The Starling in a changing farmland – Danish experiences

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NABU – conference, Hamburg 17. February 2018

Background

- BirdLife Denmark (DOF) since 2001
  - Monitoring projects
- PhD-study
  - ‘Citizen Science based Bird Population Studies’ (2014-2017)
  - Aarhus University, Kalø
- Working with Starlings as part of PhD

Aim of the PhD

The overall aim of the project was to improve the scientific use of data from Citizen Science based bird population studies in Denmark.

Photo: Peter Nielsen

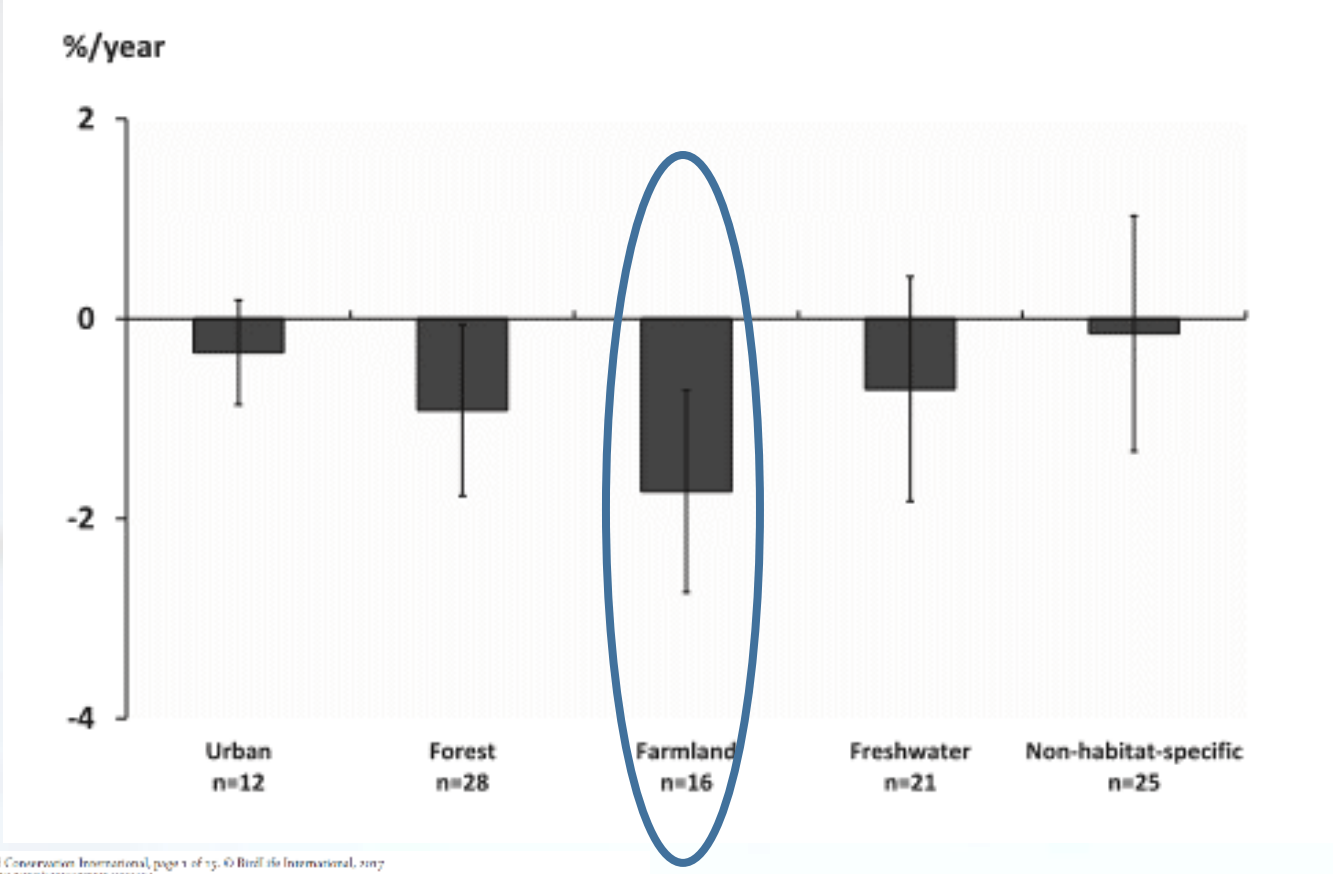
Why should we improve the scientific use?

Citizen science provides **access to more and different observations** and data than traditional science research.

Hundreds of thousands of people around the world contribute bird observations.

Such information is essential to be able to **provide the knowledge base for the optimal management and conservation of vulnerable or declining species**.

Starling – a specialised farmland bird



Bird Conservation International, page 1 of 15. © BirdLife International, 2017
doi:10.1017/S0959270917000351

Continuous population declines for specialist farmland birds 1987-2014 in Denmark indicates no halt in biodiversity loss in agricultural habitats

HENNING HELDBJERG, PETER SUNDE and ANTHONY DAVID FOX

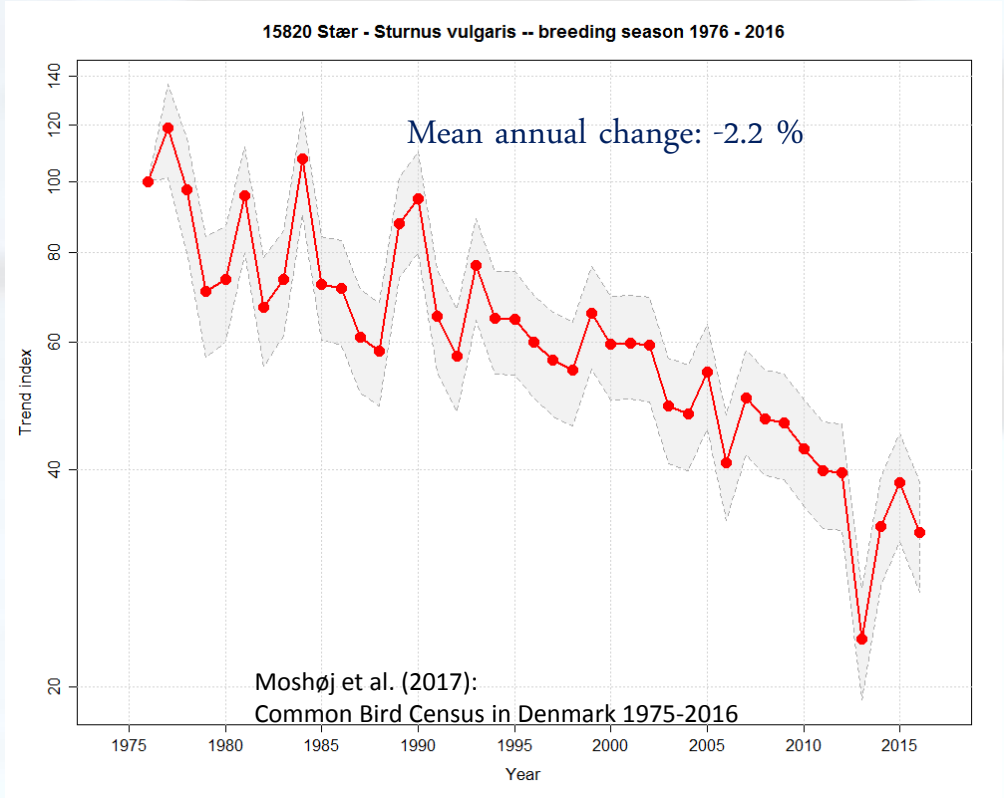
Foto: Ulrik Bruun

16 farmland specialists

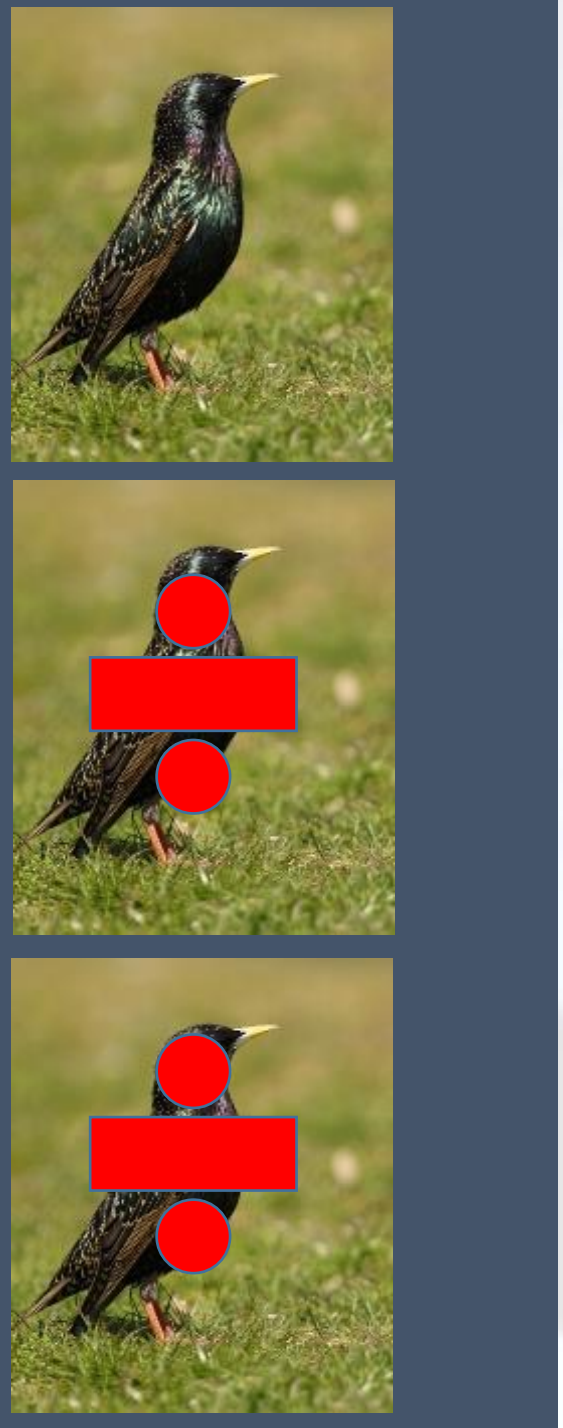
Farmland habitat classification:

- Meadow
  - (broad term: marsh, meadow etc.)
- Agriculture

Status in Denmark



Moshøj et al. (2017):
Common Bird Census in Denmark 1975-2016



Starlings and farmland changes

- Aimed to understand the Starling decline in relation to changes in farmland practices
- Regional Starling trends, density counts
- Farmland statistics

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journal homepage: www.elsevier.com/locate/agee

The decline of the Starling *Sturnus vulgaris* in Denmark is related to changes in grassland extent and intensity of cattle grazing

