

# Studies on the population ecology and migrations of wild geese in the German Democratic Republic

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## Introduction

With the exception of the Lesser White-fronted Goose *Anser erythropus* the stock of the European wild geese has increased enormously in recent years. This development is remarkable, because other bird groups, such as the birds of prey, have sharply decreased during the same period.

There are different causes for the increase. Most important are the measures of protection in the far north of the U.S.S.R., where spring hunting is now forbidden and egg collecting and the catching of moulting geese is no longer so common as in former times. Furthermore, the geese have better feeding conditions at the moulting and wintering grounds in central and western Europe. The regulations of hunting in nearly all countries with wintering geese have been changed and hunting pressure has decreased.

A side effect of this development is increasing damage caused by wild geese on crops. The large gatherings of wild geese are sources of danger for air traffic. The distribution of viral and other infectious diseases by geese is another open question. This situation has been the background for the increase of field investigations of the population ecology of wild geese. In the G.D.R. the investigations have been concentrated on the following:

- the size and distribution of the stocks and their development;
- the phenology of the migrations;
- the interaction of geese with agriculture and prevention of damage;
- social structure and flocking behaviour.

## Methods

### Goose counts

#### Greylag Goose *Anser anser*

In the G.D.R. the breeding stock of the Greylag Goose has been censused in 1973, 1977 and 1981. The next count will be organised in 1985. Furthermore, there are counts at the principal summer gathering grounds in July and August.

#### Bean Goose *Anser fabalis* and White-fronted Goose *Anser albifrons*

In the whole area of G.D.R. the total stock of these geese has been counted for a long time in mid-November and during the international midwinter census (January) of wildfowl. Furthermore, the local stock is regularly observed at selected places.

### Goose marking

Investigations on the migrations, the changes of resting grounds, the duration of stay, and problems of social behaviour need the individual marking of geese. Catching is done by cannon-net. Additionally, Greylag Geese are caught in pens during the flightless period, when they can be herded on water.

The cannon-net used corresponds generally with the model developed in the Netherlands. The system was modified with respect to the gunpowder used, the electrical ignition, and the construction of the nets.

A total of 2,400 Bean Geese have been marked in the G.D.R. Metal rings from the Vogelwarte Hiddensee and coloured plastic neck collars have been used. From 1979 yellow collars with a three-digit code have been used, by agreement with other researchers on the species.

## Results

### *The resting and wintering stock of Bean Geese and White-fronted Geese*

In the last ten days of September the first small groups of Bean Geese and White-fronted Geese arrive at the resting grounds. At the beginning of October large flocks arrive and the main resting grounds are covered with geese. The Bean Geese come a little earlier than the White-fronted Geese. After the arrival of large concentrations only small groups come during the rest of the month. At the beginning of November, occasionally in mid-November, further large flocks arrive.

In contrast to the knowledge on the

phenology of migration, little is known about the changes of flocks between the various resting grounds and the duration of stay at one place. Some stay at one place from the beginning of October to the first half of December. On the other hand, there are examples of flights some hundred kilometres to other resting grounds a few days after catching. Regularly, groups of geese are observed at places situated at resting grounds north-east of the catching place. The majority of Bean Geese migrate to western Europe at the end of November or the beginning of December, mainly to Belgium and to the Netherlands.

The number of geese migrating and wintering in the G.D.R. has increased in recent years from 200,000 at the end of the 1960's to 450,000 (both species) in the autumn of 1983. The increasing number of geese makes it more difficult to obtain accurate counts.

#### *The development of the stock of Greylag Geese*

In the G.D.R. the breeding stock of the Greylag Geese had reached nearly 2,000 pairs by 1981, and the total summer stock was estimated to be 12,000. New breeding grounds have been settled and the breeding density has been shown to have increased in places subject to detailed investigation.

