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# Wintering of Finnish Taiga Geese *Anser f. fabalis* in Skåne, South Sweden: time-budget differences among age groups

*Övervintring av finska taigagäss* Anser fabalis fabalis *i Skåne: skillnader i tidsbudget mellan olika åldersgrupper*

HAKON KAMPE-PERSSON

**Abstract**

European Taiga Geese *Anser fabalis fabalis*, wintering in Skåne, South Sweden, were studied while grazing winter wheat seedlings. The activities of individually marked birds were continuously observed from the time they left their night roost in the morning until they returned in the evening. Each time the bird changed from one activity to another, the change was noted on a continuously running cassette tape recorder. In autumn and early spring, adults allocated an average of 40% of their time to grazing, 27% to staying alert, and 25% to resting/sleeping. In winter, adults increased the proportion of the day devoted to grazing to 52%, whereas the time spent staying alert decreased correspondingly. Adults, subadults, and juveniles devoted similar proportions of the average day to grazing in winter, whereas juveniles spent less time staying alert and more time to resting/sleeping compared with adults. In autumn and winter, the geese grazed 4.0–4.1 hours/day.

*Hakon Kampe-Persson, Department of Animal Ecology, Ecology Building, SE-223 62 Lund, Sweden.*
*E-mail: kampepersson@hotmail.com*

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## Introduction

In Northern Europe (for delineation of this region, see Hallanaro & Pylvänäinen 2002), winter is a bottle-neck for many birds, residents and winter guests from breeding areas further north alike. Winterly hardships are caused by a set of factors: plant growth ceases, insects become less numerous and harder to find, food sources are frequently made unavailable by snow and ice, a higher daily food intake is needed as energy requirements for thermoregulation are higher at low temperatures, and, for diurnal species, a decreasing length of daylight reduces the time available for feeding. Especially young birds have a hard time during this season, as they often are inexperienced in feeding. In many species, their situation is aggravated further by a higher relative energy requirement due to a smaller body size.

The main winter quarters of the European Taiga Goose *Anser fabalis fabalis* are located between the mid-January isothermes 0ºC and –2.5ºC (van Impe 1987), and the northernmost larger wintering grounds are in the province of Skåne, in southern Sweden (Nilsson & Persson 1984, Nilsson *et al*. 1999).

When the geese arrive in Skåne in September and October, after migrating from their breeding areas in Sweden, Finland and Russia, high-quality food is abundant on the harvested fields (Nilsson & Persson 1984). Ploughing causes a sharp decrease in food availability, and during winter the geese are forced to graze to a large extent on winter cereals. Because cereal growth ceases during the winter, the amount of available food decreases continuously as a result of geese grazing. Furthermore, when fields are covered by snow, the geese can have difficulties in finding feeding sites close to their night roost (Nilsson & Persson 1984).

Taiga Geese feed in the daytime, leaving the night roost about 20 minutes before sunrise and returning about 45 minutes after sunset (Hakon Kampe-Persson unpubl.). Because of their diurnal foraging habits, the geese have much less time for foraging in winter than in autumn and spring. In Skåne, the length of the day is less than seven hours in mid-December, compared to ten hours in mid-October and twelve in mid-March.

The aim of this study was to ascertain how geese modify their time-budgets in order to effectively deal with the harder conditions in winter. For instance,

do they allocate more time to grazing? And/or, are there any differences among age groups?

## Study area

The study was made in Skåne, the southernmost province of Sweden (for a detailed presentation, see Nilsson & Persson 1984). Autumn work was conducted around Lake Vombsjön (55.41N, 13.35E), while most of the observations in winter were made at Flyinge (55.45N, 13.21E). In spring, I worked at both Flyinge and Lake Vombsjön, as well as at Lake Hammarsjön (55.59N, 14.10E).

