

## Changes in field choice among staging and wintering geese in southwestern Scania, south Sweden

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### Abstract

Field choice of staging and wintering geese were regularly noted during the International Goose Counts in south-west Scania, South Sweden, since the start in 1977/78. Marked changes in the selection of field types was noted during the autumn counts. When the counts started sugar beet fields were important for *Anser fabalis* during late autumn, whereas *Anser albifrons*, *Branta canadensis* and the few staging *Branta leucopsis* mainly used autumn-sown cereals and grassland, and the few observed *Anser anser* fed on stubbles. During the study period all species changed to

feed on sugar beet remains during autumn, and this was the preferred food for all species in recent years; *B. canadensis* and *A. anser* changed around 1988–1990, whereas the two smaller species *A. albifrons* and *B. leucopsis* changed later. In winter, most remaining geese used winter-cereals, grassland and in later years winter rape.

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### Introduction

Most goose populations in Sweden, similar to other parts of Europe, have increased markedly in recent decades (Nilsson 1988, 2000, Madsen et al. 1999). Contemporaneously marked shifts in the distribution of a number of goose populations have been established (Nilsson & Persson 1984, 1991, Nilsson 1988, 2000, Nilsson et al. 1999a, 1999b). These shifts were largely related to changes in agriculture, but also to changes in hunting practices (Nilsson & Persson 1984, 1991, Nilsson 2000).

Field choice of staging and wintering geese in south Sweden has been intensively studied from time to time, making it possible to establish changes in the utilization of Swedish farmland since the late 1950ies (Markgren 1963, Mellquist & Nilsson 1968, Nilsson & Persson 1984, 1991, 1992, 1998). Markgren (1963) studied field choice and habitat selection of staging and wintering geese in Scania, southernmost Sweden during 1956/57–1958/59, whereas intensive studies of these aspects in the same area during 1977/78–1986/87 were undertaken by Nilsson & Persson (1984, 1991).

Since the start of the International Goose Counts

in Sweden in 1977/78 (Nilsson 1988, 2000), field choice of staging and wintering geese has regularly been recorded in connection with the counts. Methods used in these counts are described by Nilsson (1988, 2000). In this paper, we analyse the field choice of staging and wintering geese in south-west Scania based on the counts in mid October, November and January, from 1977/78 to 1999/2000. The field choice of the Greylag Goose in south-west Scania has previously been described by Nilsson & Persson (1992, 1998), but have been included here for comparison with the other species.

### Material and study area

The study was undertaken in south-west Scania, where counts covered all areas of potential importance for the geese at the time of counting. The area and the goose habitats have been described in detail in several of the studies cited above; see especially Nilsson & Persson (1984, 1991), where maps of roosts and feeding areas can be found.

South-west Scania is an agricultural district with large fields in an often rolling landscape, with a number of small lakes and shallow coastal areas that

serve as night-time roosts for the geese. The soils are mostly heavy clay, but sandy soils prevail in some important goose areas. The main crops are cereals, rape and sugar beet. An increasing proportion of the cereals are autumn-sown providing winter food for the geese. Most of the rape is also autumn-sown. On the sandy areas crops like potatoes and carrots are common. Pastures occur close to some of the lakes and along the coast.

At the October count, stubble fields were still available to a large extent. In some years, the sugar beet harvest had started. In November, the stubble fields are mostly ploughed or of little value for the geese. Harvested sugar beet and in some areas carrot and potato crops offer extensive feeding areas for the geese, together with sprouting autumn-sown cereals. In January, available field types are winter cereals, winter rape and permanent grassland. Sometimes, in mild winters, a few fields of sugar beet remain unploughed.

## Results

Field choice of the different species is presented in graphs showing the percentage of individuals counted on different field types, for the autumn (October + November counts) and winter (January count), separately (Figure 1).

The Greylag Goose *Anser anser* was too rare during the first six years of the study to provide any reliable data on the field choice in October – November, as most individuals already had left south-west Scania. With the exception of 1984, when relatively few individuals were counted, most foraging Greylag Geese before 1988 were found on stubbles or cereals (sprouting wheat). Stubble fields were also the main field type used before departure in autumn during the first years of the intensive Greylag Goose studies in SW Scania (Nilsson & Persson 1992). From 1988 onwards the absolute majority of the Greylag Geese were feeding in harvested sugar beet fields. In January, the numbers were low and most individuals were recorded in flocks of other species on winter wheat.