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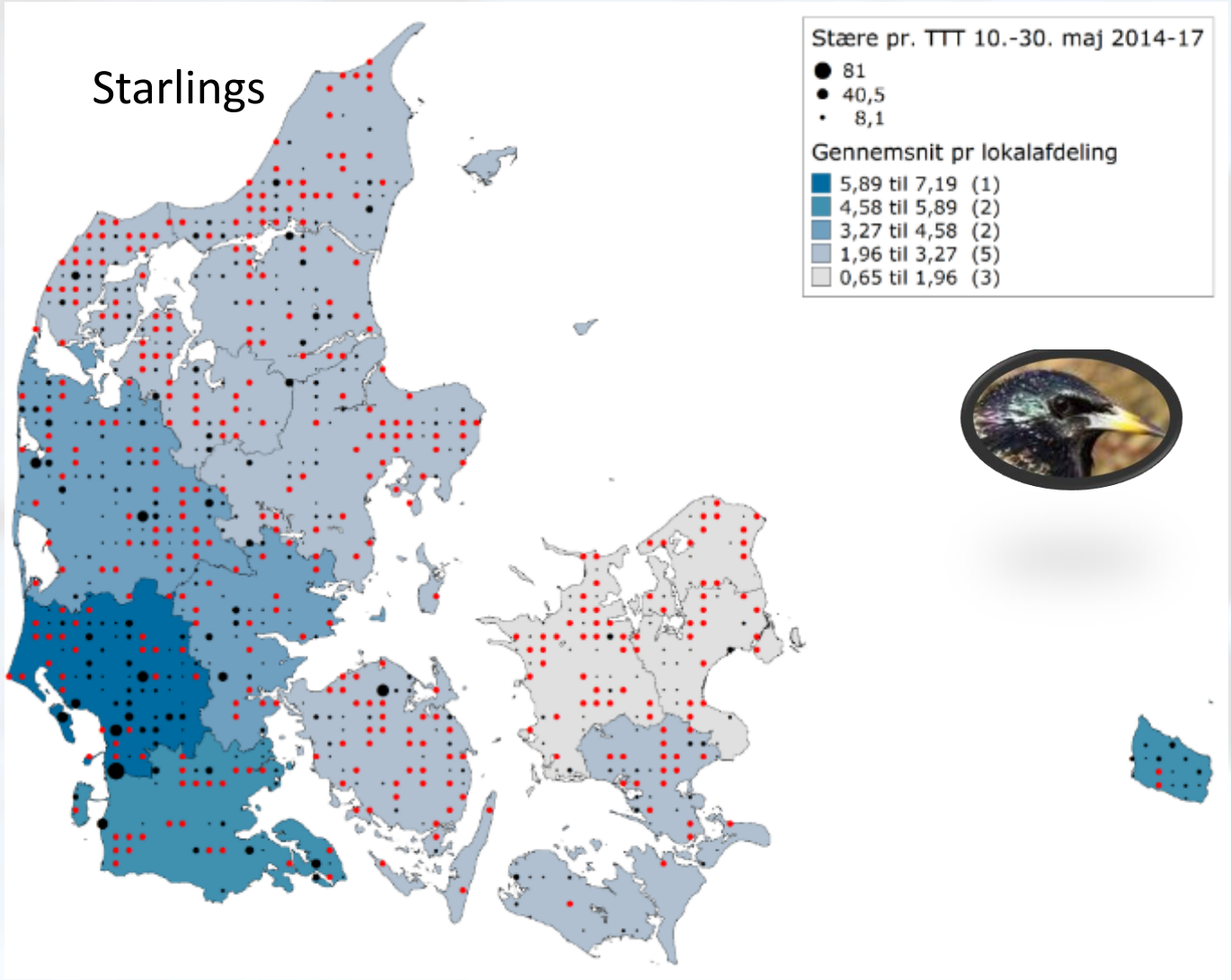
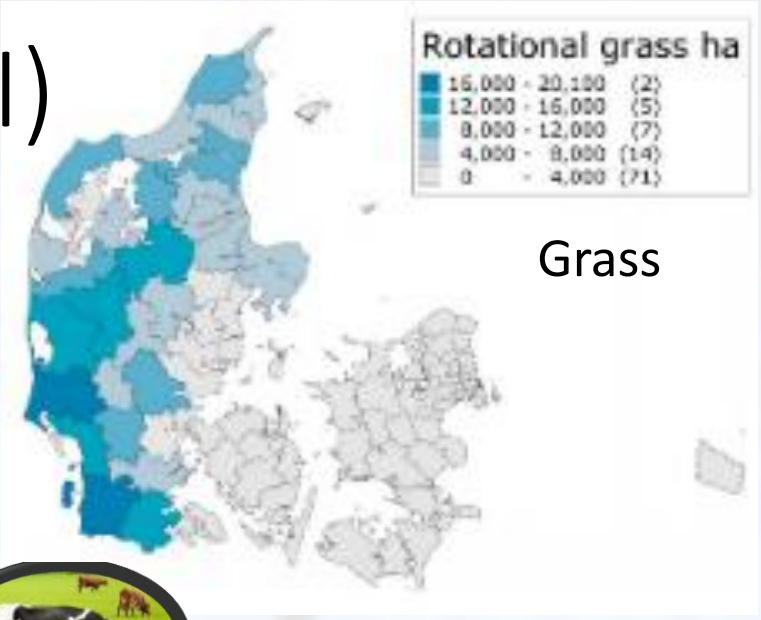
Photo: Jan Skriver

Cattle – Grass – Starlings (Atlas III)

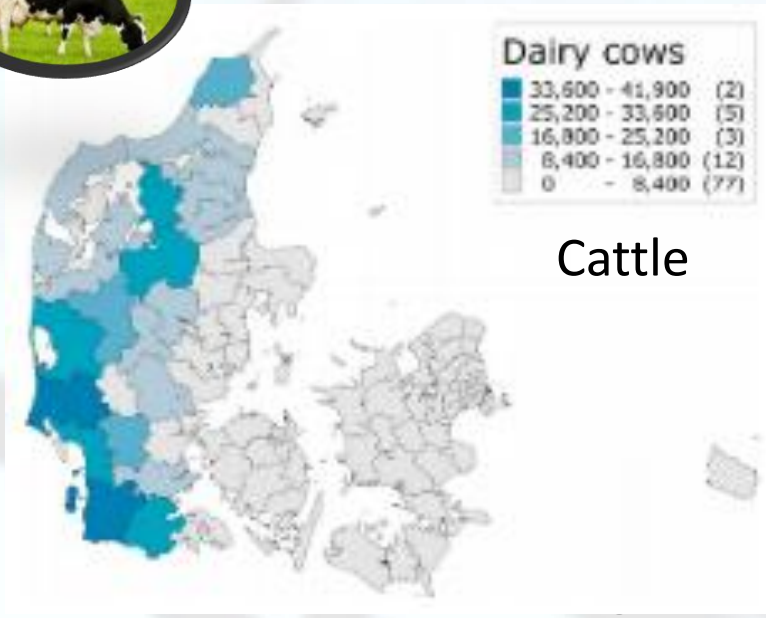
Starlings



Grass

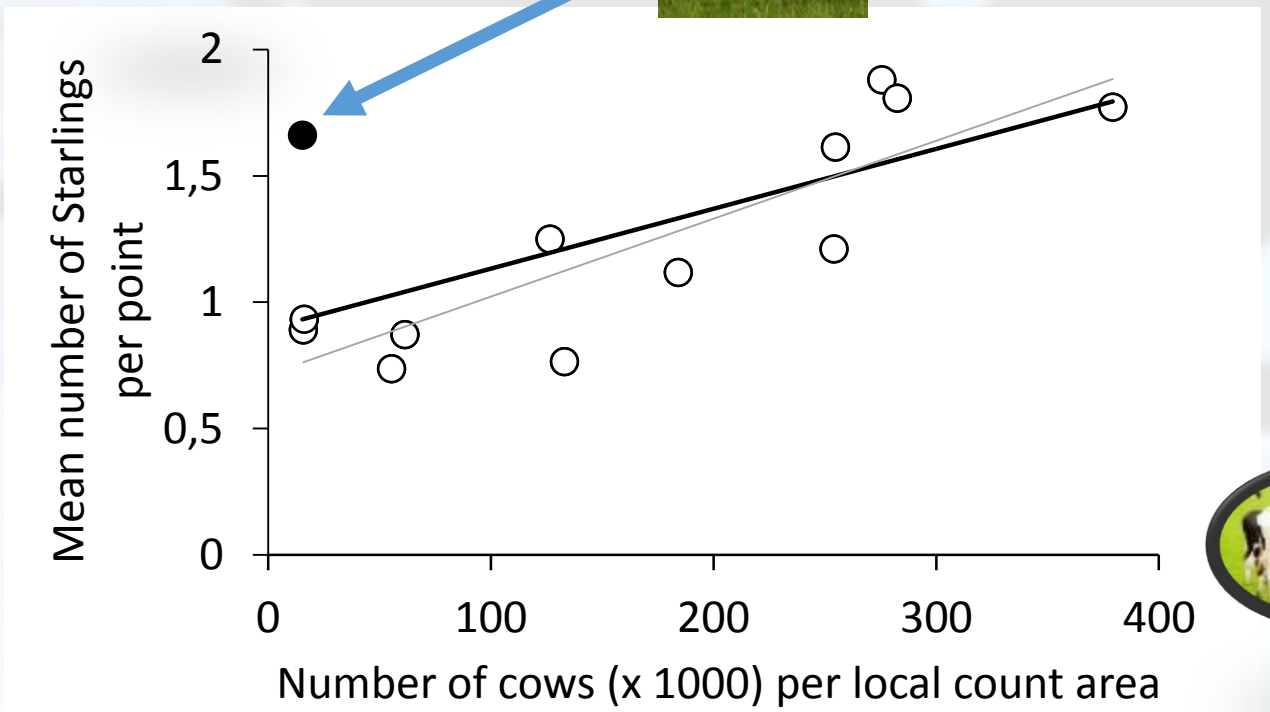


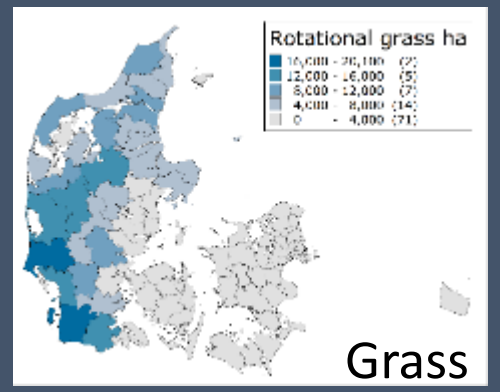
Cattle

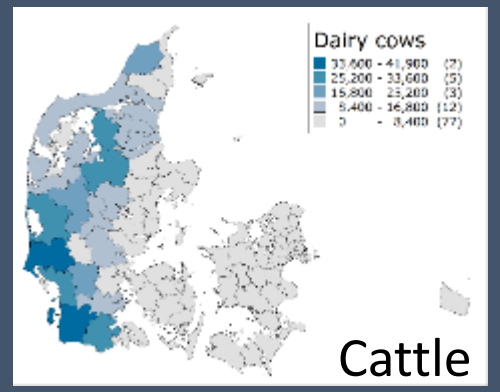


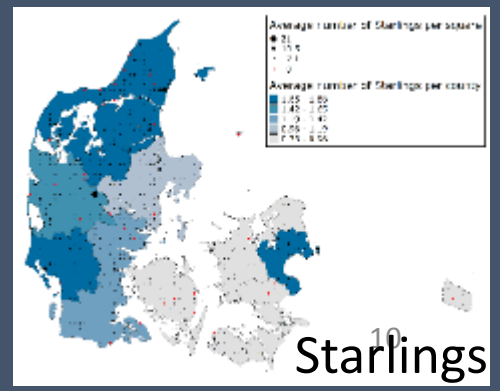
Density of cattle and density of Starlings (Atlas II-1993-96) in Danish counties