## Material and Methods

The activities of individually marked birds (for neck-collaring, see Nilsson & Pirkola 1986, 1991, Pirkola & Kalinainen 1984) were continuously observed, one at a time, from the time they left their night roost in the morning until they returned in the evening. In Germany, geese were found feeding also during the night (Mooij 1992), but that was not the case in this study; the roosting geese were checked throughout every fifth night during the periods 16–31 October and 22 November–16 March, during 78 nights in total, without recording any geese leaving the roost between their arrival in the evening and departure in the morning. I made no observations at the grazing grounds indicating that geese ever stayed there overnight. Geese of different age and sex were followed on consecutive days in autumn, winter and spring. The bird was counted as juvenile during its first winter, as subadult during its second and third winter if still unpaired, and as adult when followed by at least one young. Winter was defined as periods (>4 days long) with daytime temperatures 1–5 degrees below zero Celcius from mid-December to mid-February. The autumn observations were made in the last week of October and the spring observations in the second week of March, in years when the fields were free from snow and the daytime temperatures were above zero.

In the field, in the winters 1983/84–1985/86, a continuously running cassette tape recorder was used to note each time the focal bird changed from one activity to another. The following nine activities were noted: grazing, alert, resting, sleeping, preening, drinking, social interference, disturbed and flying. The duration of each separate activity performance was measured in seconds; no performance was considered to last less than one second.

Because of difficulties involved in following an individual bird over a whole day, most observation series refer to parts of the day. In all, about 300 hours of observations were obtained.

When constructing time-budgets, only observation periods longer than one hour were included, and only from days when the geese were relatively undisturbed; all days when they were disturbed during more than 20 minutes were excluded. To facilitate comparisons among seasons and age groups, only data from winter wheat fields were used; winter wheat seedlings being by far the most important food source in winter (Persson 1982). Within each season and age group, data from different times of the day, as well as from both sexes, were equally represented. The construction of time-budgets for the winter was facilitated by the fact that the length of time geese were away from their night roost was unchanged from mid-December to mid-February.

Within seasons, differences in time-budget data between age classes of the three main activities (grazing, alertness and resting/sleeping) were tested by Mann-Whitney U-test (Sokal & Rohlf 1981), with the individual's percentage as data point. The choice of statistical test was influenced partly by the fact that time-budget data of birds from different age classes could not be collected simultaneously and partly because most observation series (of different duration) refer to different parts of the day. Identical conditions were aimed at, but minor between-day differences in temperature, wind speed, food quality, flock size and disturbance level could not be fully avoided.

## Results

The distance between night roost and feeding grounds was much shorter in winter than in either autumn or spring and markedly shorter during the winters of 1983/84–1985/86 than during the preceding winters of 1977/78–1980/81 (Table 1; in all cases, t-test, $P<0.001$).

On the feeding grounds, the geese switched between feeding and non-feeding activities; on average, 21–22 minutes of feeding alternated with 11–15 minutes of non-feeding (Table 2). In winter, the duration of these categories of activity in juveniles were not significantly different from those in adults (in both cases, t-test, $P>0.2$). For adults, the duration of both the feeding bouts and the non-feeding periods were shorter in winter than in autumn, the latter significantly shorter ($t_{68} = 0.22$, $P>0.5$ and $t_{72} = 2.45$, $P<0.02$, respectively).

In autumn, about 40% of the time spent on the

Table 1. Mean distance (km) between roost and feeding grounds during the last week of October, second week of March, and during winter periods (temperatures below 0ºC) from mid-December to mid-February in 1983/84–1985/86, compared with monthly mean distances for the period 1977/78–1980/81 (including winter periods with temperatures above 0ºC). Number of observation days in brackets. Mean±SD.
*Medelavstånd (km) mellan nattlokal och födosöksområden under sista veckan i oktober, andra veckan i mars och under perioder med vinterväder (temperaturer under 0ºC) från mitten av december till mitten av februari under åren 1983/84–1985/86, jämfört med månatliga medelavstånd under åren 1977/78–1980/81 (inklusive vinterperioder med temperaturer över 0ºC). Antalet observationsdagar inom parentes. Medelvärde± SD.*

| | Oct | Dec | Jan | Febr | March |
|---|---|---|---|---|---|
| 77/78–80/81 | 4.1±1.1 (21) | 5.9±2.8 (20) | 8.3±3.4 (18) | 10.4±3.1(14) | 4.5±1.9 (23) |
| 83/84–85/86 | 4.0±0.4 (16) | ⊢——— | 1.0±0.5 (36) | ———⊣ | 4.5±0.2 (12) |

