

Institut für Zoologie der Universität Wien und Institut für Öko-Ethologie, Rosenberg

Habitat use and group size of Greylag Geese (*Anser anser*) in Lake Neusiedl area

Habitatnutzung und Truppgröße der Graugans (*Anser anser*) im Neusiedlerseegebiet

By Gerald Dick

Dedicated to my friend Dr. KAREL HUDEC for his 60th birthday

Key words: Greylag Goose, *Anser anser*, habitat, group size.

Abstract

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In the course of the year Greylag Geese use mainly six different feeding habitats in Lake Neusiedl area. Winter cereal fields are very important during early spring and late autumn for migrating geese. Families with goslings use the meadows predominately in front of Lake Neusiedl's reed belt. Associated with these seasonal aspects different group sizes occur on different habitats. Cereal fields and maize fields bear the largest groups while the smallest occur on the meadows. The quality of various habitats was estimated by the ratio of time spent feeding to time spent wary. In this respect meadows, goslings being absent, were best and rape fields (*Brassica napus*) worst.

Zusammenfassung

DICK, G. (1988): Habitatnutzung und Truppgröße der Graugans (*Anser anser*) im Neusiedlerseegebiet. Ökol. Vögel 10: 71-77.

Im Verlauf eines Jahres nützen die Graugänse im Neusiedlerseegebiet hauptsächlich sechs verschiedene Nahrungshabitattypen. Wintersaatfelder sind für durchziehende Gänse besonders im zeitigen Frühjahr und im späten Herbst wichtig. Familien mit Jungen nützen vornehmlich die Wiesen vor dem Schilfgürtel des Neusiedlersees. Zusammenhängend mit diesen saisonalen Aspekten treten bestimmte Truppgrößen auf bestimmten Habitaten auf. Saatfelder und Maisfelder beherbergen die größten Gruppen, während die kleinsten auf den Wiesen zu finden sind. Die Habitatqualität wurde durch das Verhältnis aufgewendeter Zeit für Fressen gegen Wachsamsein eingeschätzt. In dieser Beziehung war die Wiese in Abwesenheit der Gössel das beste Habitat, das schlechteste das Rapsfeld (*Brassica napus*).

Author's address:

Dr. Gerald Dick, Institut für Öko-Ethologie, Altenburg 47, A-3573 Rosenberg, Austria.

1. Introduction

Although the Greylag Goose (*Anser anser*) is very well known due to fundamental ethological findings (eg. LORENZ & TINBERGEN 1939) little is known about the ecological dimension of behaviour (eg. AMAT 1986). In this investigation the changes of group size and the choice of habitat in the course of the year will be reported. The quality of certain habitats shall be estimated, but their influence on the feeding behaviour is considered elsewhere (DICK 1988).

2. Study area

This study was carried out in the Seewinkel area, in eastern Austria (LÖFFLER 1982). The whole area measures approximately 450 sqkm and is surrounded by Lake Neusiedl in the West, by the Parndorfer Platte, which is mostly arable land, in the North and by the Austrian – Hungarian border in the East and South. This area, being the western bay of the little Hungarian plain, contains many small alkaline lakes (=Lacken), different soil types and – very important for the geese – contains the reed belt (*Phragmites australis*) of Lake Neusiedl with its surrounding meadows as well as the last cow pasture (=Hutweide) close to the former World Wildlife Fund reserve Lange Lacke. Seewinkel is a very important resting point for Greylags originating from Czechoslovakia on migration to and from the wintering grounds in North Africa. Apart from several thousand migrating geese (DICK 1987c) the Seewinkel holds a breeding population of about 300 pairs of Greylags (DICK et al. 1984).