Larger Copenhagen area



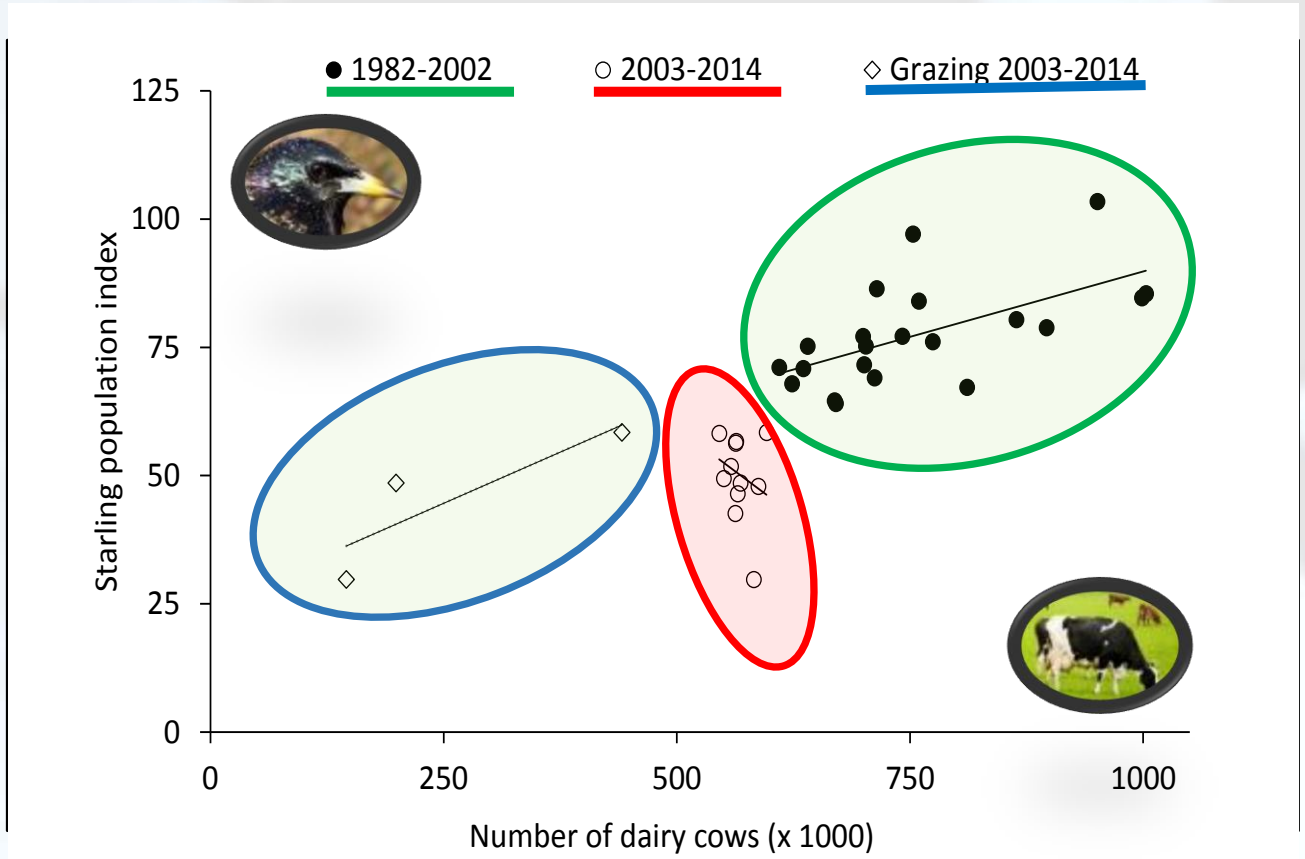






Consequences of declines in grazing cattle

The long-term decline in national Starling abundance was positively correlated with the long term numbers of dairy cattle grazing outdoors