Table 2. Length of time (minutes) that Finnish Taiga Geese spent feeding (when grazing winter wheat) before switching to non-feeding activities, and vice versa. No individual is represented by more than one period per season and category of acticity. When more than one period were available, one of these was chosen at random. Number of periods in brackets. Mean±SD.
*Tid (i minuter) som finska taigagäss ägnade åt födosök (vid bete av höstvete) innan de skiftade till icke födosökande aktiviteter, och vice versa. Ingen individ representeras av mer än en tidsperiod per årstid och aktivitetskategori. När mer än en tidsperiod fanns tillgänglig, valdes en av dessa ut slumpmässigt. Antalet tidsperioder inom parentes. Medelvärde± SD.*

| Category of activity<br>*Aktivitetskategori* | Autumn *Höst*<br>Ad | Winter *Vinter*<br>Ad | <br>Juv |
|---|---|---|---|
| Feeding *Födosökande* | 22.0±16.7 (23) | 20.6±28.1 (47) | 22.0±16.0 (15) |
| Non-feeding *Icke födosökande* | 14.9± 8.3 (29) | 10.6± 6.7 (45) | 13.1± 8.4 (19) |

feeding grounds was devoted to grazing, while the remaining main part was spent alert and resting/sleeping; each activity type accounted for about 25% of the total time (Table 3). Preening, flying, social interference and responses to disturbance accounted for the remaining 10% of the time.

In winter, there were no significant differences between adults, subadults and juveniles in time spent foraging (Mann-Whitney U-test, P>0.5 in all three cases). Although the geese spent less time per day on the feeding grounds in winter compared with autumn, they grazed for roughly the same amount of time in both seasons (Table 4). The increase in the proportion of time spent grazing in winter occurred mostly at the expence of the time used to stay alert (Table 3). Juveniles spent a significantly smaller proportion of their time alert as compared with adults (Mann-Whitney U-test, P<0.001) and devoted a larger proportion of time to sleeping. The proportion of time spent resting/sleeping by adults in winter was approximately the same as that spent in autumn. Time devoted to preening decreased markedly in winter and was lower for juveniles than for adults. The tendency for more social interference to occur in winter was related to the denser flocks occurring at this time. Interference usually involved adults chasing away subadults. In winter, geese flew an average of 12.2 minutes each day. Flights between the night roost and the feeding grounds averaged 2.6 minutes, whereas most of the flying time (on average 9.6 min.) was related to distubance.

In spring, the proportion of time used for grazing was lower compared with winter (Table 3). But, owing to longer days, the total time devoted to grazing in spring was about 30% longer than in autumn and winter (Table 4). The proportion of time spent staying alert was similar for spring and autumn, as was the percentage of time spent resting/sleeping. In spring, the proportion of time devoted to preening decreased, whereas social interference, probably connected with pair formation and the strengthening of pair bonds, took up proportionately more time.

Table 3. Seasonal time budgets for Finnish Taiga Geese grazing winter wheat. The table gives the proportions of the average day allocated to various activities during time that the geese were away from their night roost (10.5 hours in autumn, 8.0 hours in winter and 12.5 hours in spring). Number of studied individuals in brackets.
*Tidsbudget under olika årstider för finska taigagäss betande höstvete. Tabellen ger tidsfördelningen på olika aktiviteter under en genomsnittlig dag för den tid som gässen var borta från nattlokalen (10,5 timmar under hösten, 8,0 timmar under vintern och 12,5 timmar under våren). Antalet studerade individer inom parentes.*