Following feeding habitats were taken into consideration: The meadows are situated inland of the reed belt and mostly belong to *Scirpetum maritimi* and *Juncetum gerardi* (WENDELBERGER 1950). The *Scirpetum maritimi* is characterized by *Bolboschoenus maritimus*. To the *Juncetum gerardi* belong *Juncus gerardi*, *Scorzonera parviflora*, *Triglochin maritimum* and *Carex distans* while *Lepidium crassifolium* grows on salty patches. One part of this kind of meadow is also used as a paddock for horses. Sandeck and Hölle indicate certain localities within this meadow area. »Sown cereals« means newly sown cereal fields where the geese graze upon young plants. »Hutweide« is a nowadays not intensively used pasture (approx. 100 cows on 438 ha; DICK & RAUER 1982). This is a typical habitat of the pannonic region and is also known as »pušta« in Hungary. Due to undergrazing *Festucetum pseudovinae* today is degraded and species such as *Ononis spinosa*, *Lotus corniculatus*, *Achillea pannonica*, *Carduus nutans* and *Filipendula vulgaris* grow on the Hutweide. »Stubble fields« are defined as cut cereal fields where the geese feed on the remainders of the harvest. The last two categories of habitats are maize fields (*Zea mays*) and rape fields (*Brassica napus*).

3. Methods

The study period was from 1981 to 1983. The observations were carried out with binoculars (10×40) and a telescope (30×75). Only feeding flocks on land were considered. A goose flock is defined as two or more birds (BERTRAM 1978), excluding young ones as long as they are clearly distinguishable. The flock is understood to be a unit, separated from neighbouring individuals by approximately 50 meters.

4. Results

4.1 Habitat use

The seasonal pattern of use of the five most important feeding habitats is shown in Figure 1. January is not included in the Figure because too few geese are in the area at that time. The only nutritive source for the geese arriving from the winter quarters in February are the winter sown cereal fields. In the following months this type of habitat is less important. Geese from Czechoslovakia have already left and the breeding

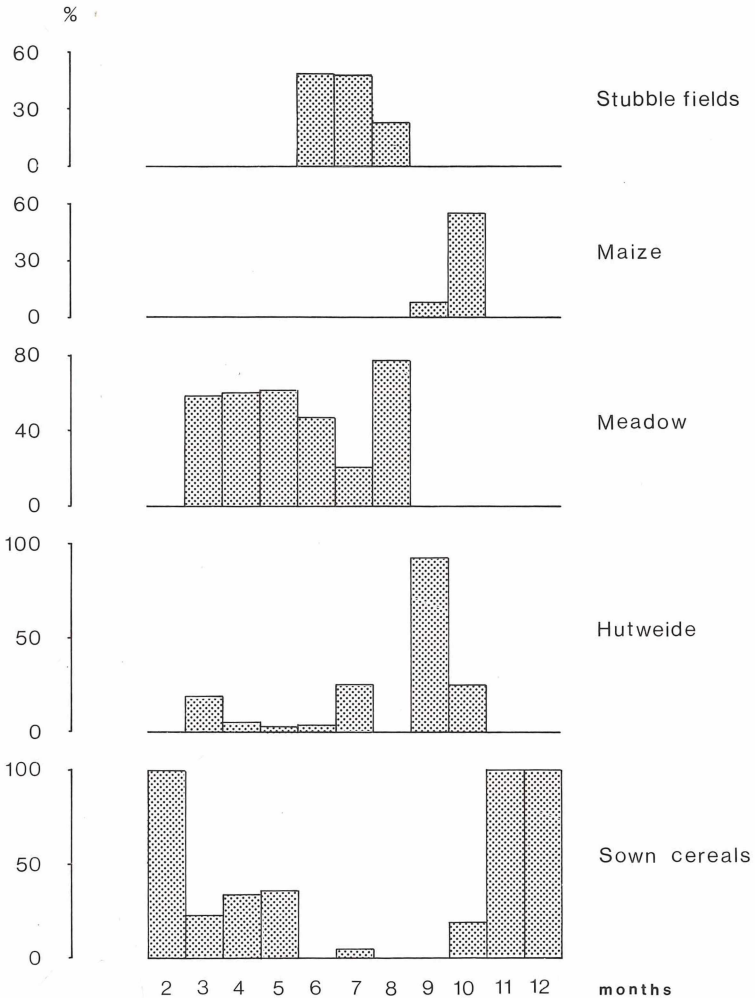


Fig. 1. Habitat use of the Greylag Goose in the course of the year. n=39 034.