Dairy cattle

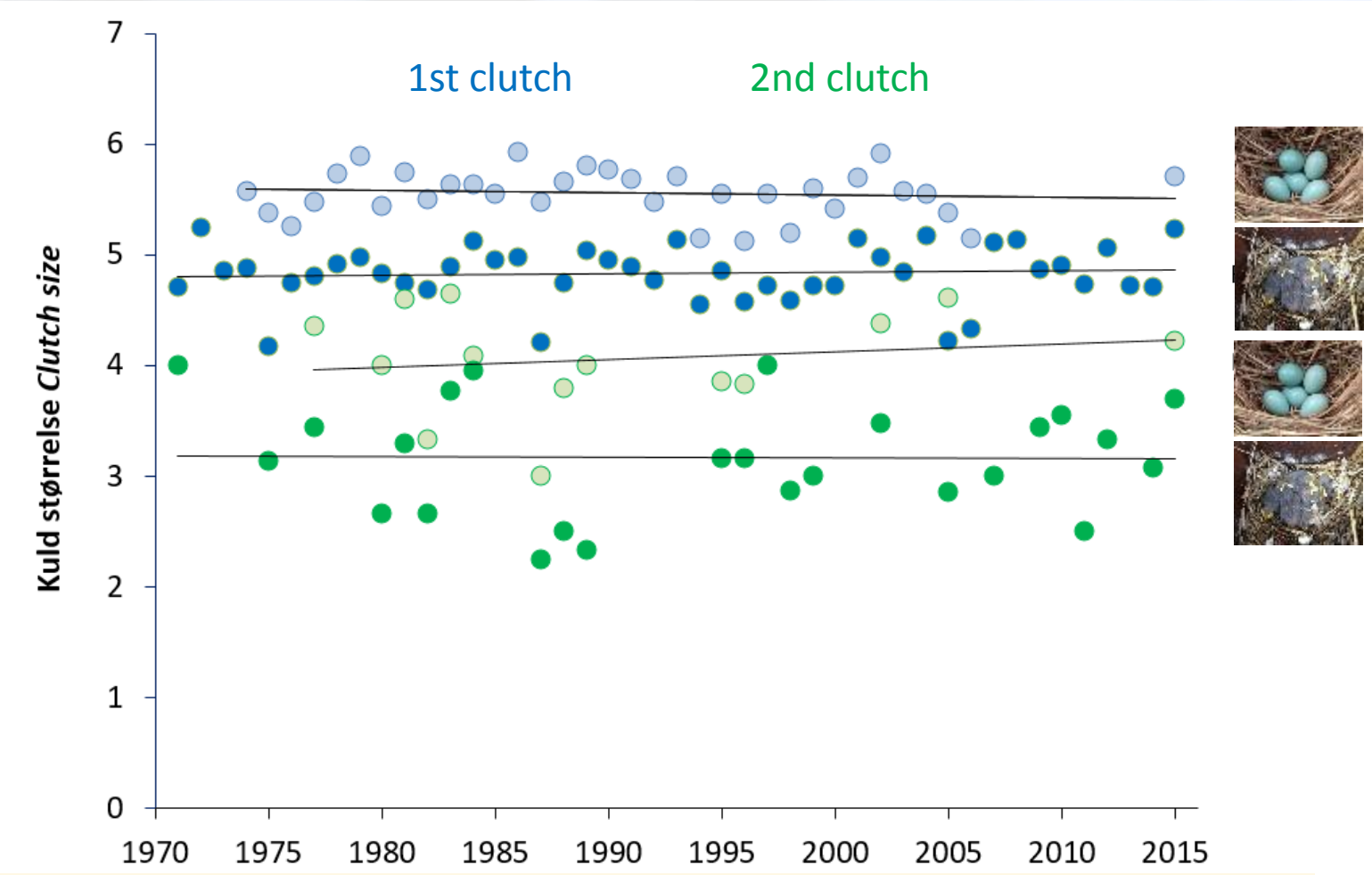
Minus 40%

Grazing dairy cattle

Minus 85%

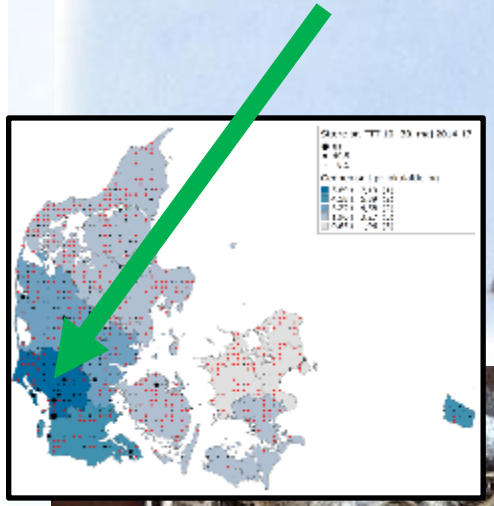
45 years of Starling studies

- No changes in nestling production



Kuldstørrelse og yngletidspunkt hos Stær i Sydvestjylland 1971-2015

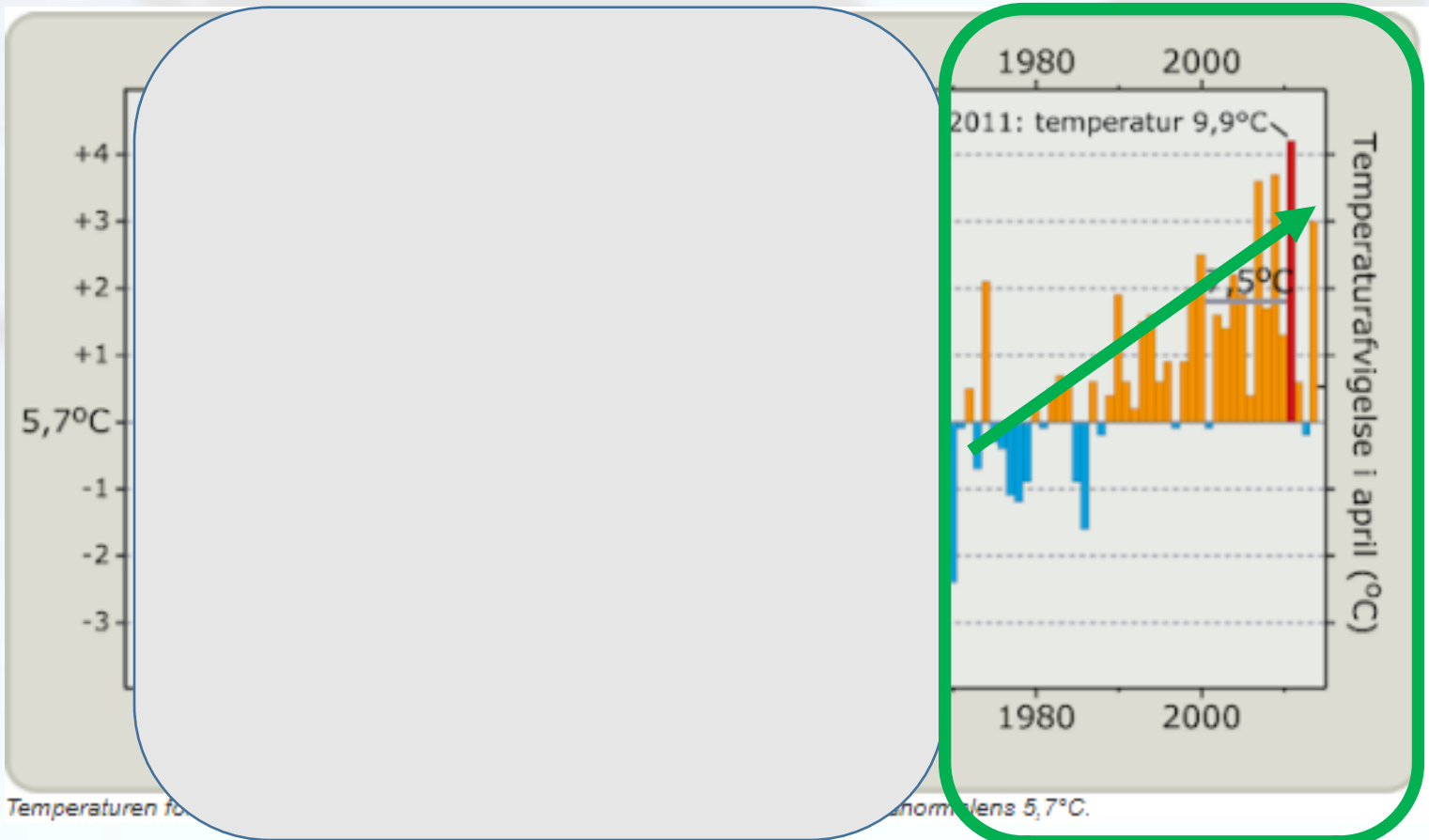
PEDER V. THELLESEN



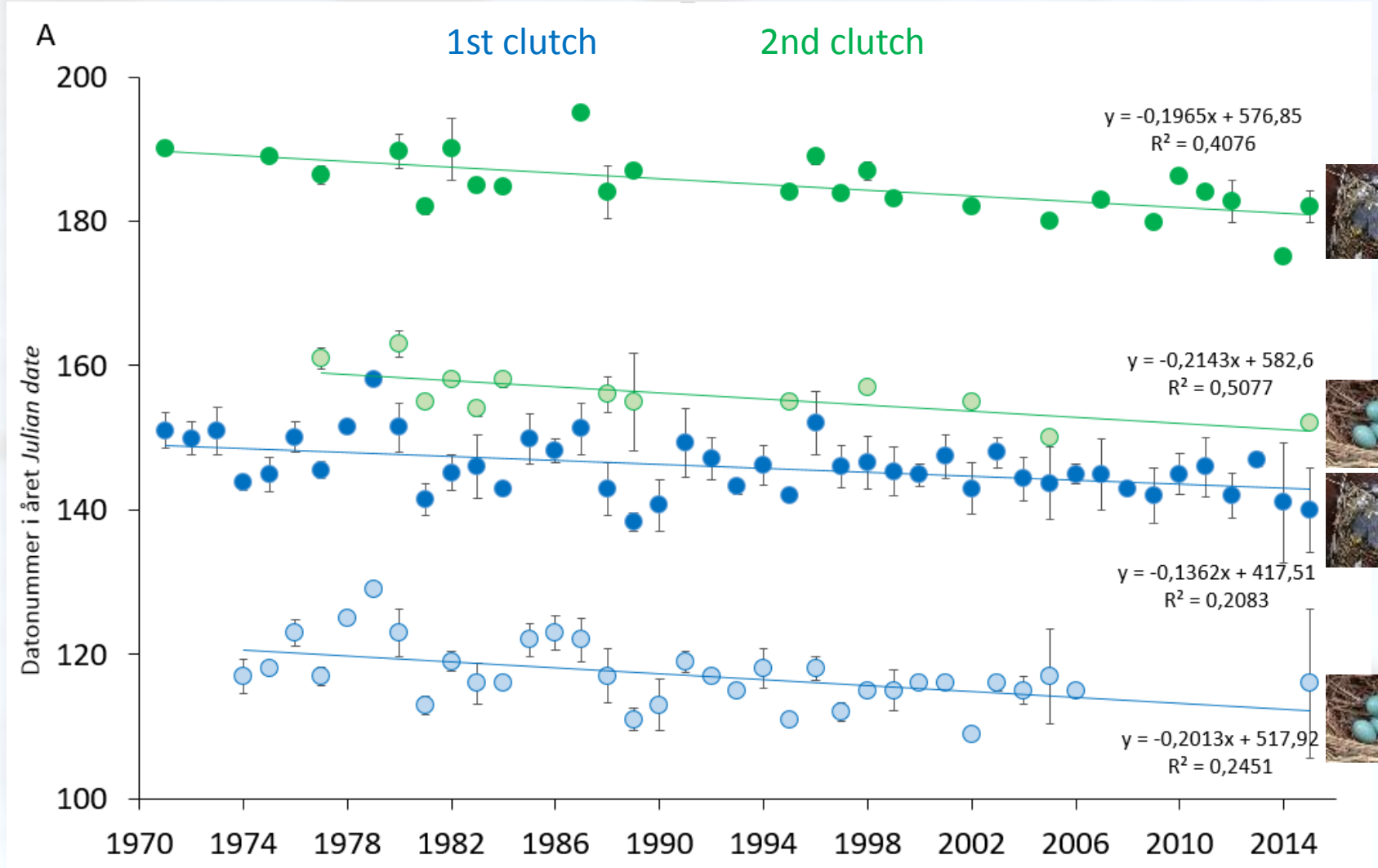
Peder Thellesen DOFT 2017: Common Starling *Sturnus vulgaris* clutch size, brood size and timing of breeding during 1971-2015 in Southwest Jutland, Denmark'

Climate change

- April temperature in Denmark - annual changes from mean

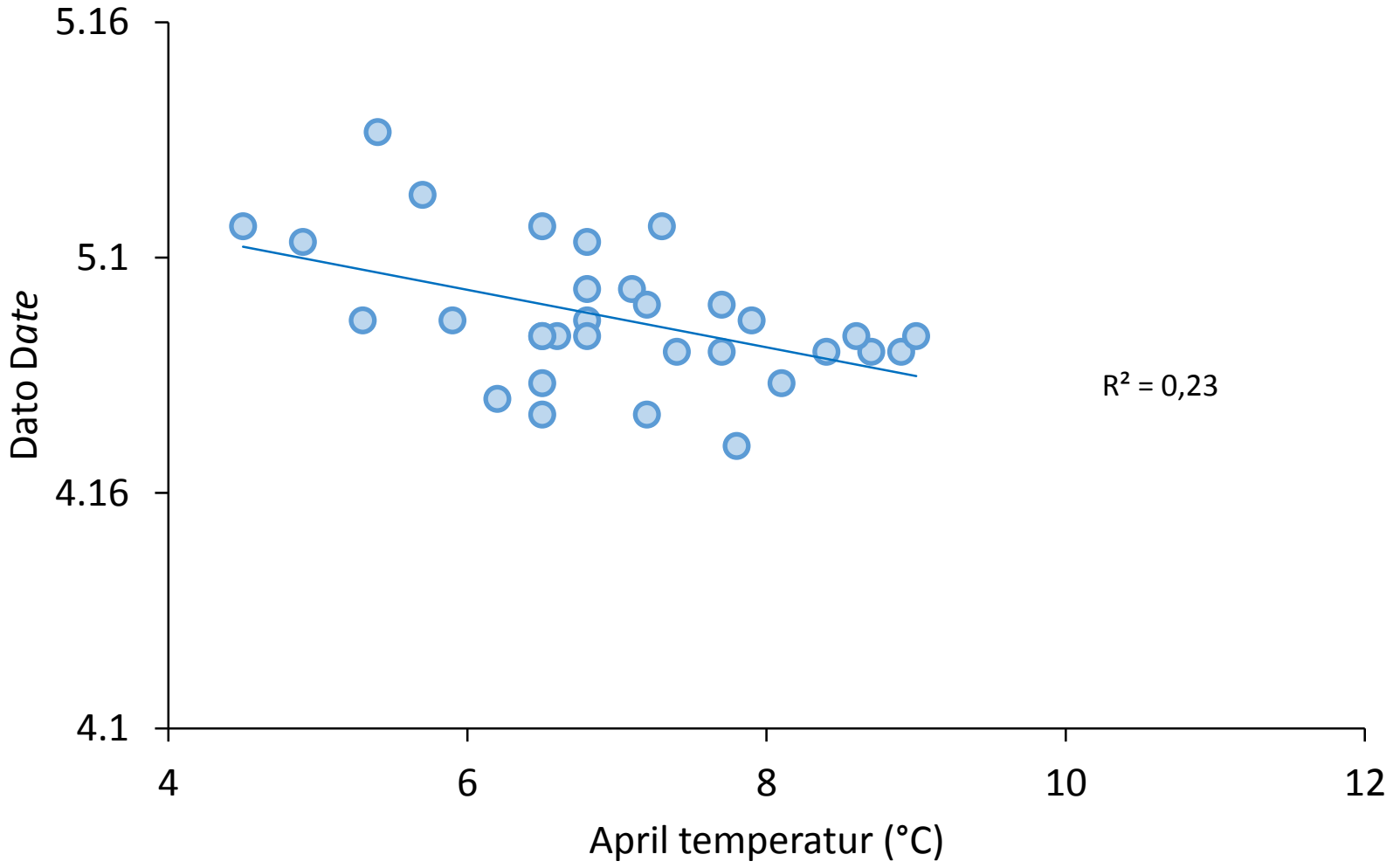


Nine days earlier now than in 1971



Starling studies in 45 years

- 1st egg correlated to the temperature in April



‘Starling Master’ Peder Thellesen

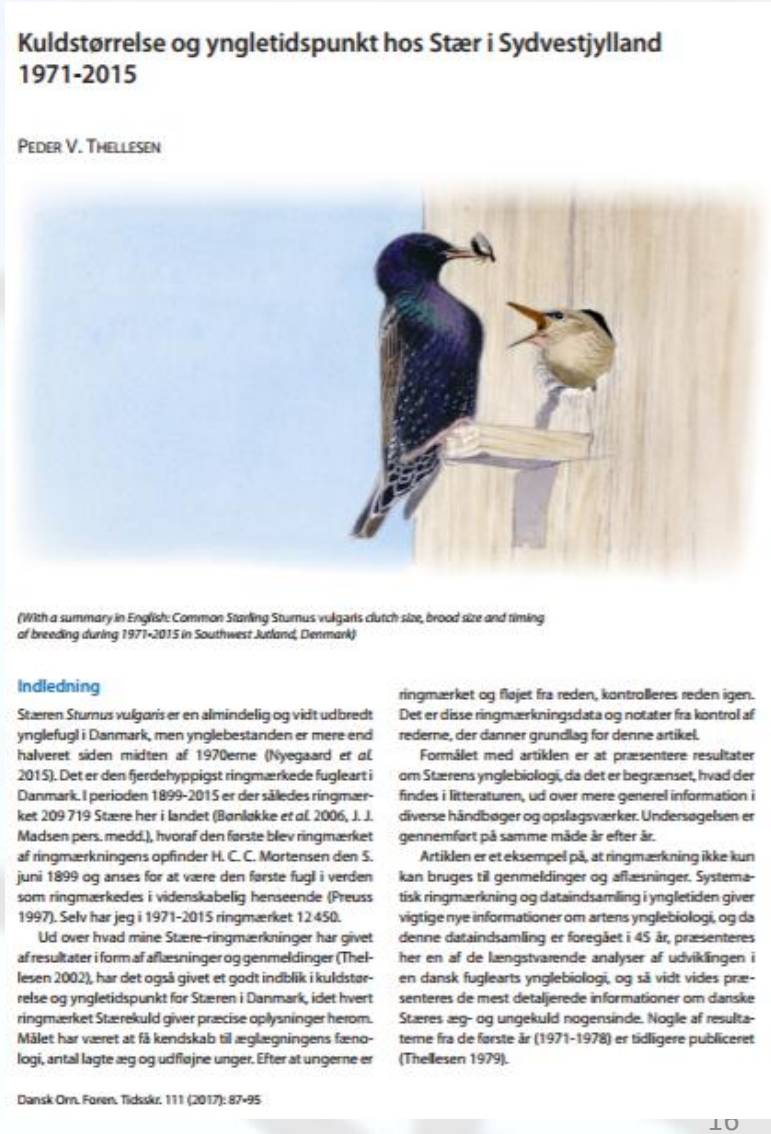
nature
International journal of science

Correspondence

Ornithology: Danish dairy farmer delivers data coup

Tony Fox ✉ & Henning Heldbjerg

Neither the name Peder V. Thellesen nor the *Danish Ornithological Society Journal* will resonate with most *Nature* readers. In a striking example of citizen science, the Danish journal has just published 45 years of Thellesen's breeding data from his studies of starlings (*Sturnus vulgaris*) in 27 nesting boxes on his dairy farm (P. V. Thellesen *Dansk Ornitol. Foren. Tidsskr.* **111**, 87–95; 2017). As far as we know, this data set



Kuldstørrelse og yngletidspunkt hos Stær i Sydvestjylland 1971-2015

PEDER V. THELLESEN

(With a summary in English: Common Starling Sturnus vulgaris clutch size, brood size and timing of breeding during 1971-2015 in Southwest Jutland, Denmark)

Indledning

Stæren *Sturnus vulgaris* er en almindelig og vidt udbredt ynglefugl i Danmark, men ynglebestanden er mere end halveret siden midten af 1970erne (Nyegaard *et al.* 2015). Det er den fjerdehyppigst ringmærkede fugleart i Danmark. I perioden 1899-2015 er der således ringmærket 209 719 Stære her i landet (Bønløkke *et al.* 2006, J. J. Madsen pers. medd.), hvoraf den første blev ringmærket af ringmærkningens opfinder H. C. C. Mortensen den 5. juni 1899 og anses for at være den første fugl i verden som ringmærkedes i videnskabelig henseende (Preuss 1997). Selv har jeg i 1971-2015 ringmærket 12 450.

