



Citizen Science as a research tool

– *with focus on data quality, scientific outputs, data management, seen through ongoing projects*

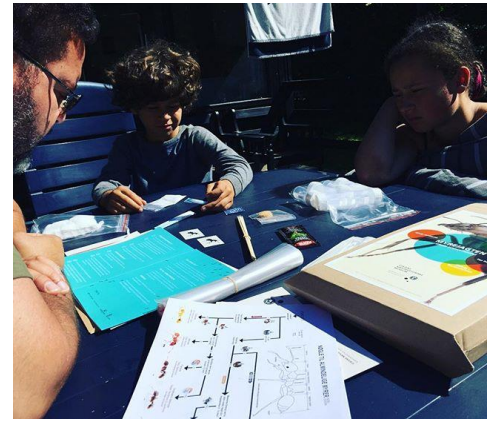
Anders P. Tøttrup

Associate Professor
Head of Citizen Science
Deputy Museum Director

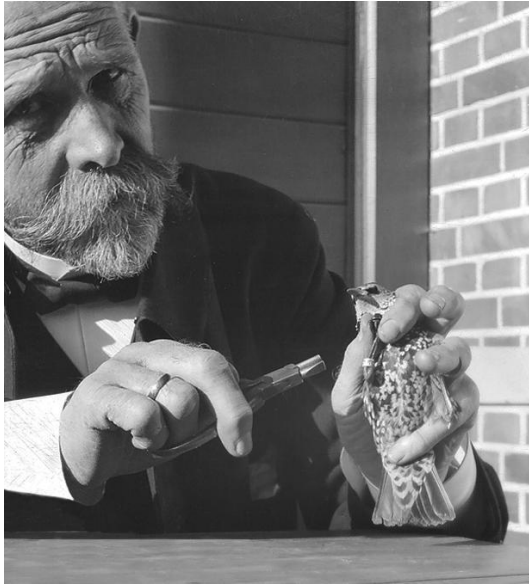
*DeiC Conference
4 November 2021
Vingsted*

Citizen Science – a definition

- Citizen Science is involving non-professionals to participate in all parts of the scientific process to address real-world problems.
- A Citizen scientist is a member of the public engaging in a Citizen Science project.
- Community Science is (more or less) equal to Citizen Science



