The pattern of occurrence of both species is discussed in relation to weather conditions and the West European population distribution. Up to 86,000 Whitefronts and nearly 15,000 Pinkfeet were the maxima counted. Nearly every winter a substantial part of the Pinkfeet population is not accounted for in the counts. Keeping disturbance as low as possible is necessary to secure the value of wintering haunts for geese.

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