Ud over hvad mine Stære-ringmærkninger har givet af resultater i form af aflæsninger og genmeldinger (Thellesen 2002), har det også givet et godt indblik i kuldstørrelse og yngletidspunkt for Stæren i Danmark, idet hvert ringmærket Stærekuld giver præcise oplysninger herom. Målet har været at få kendskab til æglægningens fænologi, antal lagte æg og udfløjne unger. Efter at ungerne er ringmærket og fløjet fra reden, kontrolleres reden igen. Det er disse ringmærkningsdata og notater fra kontrol af rederne, der danner grundlag for denne artikel.

Formålet med artiklen er at præsentere resultater om Stærens ynglebiologi, da det er begrænset, hvad der findes i litteraturen, ud over mere generel information i diverse håndbøger og opslagsværker. Undersøgelsen er gennemført på samme måde år efter år.

Artiklen er et eksempel på, at ringmærkning ikke kun kan bruges til genmeldinger og aflæsninger. Systematisk ringmærkning og dataindsamling i yngletiden giver vigtige nye informationer om artens ynglebiologi, og da denne dataindsamling er foregået i 45 år, præsenteres her en af de længstvarende analyser af udviklingen i en dansk fuglearts ynglebiologi, og så vidt vides præsenteres de mest detaljerede informationer om danske Stæres æg- og ungekuld nogensinde. Nogle af resultaterne fra de første år (1971-1978) er tidligere publiceret (Thellesen 1979).

Dansk Orn. Foren. Tidsskr. 111 (2017): 87-95

Starling decline in Europe

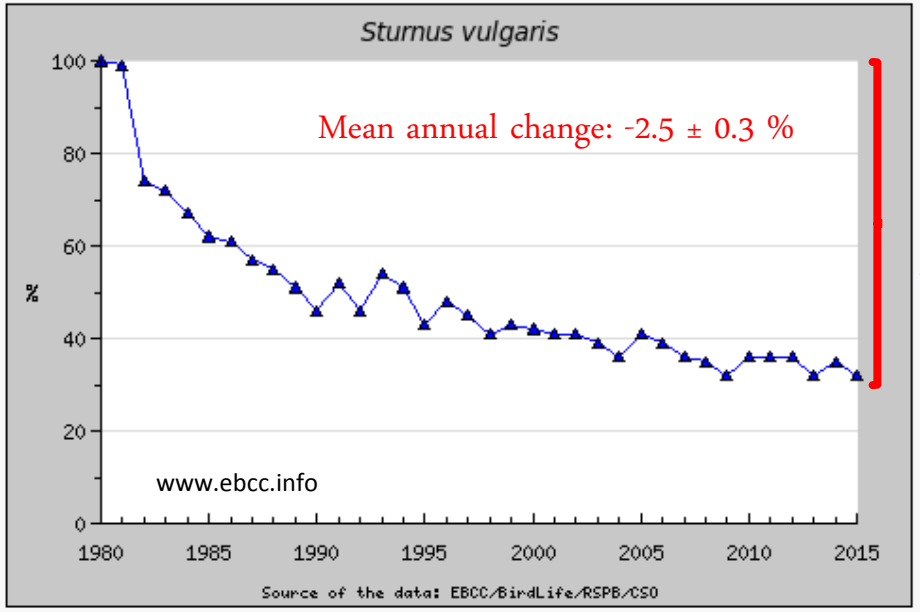
Using monitoring data from PECBMS (Pan-European Common Bird Monitoring Scheme)

Common Starling (*Sturnus vulgaris*)

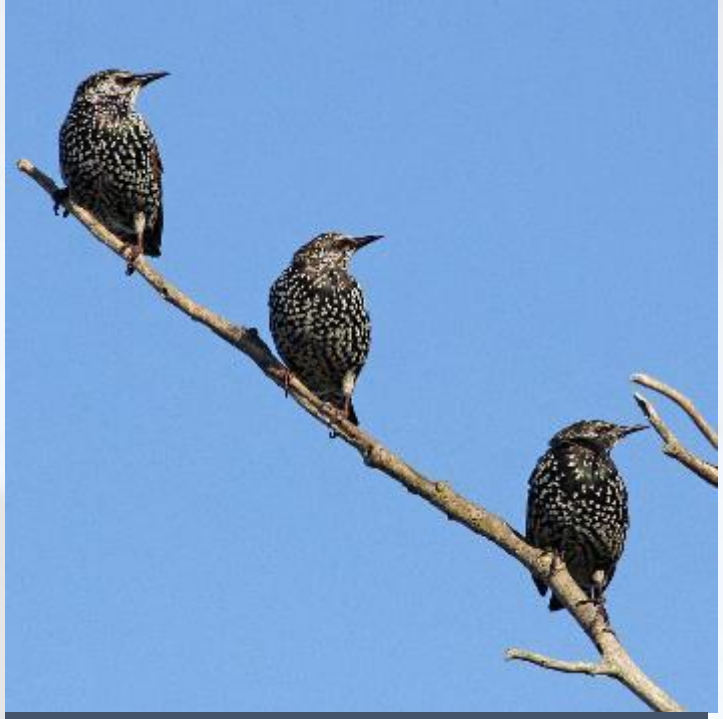
Population index (%) 1980 - 2015, Europe.
Trend classification: *Moderate decline* (explanation)

List of Countries

Source of the data: EBCC/BirdLife/RSPB/CSO



- 65%



The Starling is a widespread and common farmland species in Europe

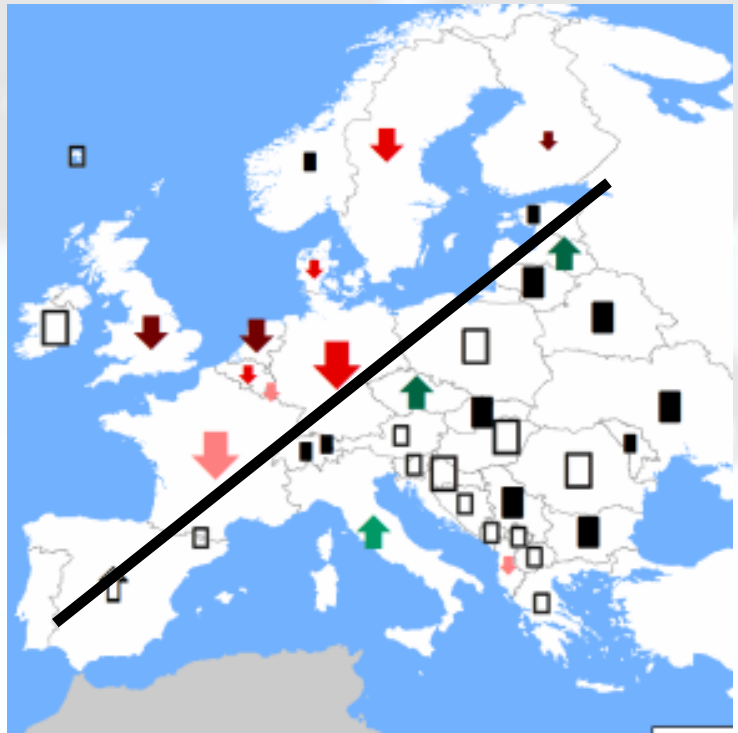
PECBMS data show that it is declining in large parts of its European range

Europe lost c. 100 million Starlings during 1980-2012

Foto: John Larsen

Large difference between West and East of Europe

Foto: Jan Skriver



European 2012 population:
28.8-52.4 million pairs
(BirdLife International (2015) European Red List of Birds)

= 57,7-105 million Starlings

1980-2012: 60% decline

Or 86-157 million lost Starlings

Studying Starlings with GPS loggers

- Hypothesis: Starlings prefer grazed areas
- Study: Use of different land cover types as a function of distance intervals from the nest and their relative availability

- Nestboxes, nestling period
- Traditional dairy farm

Foto: Klaus Dichmann

PLOS ONE

RESEARCH ARTICLE

Common Starlings (*Sturnus vulgaris*) increasingly select for grazed areas with increasing distance-to-nest

Henning Heldbjerg[1,2]*, Anthony D. Fox[1], Peder V. Thellesen[3], Lars Dalby[1], Peter Sunde[1]

1 Department of Bioscience–Wildlife Ecology, Aarhus University, Kalø, Rønde, Denmark, 2 DOF BirdLife Denmark, Copenhagen, Denmark, 3 Hjortkær, Årre, Denmark

Foraging behavior

- Aim to study the foraging behaviour on individual Starlings
- GPS loggers
- Building upon the Citizen Science based knowledge

Photo: Anthony D. Fox

Design

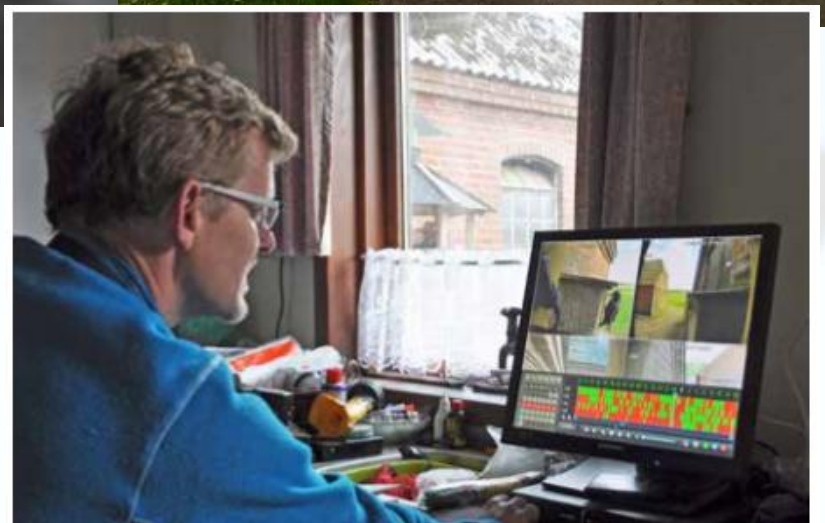
- Caught in or near nestboxes
- 17 GPS loggers (Gypsy-5),
  - 2015 and 2016
- Logger mounted on harness
  - ‘rucksack’
- One position per minute
  - (less at night)
- Battery capacity 1½ days