#### *Migrations*

The Greylag Geese breeding in central Europe represent a unitary population together with the geese breeding in Fennoscandia. All geese of this population gather in September along the southern coast of the western Baltic Sea from the area between the Isles of Ruegen and Hiddensee in the east to the Danish Isles in the west. From these large gathering grounds the geese migrate in autumn to resting grounds in the Netherlands. They are situated mainly in the new IJsselsee-Polders in Flevoland. The majority of these geese migrate to Spain in winter and stay in the Marismas of the Guadalquivir River. In this area approximately 80,000 geese were counted in December 1980. That is almost the total Baltic Sea-North Sea population. Depending on the severity of the winter a larger or smaller group of these geese have remained in the Netherlands in recent years.

The Greylag Geese breeding in south-east Europe, the Pannonic population, gather in late summer on the Great Hungarian Plain. They migrate across Italy and the Mediterranean Sea, mainly to Lake Ischkeul in Tunisia.

The border between the Baltic Sea-North Sea population and the Pannonic population runs roughly through the northern parts of Czechoslovakia and the south-west of Poland.

#### *The moult-migration of non-breeders*

In all geese species breeding in the northern hemisphere, the non-breeding part of the population undergo wing-moult at moulting grounds generally to the north. Ebbinge and Ebbinge-Dallmeijer (1977) argued that the geese move in search of longer days to give them a better chance of detecting and escaping from nocturnal predators.

The moulting grounds of the geese of the Baltic Sea-North Sea population are in the Netherlands, in Denmark, and increasingly in recent years in southern Sweden (Gotland). From the results of ringing we have learned that the non-breeders stay at the moulting grounds for nearly 6 weeks, the duration of wing growth. They leave the gathering places in the G.D.R. by the end of May and come back in the middle of July. At the same time it is possible to observe geese ringed in the C.S.S.R. (in July 1984 even a goose marked in Austria) at the summer gathering ground at Lake Guelpe (G.D.R.). These geese are on their way from the moulting grounds in southern Fennoscandia to their breeding ranges. They are observed for a few days, indicating only a short stay. It is particularly remarkable that a proportion of the geese of the Pannonic population migrate north to the same moulting grounds in southern Fennoscandia as the central European geese. They moult together with the latter and occupy the same resting grounds when they fly back. But they also stay together with parents and this year young at gathering grounds in the Pannonic region and migrate to north Africa in the autumn.

Pair formation is possible between geese coming from various populations during their stay at the moulting grounds or the resting places. The few records of geese marked in C.S.S.R. and observed in Spain can be so interpreted, likewise geese marked in G.D.R. and observed in Tunisia.

These geese have formed pairs with geese from the Pannonic population and migrated by the same route. At present these opinions are speculative. More research is necessary into pair formation in wild goose populations. Most of our knowledge is derived mainly from investigations on geese in captivity.

On the other hand, we must be very careful in interpreting our findings because very often more than one generalisation is possible. In the case of geese marked in G.D.R. and observed in Tunisia, these geese were marked after being caught at the summer resting place. It could therefore be that they are members of the Pannonic population interrupting their migration from the moulting ground to the breeding areas.

The migrations to the resting and gathering grounds, migrations to and from the moulting places and the yearly autumn and spring migrations overlap and interlock. In addition there are migrations between the resting places about which we have only little knowledge and the causes of which are not known yet. Movements in different directions during the various types of migrations will cloud the picture. Only the main lines of Greylag Goose migrations have been clarified by investigations carried out in recent years.

#### *The interaction of wild geese with agriculture and the prevention of damage*

Cereals and grass are the most important foods during migration. Bean Geese and White-fronted Geese feed on the autumn cereal seed. In spring the White-fronted Geese feed on grassland, too. Damage to farm crops is possible wherever wild geese in high concentrations stay for a long time grazing on the same fields. Greylag Geese therefore produce only small-scale damage during their stay at a few resting and gathering sites. This is the case in spring and the gathering places of non-breeders which fly thence to fields with cereal seeds and in summer on the major gathering sites. In summer damage occurs only occasionally, when, after unfavourable weather, geese flatten the standing cereal crops. After harvest the geese move on the stubbles collecting the unharvested grains.

In a series of trials we have examined damage on cereal seed. This occurs only if the grazed seedlings are very young or if the

soil is wet by the trampling of the geese. (For review, see Owen 1980 and Rutschke & Schiele 1978/79). On the other hand, geese may be beneficial to agriculture. If the roots of the seedlings are well developed, the growth of the plants in spring will be enhanced by grazing and the yield will be increased.

