

## Lethal scaring

### behavioral and short-term numerical response of greylag goose

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# Lethal scaring

A method used to

\*reduce number of geese causing damage on agricultural crops

\*assumed to reinforce effect of scaring devices



# When lethal scaring?

- Does not jeopardize maintenance of favorable conservation status
- If the birds are anticipated to cause damage on unharvested fields
- No other solutions

### Differences between species





# Why study effects of lethal scaring?



### Why study?





Thousands of geese are shoot during lethal scaring/derogation in Sweden/Europe



### Why study?

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### Why study?

Few studies verifying the effect of lethal scaring

- even fewer studies outside open hunting season





# Effects of shooting

• Difficult to study

Confounding factors

Move over large areas

Practical reasons (coordinate shooting events, landowners' permission etc.)

• Few scientific studies controlling for confounding factors

Before & After (hunting season, changes in legislation) Inside & Outside (protected areas)



	Swans	Geese	Dabbling ducks	Diving ducks
Increased flight initiation distance	-	4	2	-
Behavioural changes	1	2	8	1
Spatial redistribution (local)	4	8	25	5
Spatial redistribution (regional)	4	2	_	1

Madsen & Fox 1995



## Hypotheses

- 1. Lethal scaring will reduce the number of grazing birds at a local spatial level (field)
- 2. Birds will increase flight initiation distance to an approaching person after lethal scaring.

# "Pseudo-" Experiment







#### Control



#### Experiment/lethal scaring field





# BACI – Before-After-Control-Impact











Number of geese ~ time + field type + time\*field type

#### Lethal scaring

- Lethal scaring evening and subsequent morning
- 2-8 hunters (two and two)
- Decoys
- Hides, ditches with vegetation etc.



### Sites and number of observations

26 lethal scaring fields42 control fields

Hornborgasjön (3 trials) Kvismaren (3 trials) Tåkern (4 trials) Tysslingen (2 trial) Sörfjärden (1 trial) Väse (Värmland) (2 trials) Edenryd (Skåne) (1 trial) Finnåker (Västmanland) (1 trial)



### Results

On average 33 geese shot per trial (±7.0 SE, range 1-147).

Corresponds to ~ 9% of counted geese before lethal scaring.



### Results – number of geese





## Results – number of geese

\*In average 63% decrease at lethal scaring fields

\*Significant effect of time (decrease after performed lethal scaring)

\*Significant effect of field type (more geese on lethal scaring fields)

\*Significant interaction term i.e. an effect of lethal scaring (p<0.001)





### Results – Flight Initiation Distance





# Conclusions



#### **Future studies**

- persistence over time
- individual behaviour
- other species
- how to reinforce the effect
- comparing other methods

### Thanks!

#### David Ahlqvist (field work)



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Lethal scaring is one method used to alleviate crop damage by grazing geese. During lethal scaring, a few geese foraging on growing crops are shot to achieve a deterrent effect on other flock members. An additional amin is to reinforce the effects of non-lethal scaring measures. As the populations of geese increase in large parts of the world, an increased need for tools within the multifaceted area of goose management has been highlighted. Lethal scaring can potentially be one method, but currently little evidence exists about the effectiveness of the method.

In this study, I tested whether grazing greylag geese Anser anser show short-term numeric and behavioral responses due to lethal scaring in targeted fields, using a Before-After-Control-Impact (BACI) study design. The study includes 26 fields with lethal scaring and 43 controls (geese were left undisturbed), where the number of birds was counted and the distance between an approaching person and the geese when all individuals have raised their heads and when they escaped were measured - before and after tethal scaring was performed.

On average, 33 geese were shot per trial, which corresponds to 8.9% of the counted geese on the lethal scaring fields before the shooting occurred. The number of geese significantly decreased in the lethal scaring fields after the shooting (63% less) but were also reduced in numbers on the control fields (17% less). This result may be due to the same goose individuals using both control and lethal scaring fields, and when affected at scaring fields they choose another area or habitat for foraging; for example, in wetlands. However, the difference in the number of geese on control fields, both before and after lethal scaring, did not relate to the distance to lethal scaring fields. Moreover, birds did not seem to become more afraid of an approaching person (i.e., a non-lethal scaring tool) after the lethal scaring had been conducted (flight distance before 134 m (±15.3 S.E.) and after 149 m (±14.1 S.E.) in lethal scaring fields). In conclusion, this study shows that lethal scaring can substantially decrease the number of greylag geese in damage prone fields for at least three consecutive days, hence this method may also work as a tool to reduce crop losses. Practical experience from tools for alleviating crop damage is available from both Europe and North America, but very little has been published. It is therefore important to evaluate the effectiveness of the available tools under controlled conditions to increase our understanding of appropriate preventive tools and provide guidelines for stakeholders involved in the multifaceted area of goose management and crop protection.

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#### 1. Introduction

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Many geese populations have increased in Europe and North America during the last few decades (Ankney, 1996; Fox et al., 2010), and have also shifted the use of habitats from relatively natural systems to intensively managed agricultural landscapes (Fox et al., 2017, 2005; Gauthier et al., 2005). Increasing populations of geese can have a detrimental effect on vegetation and ecosystems (Abraham et al., 2005a, 2005b) and also bring geese into conflict with farmers as they cause crop damage (Ankney, 1996; Fox et al., 2017). The recent rapid increase in goose numbers presents a monumental management challenge, and applied research is required to increase knowledge about available tools to mitigate impact and harvest losses. Common tools to reduce damage by grazing geese aim to divert geese from economically sensitive crops to alternative feeding areas where they do not cause damage by

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#### More details?