Nestling time is c. 19 days

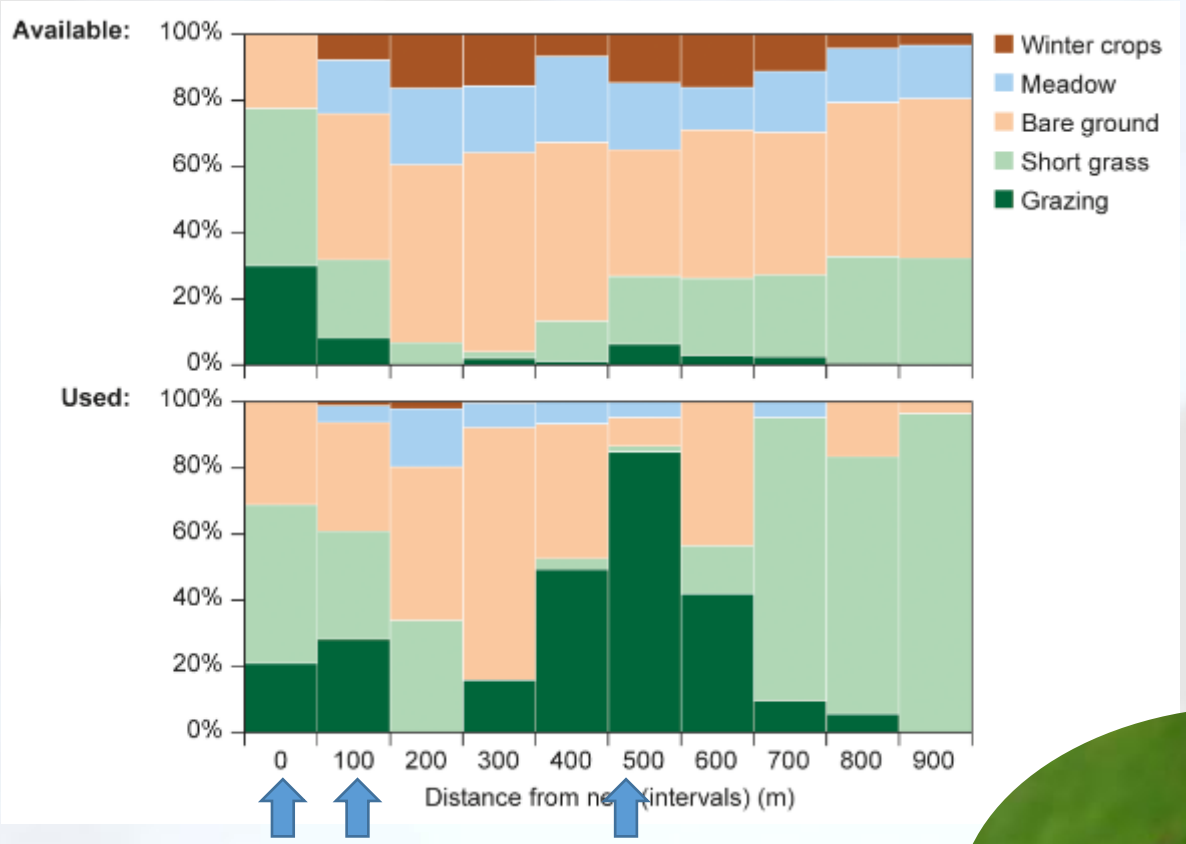
Adults were caught in days 3-11

Studying individual Starlings

- GPS-logger on harness
- Colour-rings
- Video



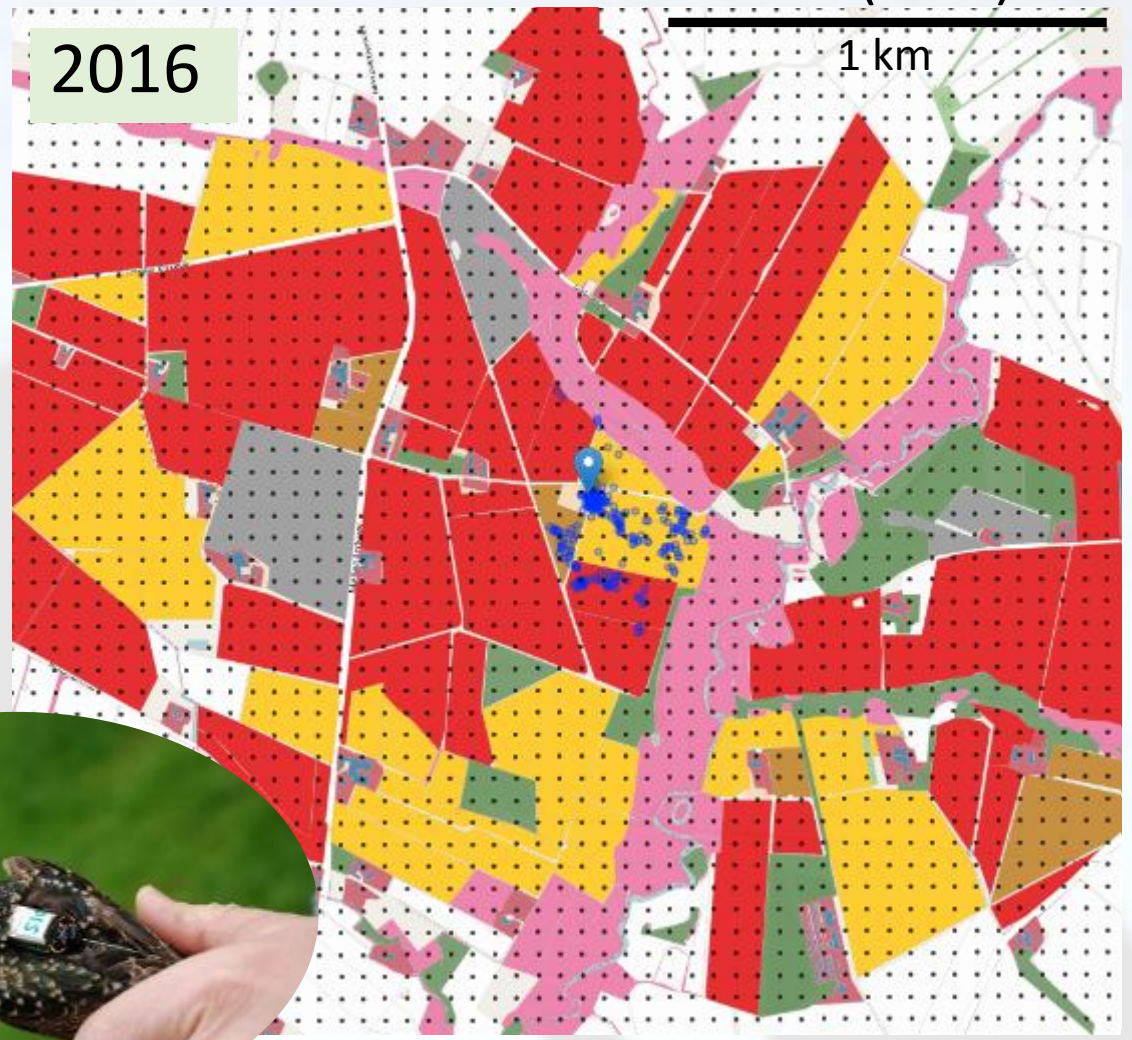
Selection of crops, comparison of **available** habitat and **used** habitat

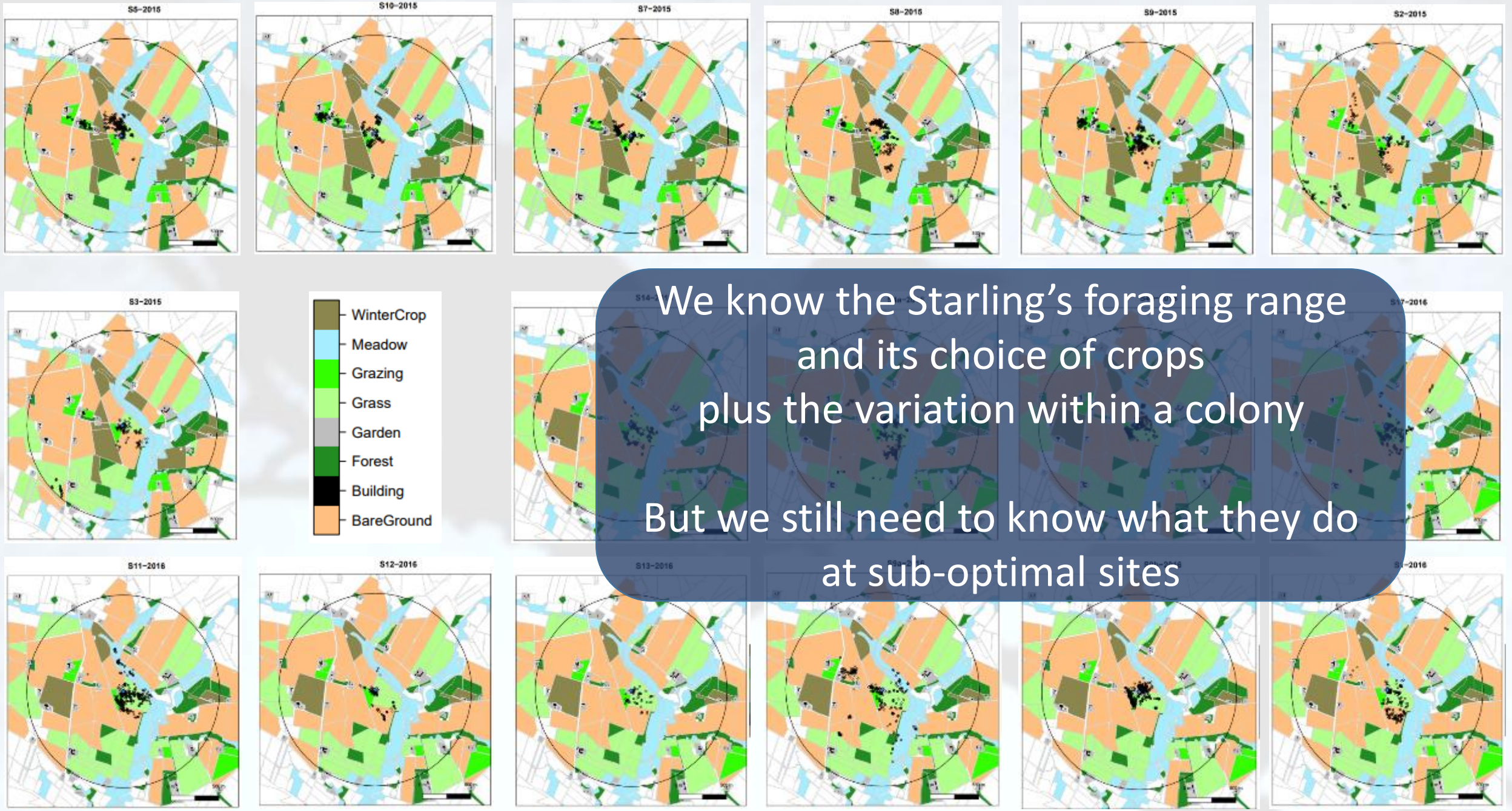


Starlings foraged within 300 metres from the nest 81% of the time

The longer they fly from the nest the more selective they are

Resource Selection Functions (RSFs)

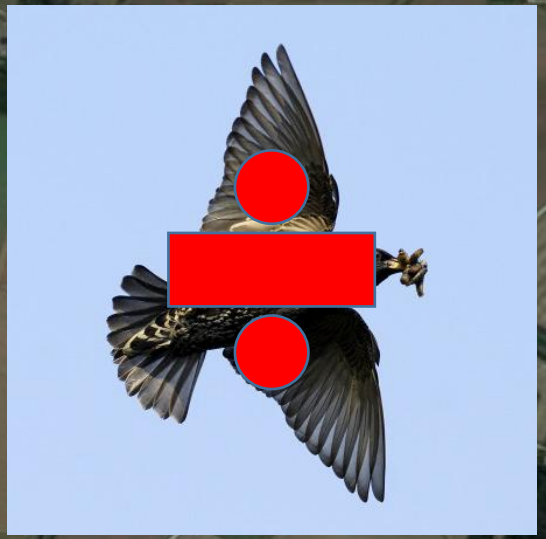


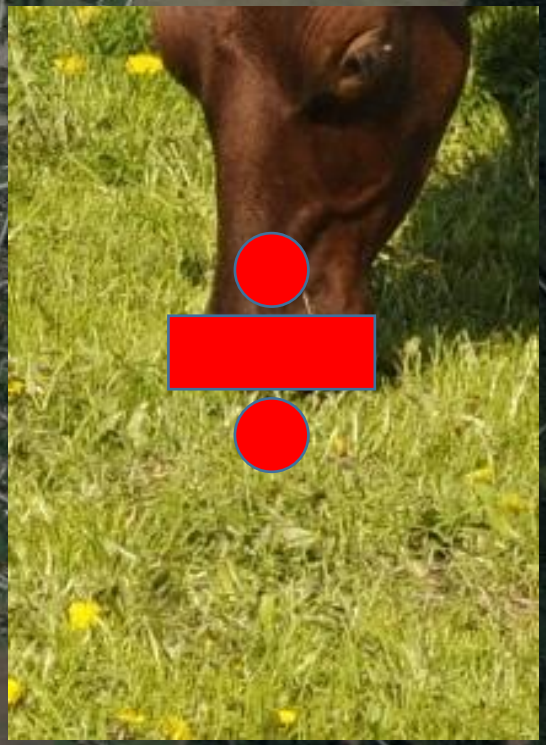


We know the Starling's foraging range
and its choice of crops
plus the variation within a colony