Already from the first years of the study, the Taiga Bean Goose *Anser fabalis* was to a large extent feeding on harvested sugar beet during autumn, but other field types such as stubbles and autumn-sown cereals were also important. In some years, a number of Taiga Bean Geese was found in harvested potatoe fields, this proportion to a large extent being dependent on the local distribution of the goose flocks, as potatoe were common only in two of the

goose areas. During the first part of the study period, the proportion found on sugar beet was roughly around 40%, whereas between 60 and 70% of the geese were recorded on sugar beet during the latter part of the period. In January, the picture for the Taiga Bean Goose was more varied due to different winter situations. With the exception of the last few winters (after 1993), winter cereals dominated markedly in most years. In the last four years with sufficient data, the weather was mild and root crops, potatoe and a number of other field types were more important than winter wheat.

During the first years of the study, White-fronted Geese *Anser albifrons* were to a large extent restricted to autumn-sown cereals and grassland, both during autumn and winter, even if a number of individuals was seen in green (sprouting) stubble fields in some years. Smaller numbers were found on sugar beet, mostly in mixed flocks with Bean Geese. During 1986 – 1990, autumn-sown cereals and grassland were still the predominantly used field types, but an increasing proportion of the White-fronted Geese were found on sugar beet, now also appearing in large species-homogenous flocks. Since then, in most years there was a marked dominance for sugar beet feeding. In winter, grassland, winter cereals and stubbles (green sprouting) were the dominating field types used in all years; we hardly observed any White-fronted Geese feeding on sugar beets.

The Canada Goose *Branta canadensis* was mainly a grazer, predominantly on autumn-sown cereals during October and November up to 1989, although about 20% of the individuals were found on sugar beet. From 1990 there was a marked change in the feeding habits of the Canada Geese, the majority in all years except 1994 found on sugar beet. In January, the Canada Geese remained grazing, up to 1986 using winter cereals and (in one year) grassland. During the cold winter of 1987, the cereals were unavailable due to snow cover and the geese were mainly feeding on rape. Similarly, in 1988 and 1989 many were feeding on rape, but in 1990 all used winter cereals. In contrast to the situation in the 1980ies, in the 1990ies the majority of Canada Geese were found feeding on winter rape.

When the study started, the number of Barnacle Geese *Branta leucopsis* staging in Scania was generally low. The majority was found on autumn-sown cereals and grasslands or, in some years, in green stubble fields. In later years, much larger numbers of Barnacle Geese have been staging in Scania in late autumn. During the same period, there was a shift in the field choice and large flocks of