pairs concentrate in the reed belt (*Phragmites australis*) of Lake Neusiedl and on some bigger Lacken. For most of them it is therefore impossible to reach winter cereal fields having a high nutritive value (OWEN 1976, 1978/79, 1980; OWEN et al. 1977). From March to May this kind of habitat is used by the vagrant nonbreeders and does not again become more important before October. The meadows inland of the reed belt are very important feeding grounds for breeding pairs and thereafter for the families with their goslings. After the moult in mid June the geese leave this area. As nearly all the geese leave Seewinkel in August, heading north to Southern Moravia (DICK et al. 1984; HUDEC et al. 1986) the high figure mainly in the meadow habitat in August (Fig. 1) is due to a methodological effect: Summing up the three years investigated 77,4% of 133 geese in total remained in this kind of habitat, and the maximum amount of geese per flock was only 22. The Hutweide is quite important in July when the geese concentrate on the summer gathering place Lange Lacke while it is also used by migrating geese during spring time. It becomes important again in September, but in October the maize fields (*Zea mays*) are more intensively used. There the geese do not only ingest the remainders of the harvest but they also actively break off multiple fruits from the fields' edges. Some maize fields are even managed for the geese by hunters. The last category of habitat, the stubble fields are used between June and August. In addition rape fields (*Brassica napus*) are visited in autumn as long as the vegetation height does not exceed that of a goose's belly.

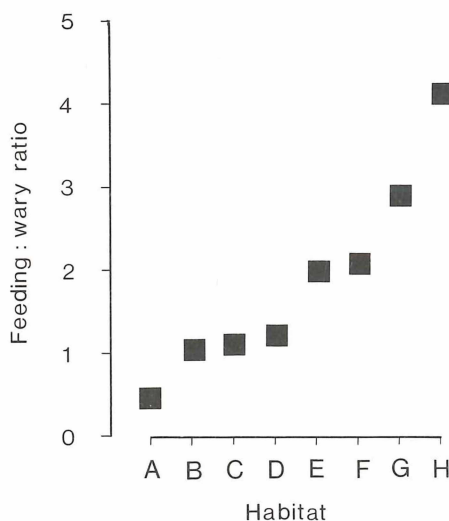


Fig. 2. Exploitation index. Wary includes look up, head up (INGLIS & ISAACSON 1978) and extreme head up (=Sichern, FISCHER 1965). Each ratio is a mean of all behavioural records per habitat (total 733 min.; ratio of per cent feeding: wary).

A = rape
 B = maize
 C = meadow/paddock with goslings
 D = stubble fields
 E = meadow - »Hölle«
 F = Hutweide
 G = sown cereals
 H = meadow/paddock without goslings

To get an idea of how important the various feeding habitats are, the proportion of time spent feeding by individuals is plotted against time being wary (Fig. 2). The best habitats in this respect were the meadow also used as paddock (without goslings) and the sown cereal fields. The same meadow is worse when goslings were present.

4.2 Group size

The group size has a large frequency range. Regarding the frequency of different group size categories (2-5, 6-10, ..., 91-100, 101-200, ..., larger than 700) flocks of two to five birds are most frequent in the observations (25,5% out of 714 flocks). Also remarkable is the relatively high value of 8,0% of the category 101-200. On the whole, flocks consisting of less than 100 birds amounted to 84% of observations (n=714) and flocks of more than 100 to 16%. The variation in group size during the course of the year is demonstrated in Figure 3. Larger flocks are found during the

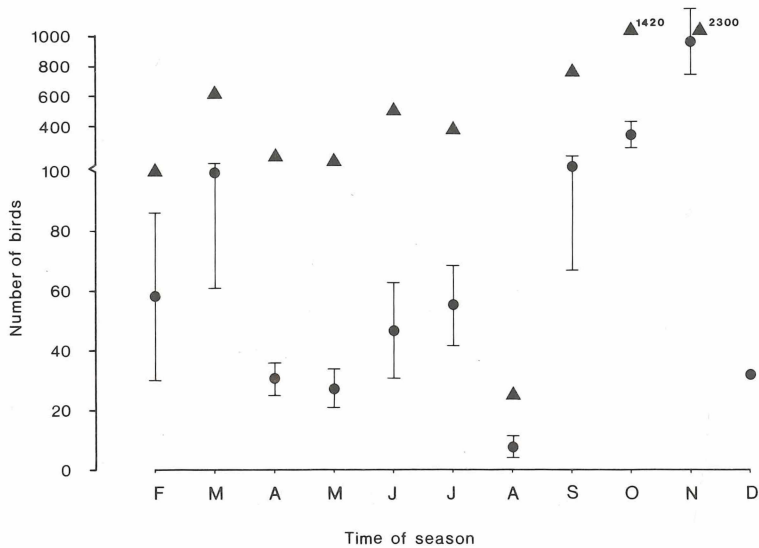


Fig. 3. Mean flock size for each month. Vertical bars symbolize 95% confidence limits, the triangles represent maximum values. n=547. December: one value.

