CROP DAMAGE AND MANAGEMENT OF THE PINK-FOOTED GOOSE Anser brachyrhynchus IN DENMARK

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ABSTRACT  More than 25,000 Pink-footed Geese Anser brachyrhynchus migrate through and stage on sites on the West Coast of Jutland in Denmark every year in autumn and spring. There is currently concern at the rate of loss of suitable staging habitats, as well as problems of conflict with farmers resulting from altered agricultural practices, with grassland now being cultivated for cereal crops. Management measures have been proposed to provide better staging opportunities for Pink-footed Geese in Denmark while also attempting to resolve the conflict with the farmers. In this paper the management of the goose population in Denmark in relation to crop damage is presented, and the consistency is discussed from an ecological viewpoint.


INTRODUCTION

More than 25,000 Pink-footed Geese Anser brachyrhynchus migrate through the north-west Europe between breeding areas on Svalbard and wintering sites in The Netherlands. In autumn and spring the population is concentrated in the western Denmark. As this represents a relatively small and isolated population, Denmark has an international obligation to adopt biologically responsible management measures. Variations in the number of geese in Denmark during the last 25 years are well documented (Fog 1977, Madsen 1982, 1984, 1986, 1987 and Jepsen et al. 1987), with a maximum of 28,800 individuals during spring 1988. During migration and staging in Denmark the Pink-footed Goose is restricted to localities along the west coast of Jutland, and the most important areas in spring are grassland and salt marshes in the Wadden Sea, Fiiilsø, Tipperne-Værnengene, Vest Stadil Fjord, Nissum Fjord and Harboøre Peninsula (Fig. 1).

The recent population expansion has caused increasing conflict between geese and farmers (Fog 1981 & 1982; Jepsen 1984; Madsen 1984). In 1987 the Danish Wildlife Administration made a proposal for management of the population of Pink-footed Geese in Denmark (Jepsen et al. 1987), and this plan is now endorsed by the Ministry of Agriculture. The aim of this paper is to examine the problems of crop damage on farmland and the management of the population.

CROP DAMAGE ON FARMLAND

Problems with geese on farmland and crop damage arise due to the relatively high number of geese in restricted areas, and the recent change in the agricultural practices in Denmark. In the last 15 years there has been a drastic decrease in the number of cattle and a subsequent reduction in the ratio of grassland to cereals. A combination of economic stagnation in agriculture, and the fact that the geese have been accustomed to foraging on cereals has resulted in a lower tolerance by farmers to the presence of geese. The Danish legislation does not allow for compensation to be paid for wildlife damage to crops, and farmers are more or less forced to solve the problems by themselves.

Since the beginning of the 1970s the Wildlife Administration has been seeking solutions to the problems which arise when geese are attracted to agricultural crops, especially in spring. A number of investigations have been conducted on the feeding of Pink-footed Geese on grassland near the Vest Stadil Fjord (Fig. 1), to determine to what extent
Fig. 1. Locations of sites in Denmark used by Pink-footed Geese during spring and autumn migration.

crop damage in adjacent fields can be prevented (Fog 1981). In 1985-1988 c. 100 000 Dkr. (US$ 15 000) was spent annually on supplementary feeding investigations (Jepsen et al. 1987). However factual evidence of damage by geese to field crops is lacking.

In Denmark investigations were undertaken from 1980-83 on the farmland of Fiilsø (Fig. 1), where Lorenzen & Madsen (1986) found, that most goose-days during the autumn were spent on stubble fields and stubble undersown with seed-grass. Only 3% of goose days were spent on winter grain fields. In spring, geese foraged particularly on newly sown barley fields. Shoot density was compared with harvest yield for different sections of the crops, both inside and outside goose enclosures. It was found that the effect of geese grazing on newly sown fields was a reduction in yield of between 7 and 20%. The maximum reduction of shoot density was 72%, but the surviving shoots compensated by setting more shoots per plant. From these rather limited results it can be concluded that crop damage occurs primarily on the newly sown fields in spring.