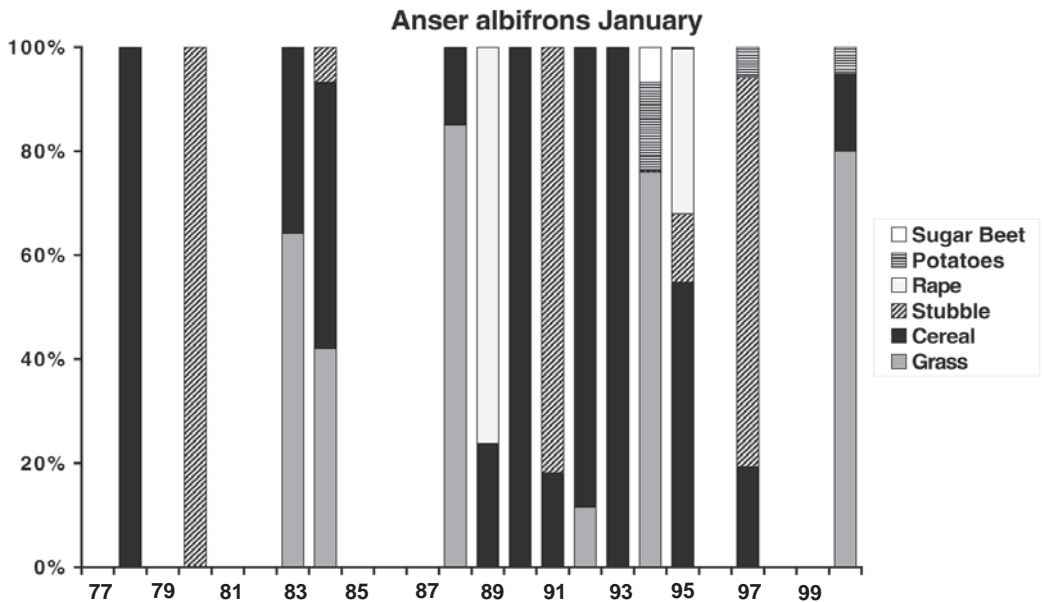
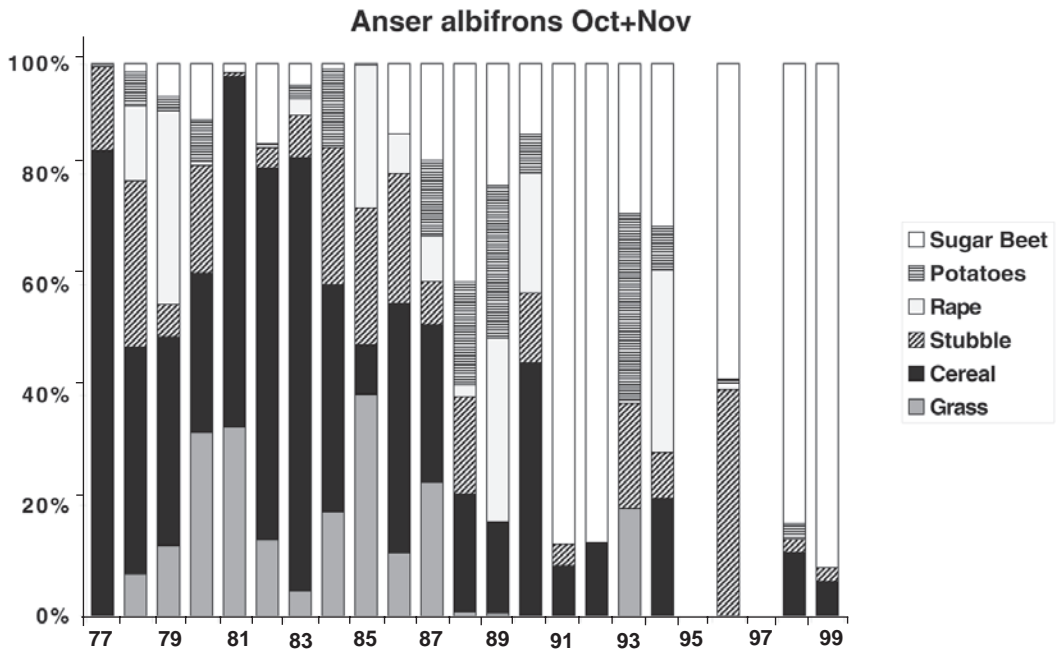
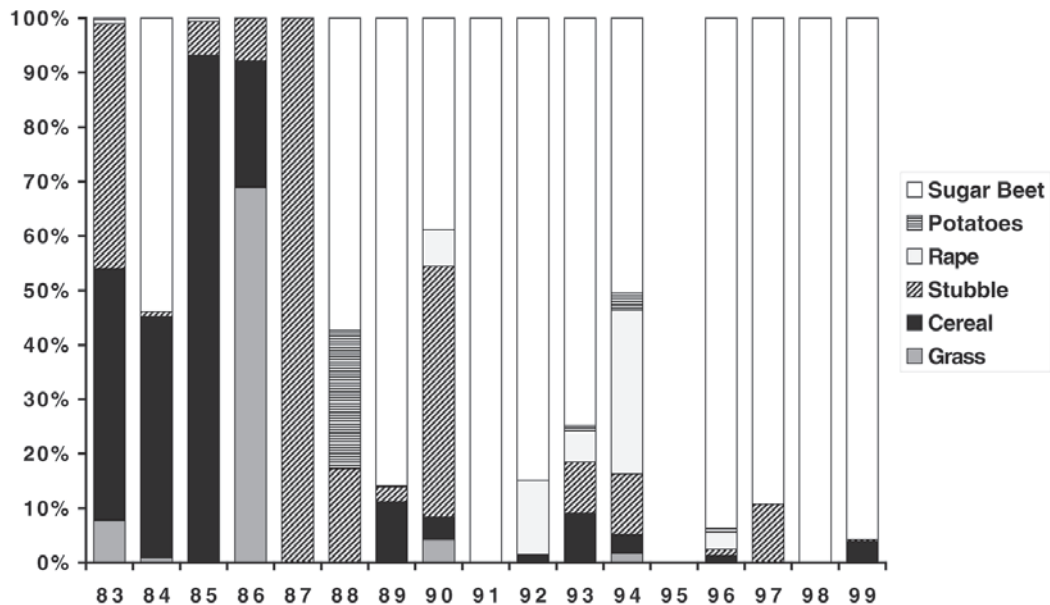


Figure 1. Percentage of geese of different species counted on the main field types in SW Scania during autumn (October+November) and winter (January), 1977/1978 to 1999/2000. Total numbers included in sample (mean±se) (*stickprovets storlek (medelvärde±standardfel)*): *Anser albifrons* Oct–Nov 7274±68, Jan 941±10; *Anser anser* Oct–Nov 5594±45; *Anser fabalis* Oct–Nov 18254±71, Jan 6279±30; *Branta canadensis* Oct–Nov 2577±37, Jan 3303±24; *Branta leucopsis* Oct–Nov 534±269.