In discussions about the influence of geese on agriculture it is very important to know these opposing influences. The simple fact whether a field is damaged or not is only possible to decide after examining all circumstances.

In most cases it is possible to prevent damage by geese or lessen their effect by adopting a particular farming strategy. Damage can be avoided if the fields are drilled before the geese arrive, allowing the seedlings to be well developed when grazed. Where seedlings are beginning to grow, damage prevention measures must be concentrated on these fields. Many scaring devices are in use, with varying success (Owen 1980). The co-operative farms of the G.D.R., with their large farms, have approved the engagement of a field-guard during the critical period in autumn. He will drive away the geese by shooting. All other methods of damage prevention tried have not been effective over a long period.

#### *Social structure and behaviour*

Wild geese are extremely social and spend their whole life in units. Social life and social behaviour are very complex, as demonstrated by the pairing for life, the links between the children and their parents, the rank order of the goslings, forming of creches, and the different forms of geese flocks. There is no doubt that the highly developed social life in geese is an essential prerequisite for their exceptional ability for learning and adaptation. These are the pre-conditions for their survival during changing environmental conditions, together with a high reproduction rate allowing for the increase of goose stocks.

In the past much work was done to understand goose behaviour in captivity (especially by Lorenz and his co-workers). However, the results obtained in captivity cannot be translated to field conditions. For this reason we are studying the social life of the Greylag Goose in the wild.

We have concentrated our investigations on the following: stability of the families,

individual recognition by calls, stability and dynamics of communities at resting sites, cohesion between immature geese after separation from their parents. The individual marking with coloured plastic neck collars which can be read from a distance is a precondition for such investigations. Furthermore, catching of families is necessary. Only this approach allows an unobjectionable identification of age, sex and place of birth. First results have already been published (Rutschke 1982).

In the last two years we have intensified our investigations about the different forms of activity in Greylag Geese flocks:

1. In the pre-breeding period the males and the females spend nearly the same amount of time on food uptake and vigilance.
2. There are remarkable differences between solitary breeding pairs and colony breeding pairs. In the former the ganders will stay mostly near and guarding the nest and female. In "colonies" the majority of ganders fly during the day to fields or grassland near the breeding ground, feeding and preening. Only a few ganders stay near the nest, a small number of guards probably being enough to protect a group of nests and females.
3. The geese at a summer gathering site will fly regularly to the feeding grounds early in the morning. Food uptake will take nearly 2 hours. At the beginning of feeding a relatively large proportion of the geese is vigilant. After a period of undisturbed feeding the proportion of vigilant geese decreases. After one hour of food uptake most of the geese finish feeding and begin to sleep or preen. After this break the geese start a new phase of feeding. For a human

watcher the increase of vigilance is a signal that the geese are preparing to fly away.

4. Characteristic changes of the social behaviour depend on the structure of vegetation. The proportion of vigilant geese feeding in long grass is higher than in short grass. In accordance with the results of Lazarus (1978) we have found geese more vigilant in the outside zone of a feeding group than in its centre.

The number of investigations of the advantages and disadvantages of life in groups have rapidly increased over the past years. However, we are far from completely understanding the variety of factors involved.

It has been necessary to concentrate on a few aspects only. It is essential to exchange the experiences and results obtained by different scientists and to co-ordinate the activities in field studies. Only in this way will it be possible to gain a deeper insight and better possibilities for applications in practice.

#### Summary

Current investigations into the population ecology of grey geese in the German Democratic Republic are briefly described. These have concentrated on the size and distribution of the stocks, their migrations, interaction with agriculture, and social behaviour. Migrating and wintering Bean *Anser fabalis* and White-fronted Geese *A. albifrons* have more than doubled in the last 15 years to 450,000. Greylag Geese *A. anser* are increasing as breeding birds and now number 12,000. Their migrations, including moult-migration, are described. Measures to lessen or prevent agricultural damage are outlined. Behavioural studies have included aspects of vigilance, and differences between solitary and colonial breeding pairs of Greylags.

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