But we still need to know what they do
at sub-optimal sites

This knowledge is useful for understanding why the Starling is absent from other areas

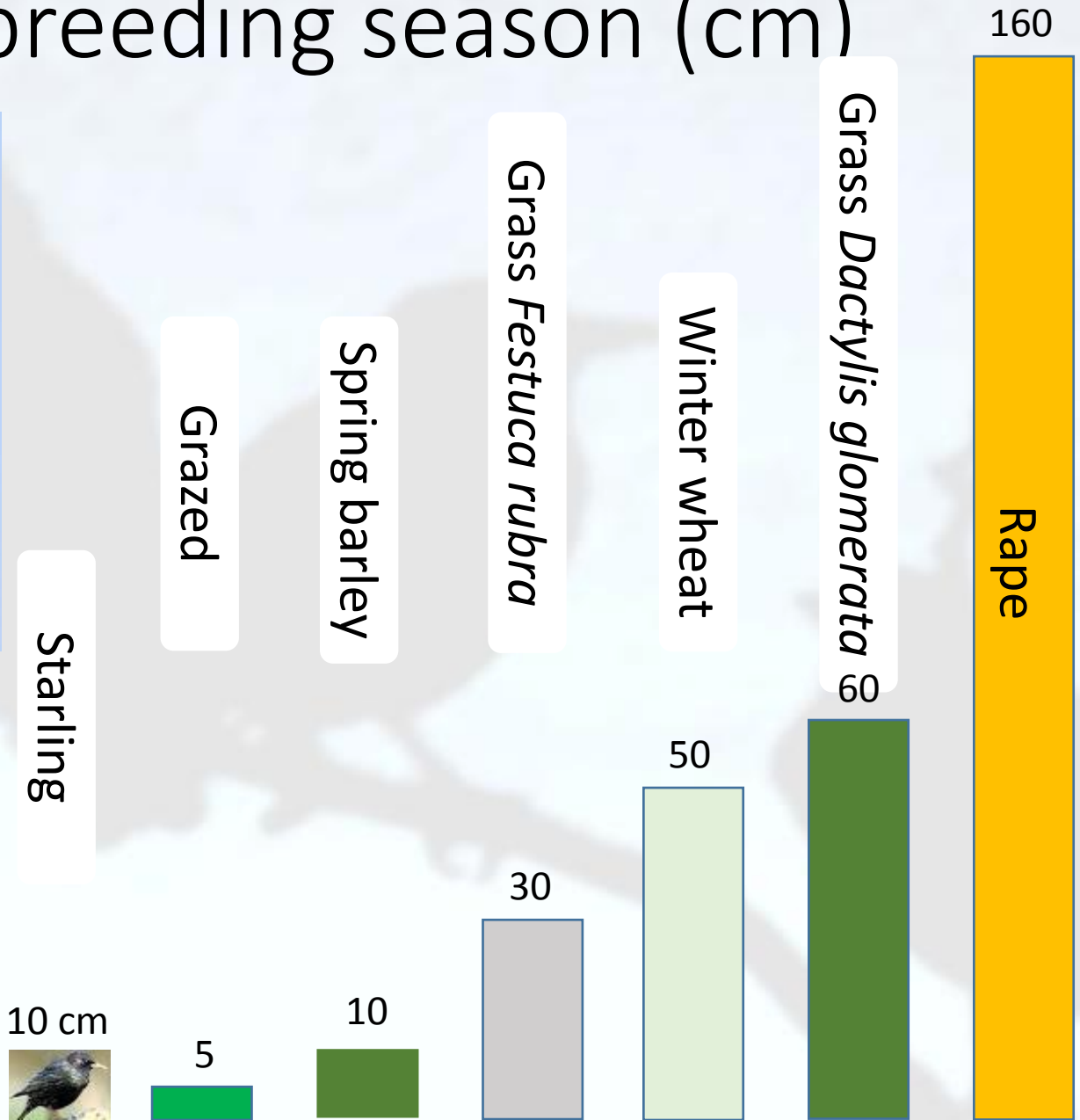




Data fra Niels Andersen (2015)

Crop height in breeding season (cm)

© *John Larsen*

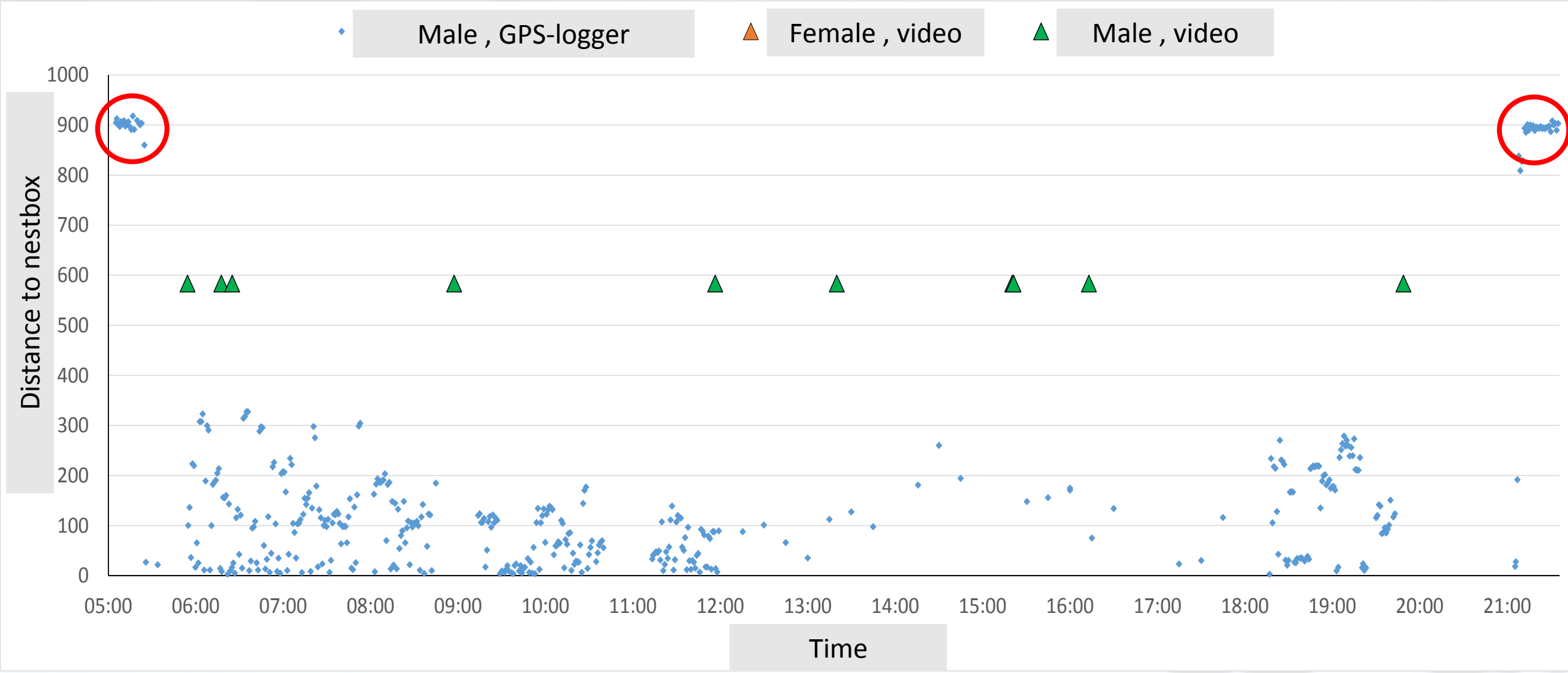


Conclusions of logger studies

- Our results highlight the importance of Grazed foraging habitats close to the nest site of breeding Starlings
- The ecological capacity for the Starling is decreasing through conversion of the most strongly selected land cover type (Grazed) to other crop types
- The spatial segregation of foraging and breeding habitats may have contributed to the observed Starling population declines
- …in Denmark and all across North and West Europe

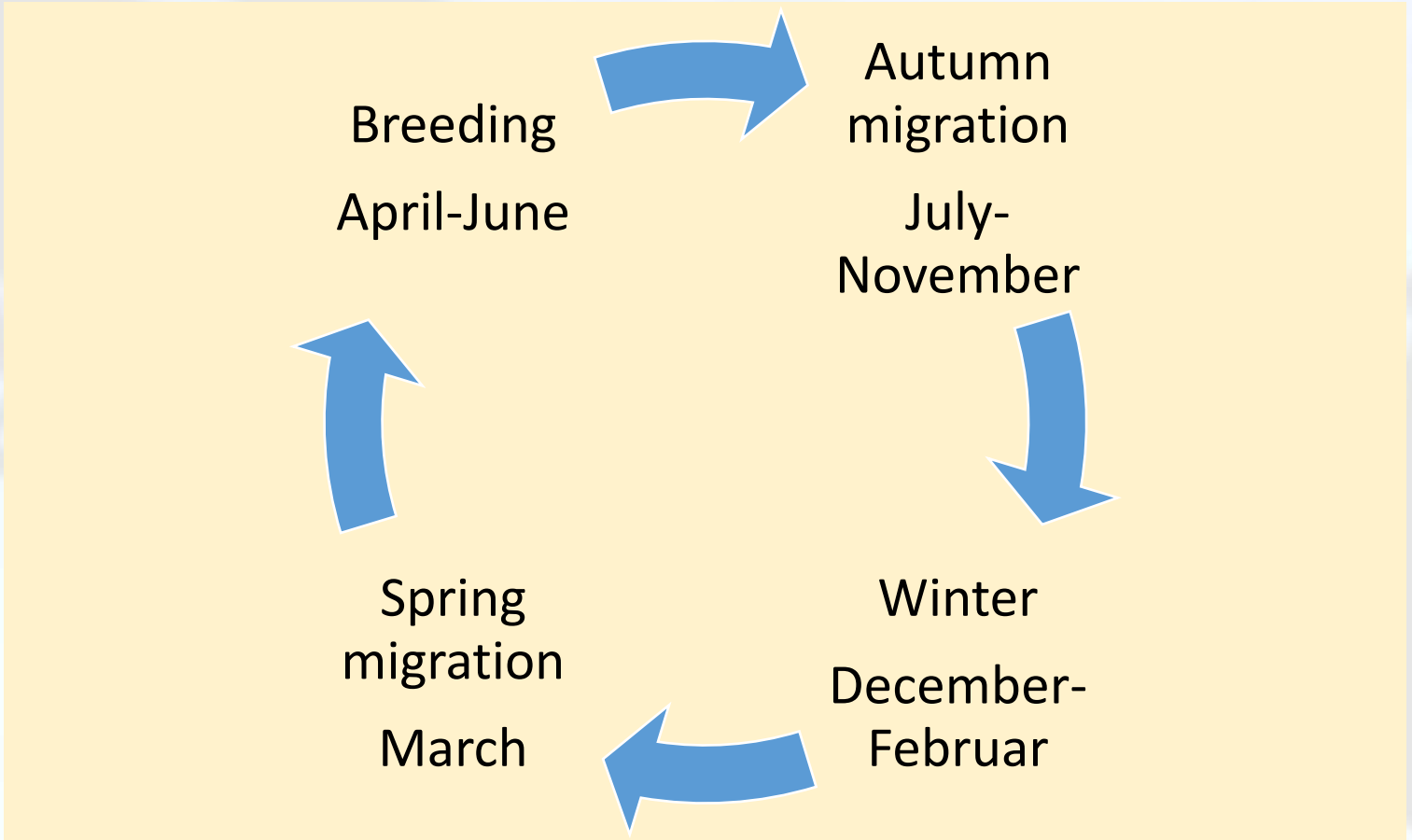
Henning Heldbjerg ved "kommandocentralen", hvor han kan følge stærenes fodring via webkamera. Foto: Helge Røjle Christensen.