Procentfördelning av de räknade gässen på de viktigaste fälttyperna i SV Skåne under hösten (oktober+november) och vintern (januari) 1977/1978 – 1999/2000.

### Anser anser Oct+Nov



### Anser fabalis Oct+Nov

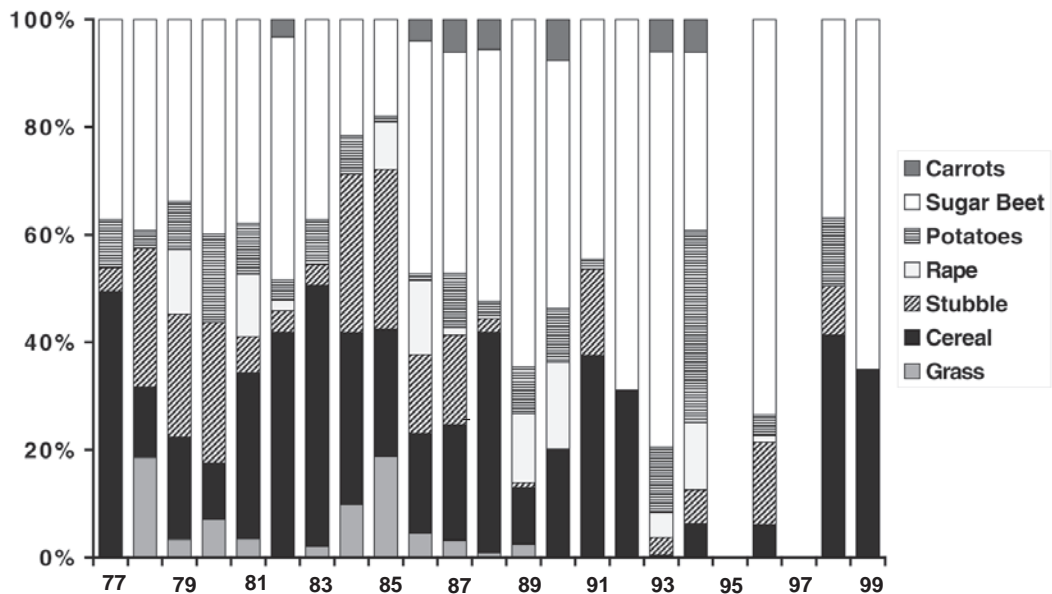


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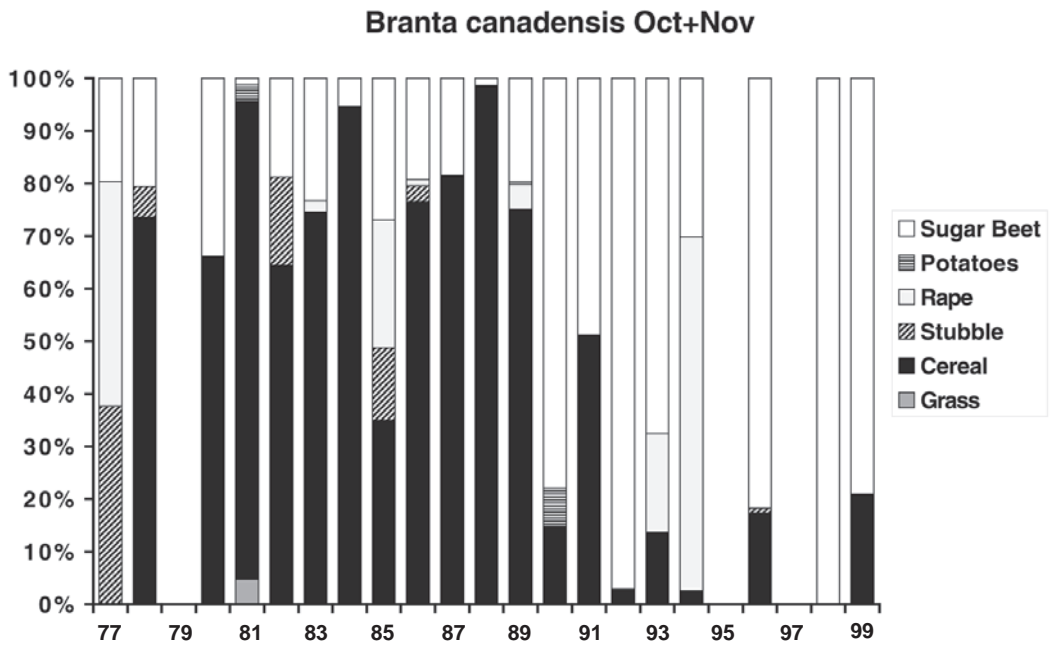
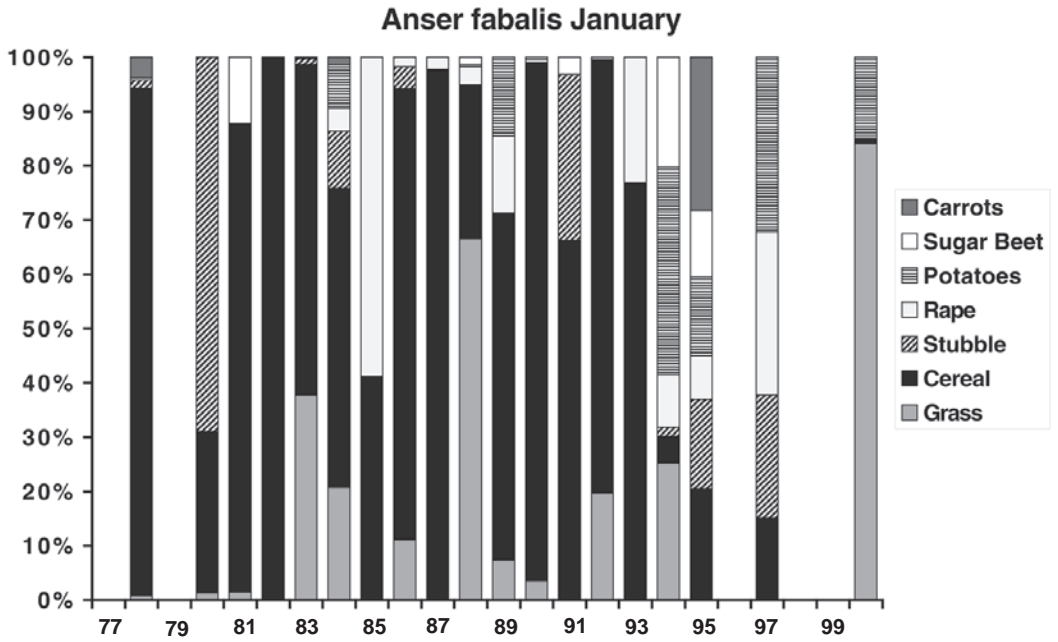
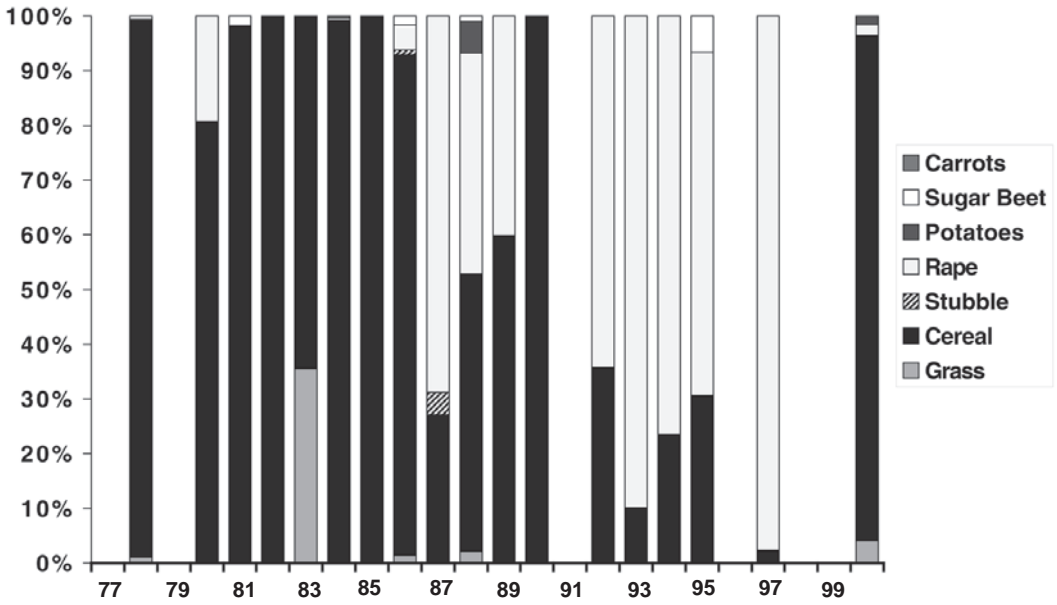