Citizen Science – actually an old discipline

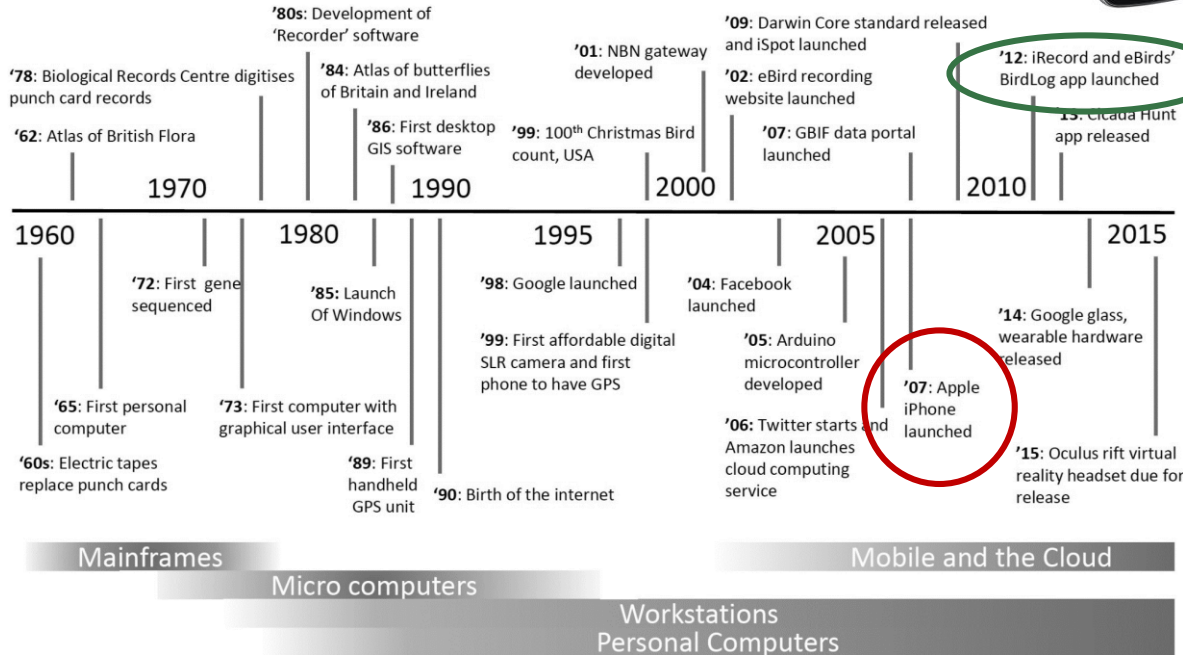


H. C. C. Mortensen
- Danish school teacher
ringing in **1899**

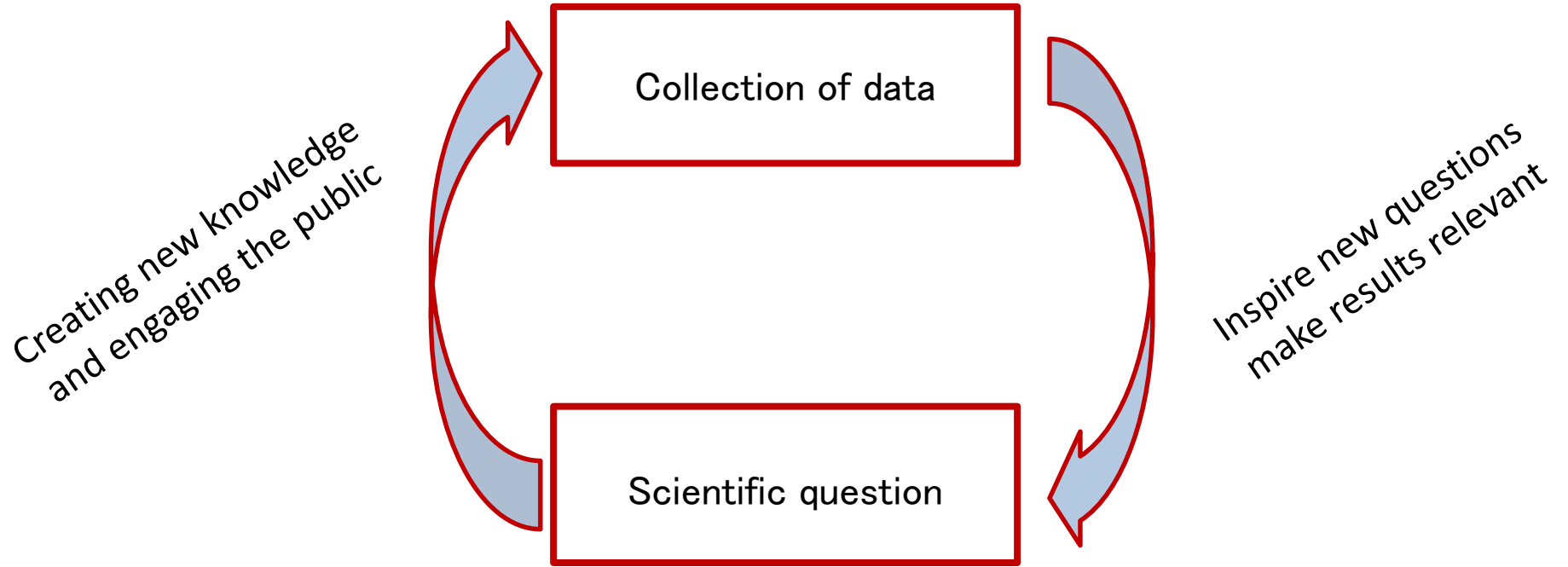


Danish Ringing Scheme
af SNM -> **2024**

Technological developments

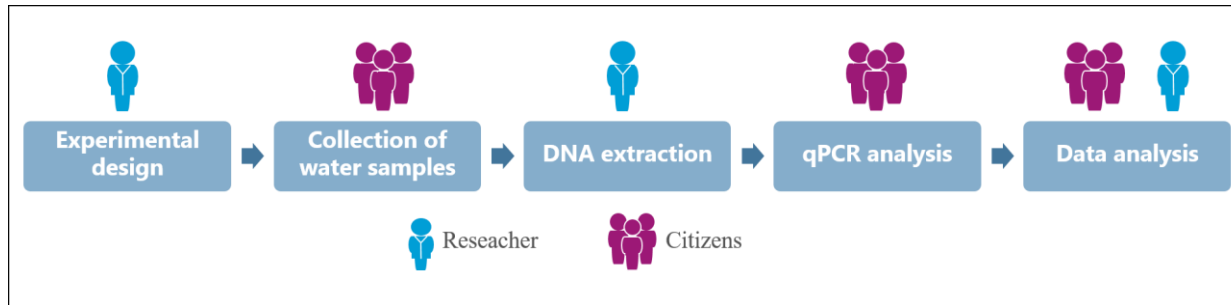