| Activity *Aktivitet* | Autumn *Höst* | Winter *Vinter* | | Spring *Vår* |
|---|---|---|---|---|
| | Ad (8) | Ad (11) | Subad (6) | Juv (6) | Ad (4) |
| Grazing *Betande* | 38.4 | 51.8 | 52.1 | 51.8 | 42.7 |
| Alert *Alert* | 26.7 | 14.8 | 11.4 | 4.9 | 26.6 |
| Resting/Sleeping *Vilande/Sovande* | 24.5 | 25.8 | 28.4 | 39.2 | 25.0 |
| Preening *Putsande* | 5.5 | 2.0 | 1.6 | 0.5 | 0.5 |
| Drinking *Drickande* | - | 0.3 | 2.4 | - | 0.1 |
| Social interference *Social störning* | 0.4 | 0.8 | 0.6 | 0.0 | 1.7 |
| Disturbed *Störd* | 2.0 | 2.0 | 1.0 | 1.1 | 0.9 |
| Flying *Flygande* | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |

Table 4. Daily time budgets (hours) for adult Finnish Taiga Geese grazing winter wheat in different seasons. Number of studied individuals during each season in brackets.
*Dygnstidsbudget (timmar) under olika årstider för adulta finska taigagäss betande höstvete. Antalet studerade individer under respektive årstid inom parentes.*

| Activity *Aktivitet* | Autumn *Höst* (8) | Winter *Vinter* (11) | Spring *Vår* (4) |
|---|---|---|---|
| Roosting *Vilande på nattlokal* | 13.5 | 16.0 | 11.5 |
| Grazing *Betande* | 4.0 | 4.1 | 5.3 |
| Alert *Alert* | 2.8 | 1.2 | 3.3 |
| Resting/Sleeping *Vilande/Sovande* | 2.6 | 2.1 | 3.1 |
| Flying *Flygande* | 0.3 | 0.2 | 0.3 |
| Others *Övrigt* | 0.8 | 0.4 | 0.5 |

## Discussion

That no age-related differences were found with regard to the percentage of the day spent grazing on the feeding grounds in winter, can probably be ascribed to physiological constraints. More specifically, it appears as though the rate of digestion limits food intake – and thus the time spent grazing – as indicated by the alternating pattern of feeding and non-feeding periods (*cf*. Drent *et al*. 1978/79). In studies reporting age-related differences, juveniles used slightly more time for feeding than adults (Davis *et al*. 1989, van Impe 1980).

Between-season differences in duration of grazing per twenty-four hours found in this study are hard to interpret. The main reason is that several conditions differed among seasons. Firstly, observations in autumn and spring were made during a period of only one week, and there are no guarantees that these weeks were representative of these seasons. In autumn, the hunting season opened just one week after that the geese had switched from gleaning wasted grain on stubbles to grazing winter wheat seedlings. The open season for bean geese in Skåne during this study was restricted to the period 1–21 November. This sport hunting was very popular, and caused a lot of disturbance among the geese (see e.g. Göransson & Karlsson 1976). Of that reason, comparable time-budget data could not be obtained during November. In spring, the geese switched

from winter wheat to uncultivated grasses after just one week of study. The timing of this shift was probably to a great extent conditioned by air temperature (Prins & Ydenberg 1985, Therkildsen & Madsen 2000). Secondly, the geese fed much closer to the night roost in winter than in either autumn or spring, and the daily time used for flights was lowest in winter. In that way, less time was needed for grazing in winter than in any of the other seasons to energetically compensate for the time in flight. Thirdly, the geese had for sure higher thermoregulatory costs in winter than in autumn and spring, at least when low temperatures were combined with hard winds (*cf*. Harvey 1971). By that, they had to graze for longer in winter than in any of the other seasons to obtain a balanced energy budget. Fourthly, geese generally switch from a simple carbohydrate-rich diet in autumn and early winter to more protein-rich vegetation in spring (Owen 1980). In the present study, the impact of such a strategy was minimized by restricting observations to winter wheat fields. Even so, however, between-season differences in food quality were most likely existent, chiefly due to a continual decline of protein content of young leaves of winter cereals (Groot 1989). Fifthly, the energetic strategy of the geese generally differs among seasons. As a rule, geese re-build their energy reserves in autumn, keep a balanced energy-budget throughout winter, and build up their energy reserves with pre-nuptial migration at hand (Owen 1980). In this respect, the present study was presumably no exception to the rule.