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### Branta canadensis January



### Branta leucopsis Oct+Nov

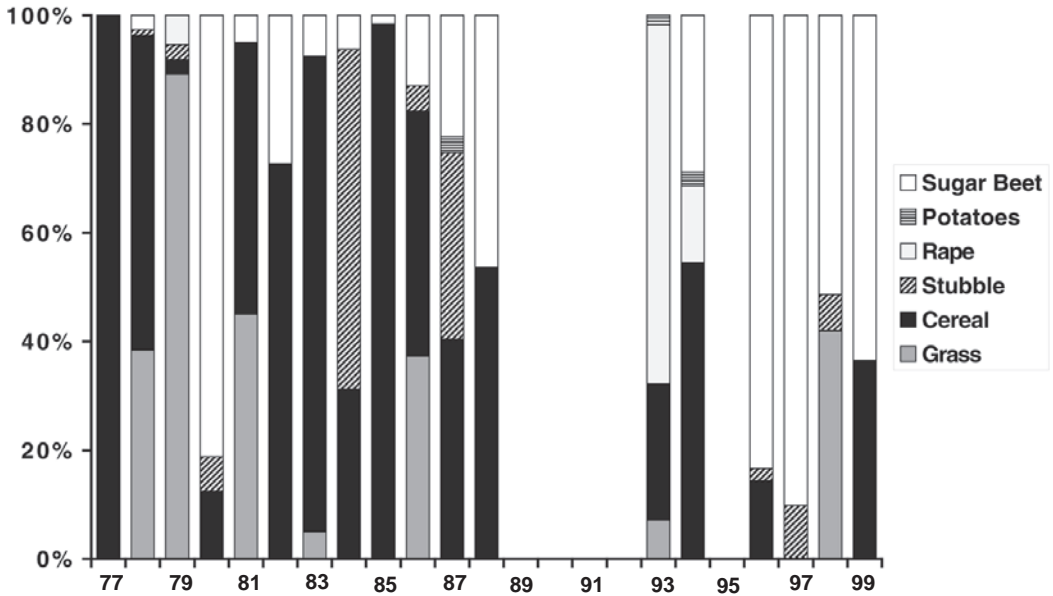


Figure 1 continued. *Figur 1 fortsättning.*

Barnacle Geese were feeding in harvested sugar beet fields.

## Discussion

The results presented above for autumn might be slightly biased, due to the way the data were obtained. When disturbed while feeding on sugar beet remains, the geese usually seek refuge in a stubble or on a field with an autumn-sown crop. In the middle of the day, they might remain long before returning to the sugar beet field, behaving in a way similar to that at a day-roost in early autumn (Nilsson & Persson 1992). Meanwhile, the geese might have been noted for the field type of the refuge, even though almost all food that day consisted of sugar beet remains. For that reason, percentages for sugar beet should be regarded as minimum values, while those for stubble, cereals and rape should be regarded as maximum values.

Whenever large undisturbed harvested sugar beet fields were available in the study area in later years, all five species considered here, as well as the Tundra Bean Goose *Anser serrirostris rossicus*, manifested an almost exclusive preference for this field type. At Trolle-Ljungby, in the north-eastern part of the province, on the other hand, where both sugar beet and potatoes are grown to a large extent, a similar high preference was found for these field types combined (Hakon Persson unpublished data).

The different goose species show a number of morphological adaptations, especially in the bill, that are related to their main food types (e.g. Owen 1980; see also Nilsson & Persson 1991 for further references on field choice of these species in South Sweden). As many species share the same type of feeding areas during the breeding season, Owen (1980) thought that the main differentiation in bill morphology was related to the winter situation, with the larger geese, such as the Baltic Greylag Goose and larger races of the Canada Goose, more adapted to digging, whereas the smaller species, like the White-fronted Goose and the Barnacle Goose, were more adapted to grazing.