Reality-tv, one nestbox, 8. May 2016

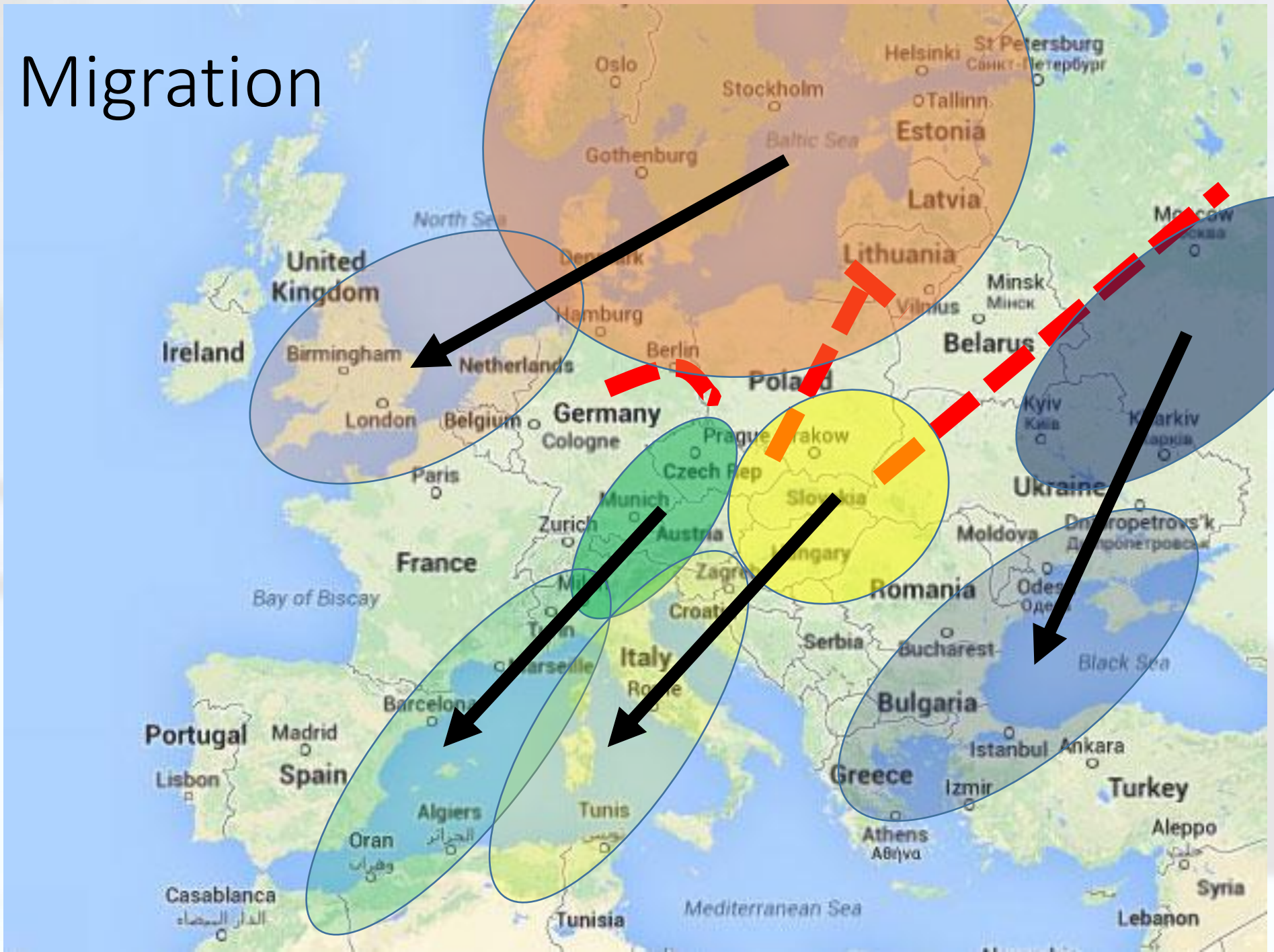


Night roost

Starling – Annual cycle



Migration


Oslo
Stockholm
Helsinki
St Petersburg
Tallinn
Estonia
Baltic Sea
Gothenburg
Latvia
North Sea
United Kingdom
Lithuania
Minsk
Hamburg
Vilnius
Belarus
Ireland
Birmingham
Berlin
Netherlands
Poland
London
Belgium
Germany
Cologne
Prague
Kyiv
Paris
Czech Rep
Ukraine
Munich
Slovakia
Zurich
Austria
Moldova
France
Hungary
Romania
Bay of Biscay
Serbia
Bucharest
Black Sea
Italy
Bulgaria
Barcelona
Portugal
Madrid
Istanbul
Ankara
Spain
Lisbon
Greece
Izmir
Turkey
Algiers
Tunis
Oran
Athens
Aleppo
Syria
Casablanca
Mediterranean Sea
Tunisia
Lebanon

Wintering grounds for German Starlings

Any differences within Germany?

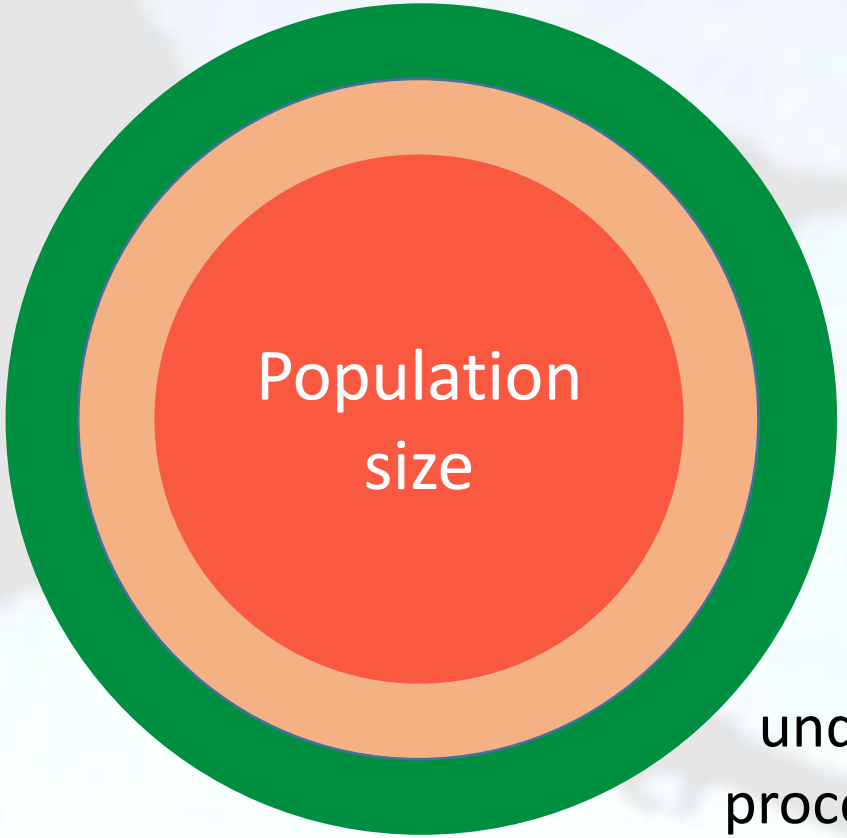
- Trends
- Production
- Survival

Demography

Basic understanding of the changes

Survival ↑↓

Reproduction ↑↓

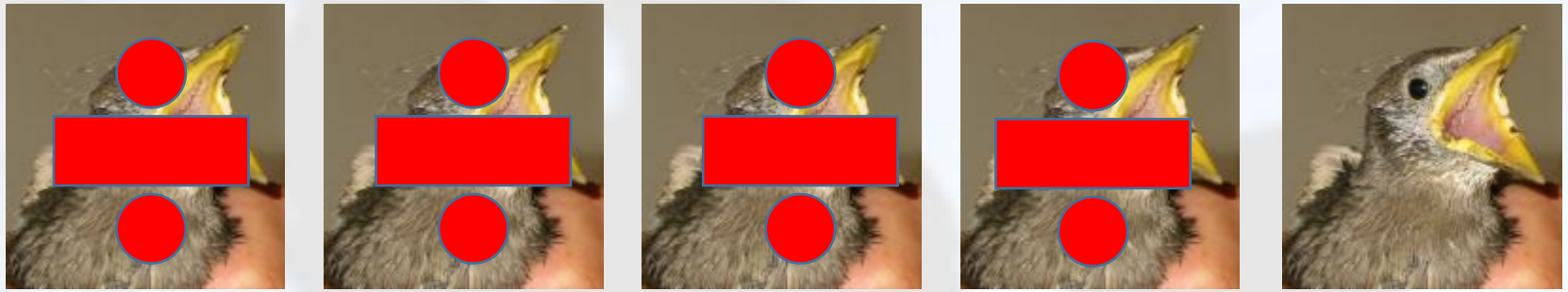


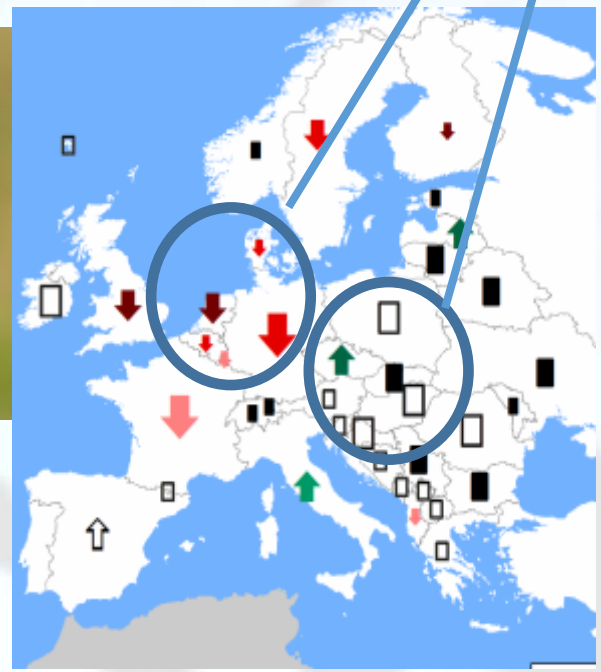
↑↓ Immigration /Emigration

Enable a better understanding of the demographic processes driving population changes

More effective management and conservation of key species in the future

Survival





Good luck

- I am looking forward to hear about the progress and the results in ‘Der Star- project’
- Thanks for the invitation

Foto: Torben Andersen

Thanks to:

Photos: Torben Andersen, Erik Biering, Ulrik Bruun, Klaus Dichmann, Tony Fox, Helge Røjle Christansen, Henning Heldbjerg, John Larsen, dof.dk, Google etc.

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