Estimates of the percentage of time on the feeding grounds devoted to, and the daily duration of, grazing in this study are much lower than those reported for wintering geese in other studies (Table 5). That can be ascribed in part to differences in the methods used. I followed individual birds, while the other studies scanned flocks at regular intervals, counting the number of birds engaged in particular activities (*cf*. Altmann 1974). Tacha *et al*. (1985) found that estimates provided by periodic observations were consistently less precise than those provided by continuous ones. The main source of error when using periodic scanning is very likely that activity performances of short duration are overlooked, and by that included in feeding. The high values found by Ebenman *et al*. (1976) might, however, be partly related to the fact that food supplies in the study area had been severely depleted by the end of January. Thus, only short vegetation remained in February, and even if the geese increased their peck rate, they were not able to fully compensate for the smaller amounts of food obtained per bite. Consequently, their only alternative was to feed for a longer time each day.

Another factor to take into account when discussing differences in Table 5 is the distance between night roost and feeding grounds, as it can differ significantly among months, years, sites, and species (Newton *et al*. 1973, Nilsson & Persson 1984, 1991). As flying is by far the most energy-consuming activity of all, the distance the geese have to fly twice a day can be important. In this study, the geese managed to feed very close to their night roost throughout the winter.

Differences in time spent grazing between species may be related to differences in bill length. Taiga Geese have a long bill, suitable for taking large bites, whereas all of the other species included as grazers in Table 5 have short bills, suitable for grazing on short vegetation. The short-billed species usually feed on pasture grasses, and despite their higher peck rate (Owen 1980), they may have to spend much more time grazing than Taiga Geese, owing to the smaller bites taken. Besides, geese have to be more selective when grazing pasture grasses as compared with winter cereals (Owen 1978/79). Markgren (1963) found that Taiga Geese took larger bites when grazing winter cereals than when grazing uncultivated grasses. Such a difference in bite size might explain why Taiga Geese spent 83–86 % of the day grazing in the Netherlands, compared to only 52% in Skåne.

The percentage of time on the feeding grounds devoted to, and the daily duration of, active feeding found in this study is, in fact, very similar to that reported for geese feeding on high-energy food (gleaners and grubbers in Table 5). Winter wheat seedlings have an energy content similar to that of afore-mentioned high-energy foods, but the digestibility is much lower (Owen 1980). However, wherever this monoculture is grown, it offers the geese a superabundance of food. In such a field, neither search time nor handling time is needed. So, the geese can ingest a large amount of food in a short length of time, and in that way largely compensate for its lower digestibility.

A long, rather narrow bill could be used for probing in soft marshland as well as grazing tall vegetation (Owen 1980). Originally, European Taiga Geese fed on uncultivated grasses in meadows and pastures in winter, and they still do in north-west Jutland (Parslow-Otsu & Kjeldsen 1992), England (Parslow-Otsu 1991) and the Netherlands (van den Bergh 1985, Koffijberg *et al*. 1997). When farmland feeding first occurred is not known. In Skåne, it

Table 5. Percentage of time away from night roost devoted to, and daily duration of, active feeding among wintering geese and sheldgeese.
*Procentandel av tid borta från nattlokal som ägnades åt, och längden av, aktivt födosök hos övervintrande gäss och spegelgäss.* Grazing = *betning*, gleaning = *plockning*, grubbing = *bökning*, pasture grasses = *betesmarksgräs*, meadow grasses ='*ängsgräs*, saltmarsh plants = *saltängsväxter*, pasture plants = *betesmarksväxter utom gräs*, *Scirpus* tubers = *rotknölar av säv*, winter wheat = *höstvete*, winter cereals = '*höstsäd*, cereal grains = *spillsäd*, maize = *majs*, soybeans = *sojabönor*.