Nowadays, most species of geese do not longer feed in their natural winter habitat but have changed to agricultural areas, even if some Greylag Geese still feed on *Scirpus* tubers (Nilsson et al. 1999b). In the agricultural areas, the geese first turned to crops similar to their natural food but gradually learned to take advantage of various crop types rich in energy.

In some areas, the geese started to use different energy-rich crops early on, and already Kear (1963) could compile information on the history of potato-

feeding among British Wildfowl. When staging geese in Sweden started to use energy-rich root crops and potatoes for feeding during the autumn is not known. When Markgren (1963) in the late 1950ies studied the feeding habits of Bean Goose and to some extent White-fronted Goose in our study area, he did not mention sugar beet or potatoes among the food types used, whereas the habit of using these food sources was well established among the Taiga Bean Geese when we started our counts in 1977/78 (Nilsson & Persson 1984). In 1965, Mellquist & Nilsson (1968) found a strong preference for potato fields among Bean Geese in late autumn, but there were no sugar beet fields in their study area.

Since 1977 there has been a marked change in the field choice of the other common goose species in Scania, to use the energy-rich remains after the sugar beet harvest to a larger and larger extent. The Canada Goose used sugar beet to some extent during the entire period, but it became the dominant food from 1990. The Greylag Goose started to use sugar beet to any extent in 1988, and with the exception of one or two years, this food has been predominating in late autumn since then. For this species, the histogram based on the mid-monthly counts is a bit misleading as sugar beet dominated also in 1990 and 1994 with the exception of some days just around the count.

The smaller goose species, the typical grazers according to Owen (1980), were a little later to adapt to sugar beet feeding in late autumn. Smaller numbers of White-fronted Geese in flocks of Taiga Bean Geese were found on sugar beet earlier, but from 1991 it was the main food in late autumn in most years. The Barnacle Goose was the last to adapt to this field type, and it has only occurred in larger flocks on such fields in the last few years.

The adoption of new feeding habits by geese in the agricultural areas have been different in different countries. Sugar beet feeding by Greylag Geese was a well established habit in the Netherlands long before the geese started to use this crop in Sweden (Ouweneel 1981, Dubbeldam & Poorter 1982, Voslamber 1989). Similarly, although grassland and cereals was the main field type used in most countries by White-fronted Geese, sugar beet feeding was mentioned for this species already by Philippona (1972).

The change in field choice to a higher utilisation of root crops should probably be seen in relation to the need to build up reserves during autumn (Raveling 1979). Sugar beet remain that is rich in starch is probably of high value in this respect.

In contrast to the situation in autumn, changes in

field choice among wintering geese were not as marked. This may be explained by the fact that after ploughing root crop (and potato) fields, the field choice becomes more limited. The field choice in January is, however, a good illustration of how rapidly the geese can adapt to a new food source. Winter rape has long been available in the study area, but it has mainly been used in very cold winters when other food sources were covered by snow. The restricted use of winter rape is most certainly an effect of secondary metabolites that can make this crop less palatable to wildlife (cf. Buchsbaum et al. 1984). Recently, a new more palatable variety of rape lacking an alkaloid has been brought into use, and this probably explains the high preference for rape by Canada Geese in the last few winters.

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## Sammanfattning

*Förändringar i fältval hos rastande och övervintrande gäss i sydvästra Skåne*

Gåsbestånden i Sverige liksom i övriga Europa har ökat markant under de senaste årtiondena, vilket bl.a. konstaterats i samband med de internationella gåsinventeringarna (Nilsson 2000). Samtidigt som gässen ökat i antal har deras utbredning ändrats markant. Förändringarna anses i betydande utsträckning bero på förändringar i jordbruket, men jaktförhållandena torde också vara av betydelse (Nilsson & Persson 1984, 1991, Nilsson 2000).

Sedan starten av inventeringarna 1977/78 har gässens fältval registrerats regelbundet i sydvästra Skåne, även om det finns luckor i täckningen vissa år. I denna uppsats behandlar vi fältvalet hos de rastande och övervintrande gässen i SV Skåne baserat på inventeringarna i oktober, november och januari. Grågåsen har tidigare behandlats utförligt i ett par arbeten (Nilsson & Persson 1992, 1998), men har innefattats i studier för en jämförelse med de andra arterna.

Sydvästra Skåne är ett jordbrukslandskap kännetecknat av flera småsjöar och grunda havsområden som är lämpliga viloplats för gässen. De viktigaste grödorna är spannmål, raps och sockerbetor, medan morötter och potatis odlas inom vissa mindre områ-



den med sandjord. En ökande andel av spannmålen sås under hösten, vilket ger gässen god tillgång på vinterföda. Rapsen sås också som regel under hösten. Dessutom förekommer en del betesmarker, främst nära kusterna.

