

Fig. 1. Study area, numbers indicate certain localities where geese occur. Roman figures indicate main breeding range (area I) and Central Seewinkel with gathering site Lange Lacke (area II).

The analysis presented here only includes geese ringed as goslings (pulli). When a comparison is made to the geese ringed as adults, this is specially indicated. "Juveniles" are geese after fledging in the year of ringing and "non-breeders" include immatures (first year after ringing) and non-breeding geese in their second year after ringing.

RESULTS AND DISCUSSION

Goslings and Juvenile Geese

Geese move to separate rearing areas after the hatch of their young (e.g. Healey *et al.* 1980) and this has also been shown for the Greylag Goose (Hudec & Rooth 1970). Distances of 5 to 10 km (and exceptionally 30 km) are usually covered (Paakspuu

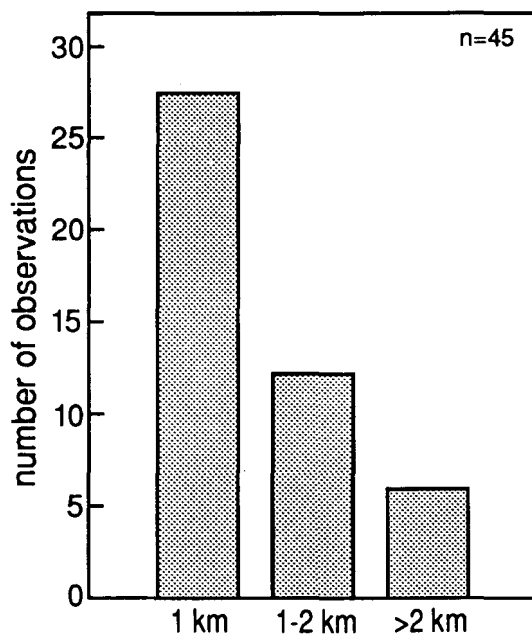


Fig. 2. Distance of movements by goslings and juveniles.

1963), and have also been reported from Lake Neusiedl (Triebel 1979). The observations of goslings and juvenile geese (in year of ringing) clearly showed that there was a movement between different rearing localities in area I after ringing (June, July, August). In this context the ringing place was considered to be the original rearing site. Distances of less than one kilometer were predominantly seen, indicating that if changes of locality happened, nearby areas were preferred (Fig. 2).

Area II, which includes the main night roost Lange Lacke, is the summer gathering place. The numbers of counted geese in area II increased in July before the geese left Austria in August (Dick *et al.* 1984, Hudec *et al.* 1986). Of the geese ringed in area I, 40% were resighted in area II in July or August; 62 individuals (26.2% of the ringed ones, excluding recoveries) were seen again in September, October and November in area II, which after the summer migration is an important gathering place.

Non-breeders

Flocks of non-breeders (first and second year after ringing) were especially conspicuous during

April and May when they separate from the breeding individuals, and were observed in area I as well as in area II. As there are nearly no meadows as feeding sites on the western shore of lake Neusiedl, geese normally occur there only in small numbers. In the first year after ringing there were resightings of 69 individuals from March to August (30% of the ringed goslings excluding recoveries in the year of ringing; Fig. 3), this being 89.6% of all observed individuals in the first year after ringing. Until May, there was a clear preference for area I (vicinity of breeding sites), which did not change until late June. The non-breeders do not moult with the breeding population and only 6 individuals were observed in June during the period of moult. In the first year after ringing 20.8% of the registered geese were seen before the moult and again in July, 40.3% only before moult and another 23.4% only after moult (Fig. 3).

Of birds observed in the first year after ringing, 21 (27.3%) revisited their natal rearing sites, although 76% of these also visited other localities. From the geese which did not visit their own rearing sites (39% of the observed), 14 were seen in area I and 15 in area II, one goose in both areas. All resightings of geese ringed as adults, which had bred in subsequent years, came from their original ringing sites.

Of 77 different individuals observed in the first year after ringing, 35 (45.5%) were observed with

another goose from the same ringing site. In the second year after ringing there were still 10 out of 29 individuals (34.5%) associating with a goose from the same ringing site. On the other hand 24 (31.2%) in the first year and 11 (38.0%) in the second year were seen together with geese from other sites. However one and two year old geese tend to join geese of the same age and from the same rearing sites, this being a decreasing tendency in the second year. These observations support the assumption that geese know each other individually as under semi-captive conditions (Schlager 1981, Lorenz 1988). Furthermore, this could mean that birds pair preferentially with those of the same locality, but for answering this question more observations of ringed geese are required.