| Taxon | Study area<br>*Undersökningsomr.* | Months<br>*Månader* | %<br>*%* | Hours<br>*Timmar* | Way of feeding; food item<br>*Födosöksmetod; födoslag* | Reference<br>*Referens* |
|---|---|---|---|---|---|---|
| *Branta leucopsis* | South-west Scotland | 12–02 | 92–95 | 6.6–8.5 | grazing; pasture grasses | Owen *et al*. 1992 |
| *Anser fabalis fabalis* | Scania | 02 | 93 | 9.5 | grazing; winter cereals | Ebenman *et al*. 1976 |
| *Chloephaga rubidiceps* | Falkland Islands | 08 | 91 | 8.2 | grazing; meadow grasses | Summers & Grieve 1982 |
| *Anser albifrons albifrons* | England | 11–03 | 90 | 8.4–9.9 | grazing; pasture grasses | Owen 1972 |
| *Anser serrirostris rossicus* | South Netherlands | 01–02 | 89 | | grazing; winter cereals | Van Impe 1980 |
| *Chloephaga picta leucoptera* | Falkland Islands | 08 | 89 | 8.0 | grazing; meadow grasses | Summers & McAdam 1993 |
| *Anser fabalis fabalis* | South Netherlands | 12–03 | 84 | | grazing; meadow grasses | Van Impe 1980 |
| *Anser brachyrhynchus* | Jutland | 02 | 84 | 8.0 | grazing; pasture grasses | Therkildsen & Madsen 2000 |
| *Branta bernicla bernicla* | Norfolk | 11–03 | 79 | | grazing; pasture grasses | Riddington *et al*. 1996 |
| *Branta bernicla bernicla* | Schleswig-Holstein | 03 | 67–79 | 7.8–8.5 | grazing; saltmarsh plants | Stock & Hofeditz 1996 |
| *Anser brachyrhynchus* | Jutland | 02 | 75 | 7.1 | grazing; winter wheat | Therkildsen & Madsen 2000 |
| *Chloephaga melanoptera* | Peru | 09 | 73 | 8.8 | grazing; pasture plants | Summers & Castro 1988 |
| *Anser fabalis fabalis* | Scania | 12–02 | 52 | 4.1 | grazing; winter wheat | This study |
| *Anser anser anser* | Doñana | 01 | 39–62 | 3.5–5.6 | grubbing; *Scirpus* tubers | Amat 1986 |
| *Anser anser anser* | Camargue | 12–02 | 35–48 | 3.5–4.8 | grubbing; *Scirpus* tubers | Desnouhes *et al*. 2003 |
| *Anser serrirostris rossicus* | Hungary | 02 | 33–42 | 4.0–5.0 | gleaning; maize | van den Bergh & Phillipona 1985 |
| *Branta canadensis interior* | Illinois | 12–02 | 40–57 | 2.6–4.3 | gleaning; maize, soybeans | Gates *et al*. 2001 |
| *Anser albifrons frontalis* | California | 12–02 | 21 | 2.1 | gleaning; cereal grains | Ely 1992 |
| *Anser c. caerulescens* | Missouri | 12–02 | 18 | 1.9 | gleaning; maize, soybeans | Davis *et al*. 1989 |

happened a long time ago, because there were complaints of damage to winter rye already one and a half century ago (Nilsson 1858). However, uncultivated grasses were still the main food source in Skåne in the late 1950s (Markgren 1963). Twenty years later, the geese had switched from uncultivated grasses to winter cereals altogether (Persson 1982). As the area with natural meadows and pastures in Sweden decreased by about 90 % between 1850 and 1980 (Alexandersson & Eriksson 1988, Gerell 1988), this shift can be viewed as an adaptation to changes in land use during the modernization of Swedish agriculture.