Vid oktoberinventeringen finns normalt fortfarande en hel del spannmåls-stubbåkrar, vilka dock i november är av föga värde för gässen och ofta dessutom har plöjts. Vissa år har betskörden påbörjats före oktoberinventeringen, men i november är merparten av betfälten skördade och ger gässen goda födosökmöjligheter tillsammans med de nysådda sådesfälten. I januari är höstsäd och raps de viktigaste fälttyperna, men vissa milda vintrar finns en del oplöjda betfält kvar.

Gässens fältval sammanfattas i Fig. 1. Grågåsen rastade endast i mindre antal i Skåne i oktober/november när inventeringarna började och sågs då mest på stubbåkrarna. Samtidigt som arten har ökat i antal stannar den längre in på höstarna och utnyttjar nu i huvudsak betfälten för sitt näringsök under oktober och november innan de lämnar landet.

Redan när studierna påbörjades på 1970-talet åt sädgässen i betydande utsträckning rester av skördade sockerbetor under hösten, även om andra typer av fält också utnyttjades. Under vintern har sädgåsens födoval varierat beroende på väderleken, men gräs- och höstsäd har varit viktiga födoplatser.

Under de första åren var blåsgåsen i stort sett bunden till höstsäd och gräsmark både under hösten och vintern, även om enstaka blåsgäss sågs tillsammans med sädgåsflockarna på sockerbetsfält. Under undersökningsperioden skedde en markant förändring i blåsgåsens fältval och de senaste höstarna utgör betfälten den klart mest prefererade typen av fält under hösten, medan det inte skett någon förändring i valet av fält under vintern.

De första åren var också kanadagåsen i huvudsak en betande art, som utnyttjade höstsäd under höst och vinter. Under vintern utnyttjade kanadagässen också i betydande utsträckning raps, speciellt under snörika vintrar när höstsäden ej var tillgänglig. Även här har en markant förändring skett och de flesta kanadagässen söker numera föda på betfälten under hösten. Vintertid har en betydande andel av kanada-

gässen gått över till att söka föda på raps sedan mer smakliga varianter börjat odlas.

När inventeringarna startade var den vitkindade gåsen en sparsamt förekommande rastare i Skåne, vilken i huvudsak noterades på höstsäd eller gräs- mark. Under senare år har arten börjat rasta i allt större utsträckning i Skåne och samtidigt har även denna art börjat utnyttja betfälten.

Den bild inventeringarna ger av gässens fältval kan vara något påverkad av metodiken. Störda gäss lämnar ofta sockerbetsfält och slår ner på höstsäd eller raps och kan komma att registreras för denna fälttyp. Betorna är därför särskilt under hösten underrepresenterade i diagrammen, medan höstsäd och raps kan vara något överrepresenterade.

Under senare år visar samtliga här studerade arter en markant preferens för sockerbetor när större ostörda fält med skördade betor finns tillgängliga i området. De olika arterna har dock börjat utnyttja denna rika födokälla vid olika tidpunkter. I SV Skåne hade sädgässen redan börjat utnyttja sockerbetor när undersökningarna började, men denna födokälla nämns inte i Markgrens (1963) studier i slutet av 1950-talet. Vissa kanadagäss sökte föda på betfält redan tidigt, men betor blev en dominerande födokälla för arten först kring 1990, medan grågåsen började utnyttja betorna något tidigare. Sist att utnyttja sockerbetor var blåsgåsen och den vitkindade gåsen, vilka är de mest utpräglade betarna.

De olika gåsararterna (och underarterna) visar ett antal morfologiska anpassningar, särskilt i näbbens form, för de viktigaste födotyperna (Owen 1980, se också Nilsson & Persson 1991 för ytterligare referenser). De större arterna såsom grågås och de större raserna av kanadagäss (bl.a. de som inplanterats till Sverige) är mer anpassade till att gräva efter rötter, medan de mindre arterna såsom vitkindad gås och blåsgås är mer anpassade till att beta gräs. Numera finns knappast några naturliga furageringsområden för gässen i Europa under vintern även om vissa grågäss fortfarande utnyttjar *Scirpus*-rötter (Nilsson et al 1999b). Istället söker de allra flesta övervintrande gäss, inklusive de i sydvästra Skåne, sin föda i jordbrukslandskapet.