THE MANAGEMENT PLAN

Objectives

In the management of the population of Pink-footed Geese, it is important to provide geese with undisturbed areas (Owen 1977; Jepsen 1984). At the same time, opportunities should be sought to reduce the impact of goose feeding on agricultural crops in a biologically responsible way. It is recommended that sites of the order of 100 ha of grass habitat should be established at Fiilsø, in the western part of the Skjern Å Valley, at Vest Stadil Fjord and at Nissum Fjord (Fig. 1). These grass areas should have clear sight-lines in at least three directions and a width of at least 1000 m, so that the geese can feel secure (Madsen 1985a). In addition, it is suggested that the management shall include grassland areas at the Tipper Peninsula, Nissum Fjord and the Harboøre Peninsula, to provide high quality foraging opportunities. The management of these 100 ha areas implies an agreement or contract with the landowners concerning the location, rent, choice of crops, management, etc.

Goose feeding sites

It is implicit that the special feeding sites for geese have to incorporate fundamental criteria such as:

- lack of disturbance,
- minimum size (e.g. 100 ha),
- quality and quantity of food supplies.

Experience shows that during spring the geese will forage on newly sown grain and pea fields. To en-
GEESE MANAGEMENT IN DENMARK

To ensure maximum use of protected goose areas, it is important that they should be more attractive to the geese than areas where the geese are considered as a pest. For that reason it is expected that it will be necessary over a period of years to provide supplementary grain ("lure crop") as food in the grassland areas. From measurements in extensively fertilised and grazed grassland, e.g. in the Værmenger, primary production of grass is known to be c. 150 g dry weight (dwt) per m² in the period 1 January - 15 May (J. Madsen pers. comm.) In April-May a Pink-footed Goose requires c. 300-350 g grass (dwt) per individual per day. Therefore, an area of 100 ha supports about 14 300 Pink-footed Geese over 30 days (Lorenzen & Madsen 1986).

This is a maximum estimate which can only be achieved if the vegetation is managed with well-controlled use of fertilizer, cattle grazing or hay-cutting, as appropriate. It is also assumed that the geese have undisturbed access to the entire area.

Economic assumptions

It would be appropriate that the management of the special goose sites should be carried out by the landowners in close co-operation with the Wildlife Administration, and compensation should be paid for the difference in profit for cultivation of grass instead of other crops as barley, wheat, peas or rape. In addition, there will be the expense of grain for lure-crop in connection with supplementary feeding of the geese during the spring period. It is estimated that lure crop would be required in the period 15 April - 15 May, using c. 500 kg of barley per day per 100 ha. The estimated working hours to complete this task are two hours per day per site. A co-ordinated management plan for the special goose sites would have a minimum annual cost of about 200 000 Dkr. (US$ 30 000), depending on the amount of compensation paid to landowners.

Prevention of crop damage

In order to make the management plan most effective, it must be assumed that the farmers will aim for maximum sowing depth for grain and peas, and that at the same time there is an effective effort to keep the geese away from cereal fields by using various preventive measures.

DISCUSSION

The Wildlife Administration is aware that the problem of geese versus farmers, as seen from the farmer's viewpoint, could be solved satisfactorily by feeding with lure-crop (barley and possibly peas). Ecologically the problem is more complex. Grain provides the geese with the opportunity to build up the necessary fat reserves quickly, but protein-rich food in the form of grass is probably a prerequisite for building up protein reserves (Madsen 1985b). The claim that foraging on cereals has been a significant factor in the increase of the population of the Pink-footed Goose is not supported. Analyses of ringing recoveries indicate that the increase has been brought about by better survival and not a high reproductive rate (Ebbinge et al. 1984).

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**SAMENVATTING**

Meer dan 25 000 Kleine Rietganzen trekken door en verblijven enige tijd op plaatsen aan de westkust van Jutland (Denemarken). De laatste tijd is er een zorgwekkend verlies aan geschikte habitats en daarnaast zijn er conflicten met boeren die voortvloeien uit de overgang op andere teelten (van grasland naar graanverbouw).

Beheersmaatregelen, zoals het instellen van speciale ganzengebieden waarin men 'lokgewassen' als gerst en mogelijk erwten zaaft, worden in dit artikelen vanuit ecologisch standpunt besproken.