The European Taiga Goose has apparently benefited greatly from its shift to farmland feeding. When grazing uncultivated grasses, 7.0–7.7 hours a day were used for active feeding in winter (Figure 15 in Markgren 1963), compared to only 4.1 hours when grazing winter wheat (this study). Such an inference is strengthened by the fact that the length of time the geese were away from their night roost remained unchanged from mid-December to mid-February when grazing winter wheat. Earlier, when grazing uncultivated grasses, it had increased from 8.5 hours in mid-December to 11.0 hours in mid-February. Thus, it is no exaggeration to state that European Taiga Geese wintering in Skåne have no problems in obtaining enough food as long as the winter wheat seedlings are not covered by snow, the geese can feed close to their night roost, and they are relatively undisturbed.


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## Sammanfattning

För fåglar som övervintrar i nordeuropa utgör vintern ofta en "flaskhals". Detta beror bland annat på att växternas tillväxt avstannar, insekterna blir fåtaligare och svårare att finna, födan ofta blir oåtkomlig på grund av snö eller is, ett högre födointag fodras eftersom energiåtgången för att bibehålla kroppsvärmen ökar vid låga temperaturer, och den tillgängliga tiden för födosök för dagaktiva arter reduceras då dagslängden minskar. Speciellt ungfåglar har det svårt denna årstid, ofta beroende på att de är oerfarna i att skaffa föda. Hos många arter försvåras situationen för ungfåglarna av att de beroende på en mindre kroppsstorlek har ett relativt högre energibehov.

Övervintringsområdet för den europeiska taigagåsen (en av minst sex arter/raser inom sädgåskomplexet) ligger i huvudsak mellan januari-isotermerna 0ºC och –2,5ºC, och dess nordligaste lokaler av betydelse finns i Skåne. När gässen om hösten anländer till Skåne finns det gott om föda av hög kvalitet på de skördade fälten. Plöjningen minskar födoutbudet drastiskt och under vintern är gässen tvingade att till stor del beta höstsäd. Eftersom sädesbroddens tillväxt upphör under vintern minskar födotillgången som ett resultat av gässens bete. När fälten täcks av snö kan gässen dessutom få svårt att finna föda i närheten av sin nattlokal. Eftersom taigagäss endast söker föda om dagen, och lämnar nattlokalen omkring 20 minuter före soluppgången och återvänder omkring 45 minuter efter solens nedgång, är den tillgängliga tiden för födosök betydligt kortare under vintern än under höst och vår.

För att studera hur gäss modifierar sin tidsbudget för att möta hårdare villkor under vintern, samt för att utröna om det finns skillnader mellan olika åldersgrupper, användes taigagäss som halsringmärkts på häckplats i Finland. Fältarbetet utfördes vid Vombsjön, Flyinge och Hammarsjön. En utvald fågel följdes från det att den lämnade nattlokalen på morgonen tills den återvände i kvällningen. Varje gång den skiftade från en aktivitet till en annan registrerades detta på en kontinuerligt gående bandspelare. Nio aktiviteter registrerades: betande, alert, vilande, sovande, putsande, drickande, social störning, störd och flygande. Längden av de enskilda aktivitetsperioderna mättes i sekunder och ingen period ansågs ha varat i mindre än en sekund. Till tidsbudgetarna användes endast aktivitetsdata från dagar då gässen

varit relativt ostörda, varför samtliga dagar då gässen störts under mer än 20 minuter uteslöts. Vidare, för att lättare kunna jämföra olika årstider och ålderskategorier, utnyttjades endast data från fält med höstvete, eftersom sädesbrodd var den alltigenom dominerande födan vintertid. Vinterdata insamlades under dagar med 1–5 minusgrader, medan höst- och vårdata kom från dagar med plusgrader och snöfria fält.