migration period in spring and autumn. The slight decrease in May is due to the moult. As the summertime proceeds the geese begin to gather and to form bigger flocks whereas geese are nearly totally absent in August and only small flocks remain. Also different habitats do have different group sizes (Tab. 1). Groups of some

Tab. 1. The mean ($\bar{x}$) of maximum group sizes per decade (ten day periods of the year) for five habitats (O-values omitted). n is the number of decades when geese were present. sd. standard deviation, max. highest figure of all the maximum group sizes per decade.

	Sandeck-meadow	stubble field	Hutweide	sown cereals	maize
n	18	5	13	14	4
$\bar{x}$	50,1	223,4	227,2	352,4	1057,8
sd.	55,9	168,4	242,8	503,0	801,1
max.	180	500	700	2000	2000

hundred individuals are never seen on the meadow habitat while on the other hand groups of more than a thousand birds appear on sown cereal fields and on maize fields. The stubble fields and the Hutweide have a kind of intermediate position. They mostly attract flocks of up to 200 individuals, but even more in some decades (=ten day periods of the year).

5. Discussion

In contrast to investigations of other goose species (eg. PRINS et al. 1980) the Greylag Goose passes the majority of time in the study area and therefore uses various types of habitat. During the breeding season the meadows in front of the reed belt are intensively used (Fig. 1). These meadows only exist on the eastern shore of Lake Neusiedl to a greater extent, where the majority of geese breeds. The availability of feeding grounds must be responsible for the restricted breeding dispersion because potential breeding sites (RUTSCHKE & FRÄDRICH 1975; WARTHOLD 1983) do exist throughout the reed belt, which is moreover expanding since the end of the last century (LÖFFLER 1974). When having goslings the geese cannot move to the more profitable sown cereal fields, although some families go to the nearby Lacken when the young have hatched. But as soon as the moult is over the geese concentrate on Lange Lacke from where they utilize other habitats (cf. Fig. 1; Fig. 3). These social and seasonal constraints are very important for the possibility of habitat use and should be taken into consideration when thinking of optimization (CODY 1974; PIKE et al. 1977). Furthermore the possibility of having traditional feeding grounds (eg. meadows or fields around Lange Lacke) is an important influencing fact for this highly socially organized species as well as the role of early experience of goslings (KLOPPER 1963).

As geese cannot digest a great part of what they eat (i.e. cellulose, MATTOCKS 1971), they have to spend a large amount of time for feeding during the day. On the other hand time spent vigilant occurs at the expense of time spent feeding. Therefore the ratio of time spent feeding to wary was used to estimate habitat quality. The influence of the goslings on their parents behaviour is interesting. The presence of goslings reduces the parents' time spent feeding due to increased wariness (Fig. 2). Also the individual feeding bouts are shorter when goslings are present (DICK 1988). In this case it is evident that the exploitation of habitat has reduced due to other factors than the nutritive value.

Certain group sizes are also associated with different habitats (Tab. 1). Geese which are organized as pairs or observable family units are preferable found on the meadow and are very frequent in the observed flocks (25,5%). This high frequency is due to the relatively long period of time the geese are observed as pairs or families. Therefore large flocks of geese do not occur in the meadow. The category 101-200 is preferred by non breeding and gathering geese. Furthermore during the time when the geese gather (July) and form bigger flocks stubble fields are more attractive (Fig. 1), possibly because of a higher nutritive value compared to the high grown grass (high-

her than a goose) in the meadow. The high nutritive value of sown cereals (OWEN 1976) and the maize fields as well as the vicinity of the night roost (Lange Lacke) attracts the biggest flocks in autumn and winter (Tab. 1, Fig. 1, Fig. 3).

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