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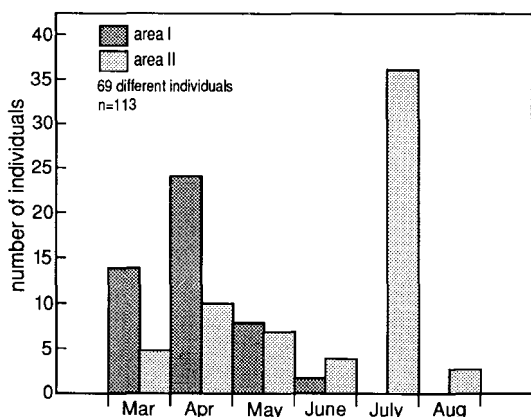


Fig. 3. Observations of neck-banded immatures.

ON THE SPATIAL DISTRIBUTION AND SOCIAL ORGANISATION OF NECK-BANDED GREYLAG GEESE *Anser anser* IN THEIR BREEDING AREA OF LAKE NEUSIEDL, AUSTRIA

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ABSTRACT Although goslings are known to move up to 10 km in their first days of life, juvenile geese only moved short distances (up to 1 km) from their ringing sites after ringing. In July the geese gathered in the central Seewinkel area (main gathering place Lange Lacke). After summer migration resightings of ringed geese dated from September onwards. The large flocks of non-breeders preferred the Lange Lacke area. Observations of non-breeders indicated that they left the area almost completely during moult and they were then resighted in July. Before the moult, non-breeding geese showed small-scale movements indicating fidelity to favoured localities. Some of them were the former rearing sites. The association of birds ringed on the same site and in the same year in the first and even the second year after ringing was shown.

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INTRODUCTION

Since 1970, neck-banding of Greylag Geese, *Anser anser*, has been coordinated by the International Waterfowl and Wetlands Research Bureau in Central Europe (Hudec 1970, Dick 1989). Austria has taken part in this project since 1982. One aim of the project is to establish site loyalty of breeding and wintering geese and to identify separate flyway migration patterns of the various European populations. Although the observations are not yet as extensive as in other studies (cf. Rutschke & Warthold 1986), initial analysis is presented here on the following subjects: the spatial distribution of geese, fidelity to certain localities, association of individual geese, change of localities and the whereabouts of non-breeders.

STUDY AREA, MATERIALS AND METHODS

In the far eastern corner of Austria, surrounded by reeds, lies Lake Neusiedl, which holds the majority of Austria's wild breeding Greylag Goose population. The reedbanks of the eastern shore harbour

most of the breeding geese. Inland of the reed *Phragmites australis* there is an extensive strip of meadows (mostly *Juncetum gerardi* and *Scirpium maritimi*, Fig. 1), which the geese use as feeding areas. The central Seewinkel area east of the lake, with numerous small and shallow lakes (called "Lacken") is important as a gathering site, where geese feed mostly on arable land (Dick 1987, 1988). The main breeding and rearing sites on the eastern shore of the lake are here described as area I, the central Seewinkel with the Lacken is treated as area II (Fig. 1).

From 1982 to 1987 288 geese were marked with white neck collars and a three digit code. Adults of the breeding population were caught during moult ($n = 33$), and goslings before fledging ($n = 255$). Systematic observations were carried out between 1982 and 1988 on 262 days ($n = 868$). All goose resorts were visited in the same order and searched for ringed individuals using telescopes (30x75 60x65). In addition, 459 casual observations from other observers were included. Resightings, at least one observation per goose, exist for 87.5% of the ringed individuals. Up to the end of 1988 45 geese (15.6%) were known to be dead and 36 geese (12.5%) were not resighted at all.

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SAMENVATTING

Dit artikel geeft informatie over de ruimtelijke verdeling, plaatstrouw, plaatswisseling en associaties tussen individuen van met halsbanden gemerkte Grauwe Ganzen bij het Neusiedl Meer in Oostenrijk (Fig. 1). Jonge ganzen zijn gedurende enkele weken trouw aan een vrij klein gebied (Fig. 2). Dit gebeurt na aankomst op hun opgroeiplaats, die verscheidene kilometers van het nest kan liggen. In juli verplaatsen de families zich naar het centrale Seewinkel gebied (Fig. 1), waar ze zich verzamelden voor de trek. Vanaf september worden daar opnieuw gemerkte ganzen waargenomen. De niet-broeders bezoeken gedurende het vroege voorjaar (maart en april) vooral het gebied met de opgroeiplaatsen (Fig. 3). Sommige ganzen kunnen daarbij een duidelijke voorkeur tonen voor hun eigen opgroeiplaats. Tijdens de rui in mei en juni vertrekken vrijwel alle niet-broeders naar elders. In juli keren ze terug naar het centrale Seewinkel gebied (Fig. 3). De niet-broeders blijken zich in hun eerste en tweede jaar vooral op te houden in gezelschap van ganzen die in hetzelfde jaar op dezelfde plaats opgroeien.