I denna studie lyckades gässen beta i närheten av nattlokalen hela vintern, betydligt närmare än under såväl höst som vår, och avsevärt närmare än under tidigare vintrar. Avståndet mellan nattlokalen och de fält där gässen söker föda är av stor betydelse, eftersom flygande är den med bred marginal mest energikrävande aktiviteten. Anmärkningsvärt är dessutom att den tid som gässen dagligen var borta från nattlokalen höll sig konstant (8 timmar) från mitten av december till mitten av februari. På fälten uppvisade gässen ett typiskt mönster, där 21–22 minuter av födosök följdes av 11–15 minuter av icke födosökande (främst vila), varefter gässen återigen började beta. Detta alternerande har sannolikt en fysiologisk förklaring. Efter att ha ätit sig mätta måste gässen helt enkelt smälta en del av födan innen de kan äta mer. I slutet av oktober och mitten av mars använde gamla gäss 40% av tiden på fälten till bete, 27% till att vara alert och 25% till vila. Vintertid ökade de gamla fåglarna andelen av dagen som ägnades åt bete till 52%. Oväntat nog använde de olika åldersgrupperna lika stor del av vinterdagen till bete, vilket säkerligen beror på tidigare nämnda fysiologiska begränsning. Jämfört med gamla använde subadulta och framförallt juvenila fåglar mindre tid till att vara alerta och mer till vila. Under höst och vinter betade gässen 4,0–4,1 timmar dagligen, vilket ökade till 5,3 timmar under våren.

Värdena i denna studie på såväl andel av dag (52%) som total tid dagligen (4,1 timme) som vintertid utnyttjades för bete är avsevärt lägre än vad man funnit hos andra gäss. Vanligtvis ligger dessa värden i storleksordningen 80–95 % och 7,0–9,9 timmar. En av anledningarna till skillnaderna kan vara valet av metod. Jag följde enskilda individer, medan andra studier baserats på att en lämplig flock spanats av med regelbundna intervall, varvid varje ingående flockmedlem hänförts till någon av de förutbestämda aktiviteterna. I en jämförande studie fann man att den av mig valda metoden var den mest exakta. Den främsta felkällan vid periodiskt scannande är säkerligen att aktiviteter som endast varar en kort tid förbises, och därigenom räknas som aktivt födosök. Val av metod är dock inte hela förklaringen. En annan förklaring till detta kan vara relaterad till mellanarts-skillnader i näbblängd. Taigagäss har en lång näbb, lämpad för att ta stora bitar föda, medan övriga arter i de ovan refererade studierna har korta näbbar, lämpade till att beta kort vegetation. De kortnäbbade gässen betar vanligtvis på betesmark, och trots att de betar snabbare, måste de, på grund av att de tar mindre bitar, använda mycket mer tid per dag för bete än taigagäss. Vidare måste gäss vara mer selektiva då de betar på en betesmark jämfört med ett höstsädesfält. För taigagås i Skåne har det visats att den tar större bitar då den betar höstsäd än då den betar okultiverade gräs.

Ursprungligen betade den europeiska taigagåsen på naturlig gräsmark vintertid, vilket den fortfarande gör i nordvästra Jylland, England och Nederländerna. När den började söka sig till jordbruksmark är inte känt. I Skåne skedde det tidigt, ty redan i mitten av 1800-talet klagades det över skador på höstsådd råg. Naturlig gräsmark var dock fortfarande i slutet av 1950-talet den viktigaste födokällan i Skåne, men 20 år senare skiftade gässen helt och hållet till höstsädesfält. Med tanke på att arealen naturlig gräsmark i Sverige minskade med 90% mellan 1850 och 1980 kan detta skifte ses som en anpassning till ett ändrat markutnyttjande i samband med moderniseringen av svenskt jordbruk.

Den europeiska taigagåsen har uppenbarligen gynnats av sitt skifte från naturlig gräsmark till jordbruksmark. När den betade okultiverade gräs utnyttjades dagligen 7,0–7,7 timmar för aktivt födosök, jämfört med endast 4,1 timme vid bete av höstsädesbrodd. En dylik slutsats styrks av att tiden gässen var borta från nattlokalen förblev oförändrat 8,0 timmar från mitten av december till mitten av februari vid bete av höstsädesbrodd, medan den ökade från 8,5 timmar till 11,0 timmar då gässen betade okultiverade gräs. Sålunda är det ingen överdrift att påstå att de europeiska taigagässen som övervintrar i Skåne inte har några problem med att finna tillräckligt med föda så länge som höstsädesbrodden inte täcks av snö, gässen kan söka föda nära sin nattlokal och är relativt ostörda.