Citizen Science – “classic”

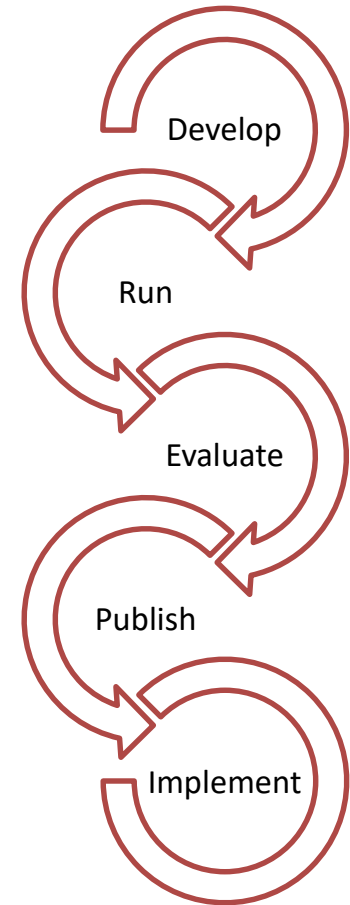


Citizen Science – *new approaches*

Involving the public in all phases of the scientific process

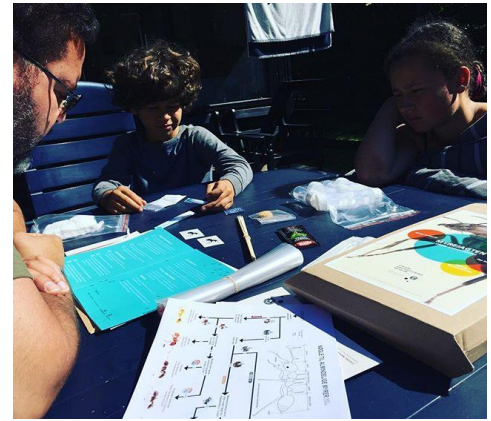


Tøttrup et al. 2021

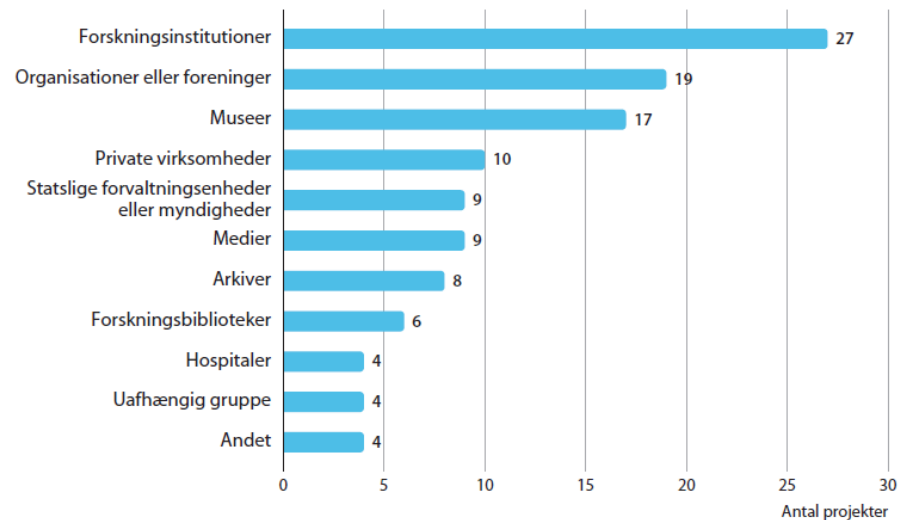
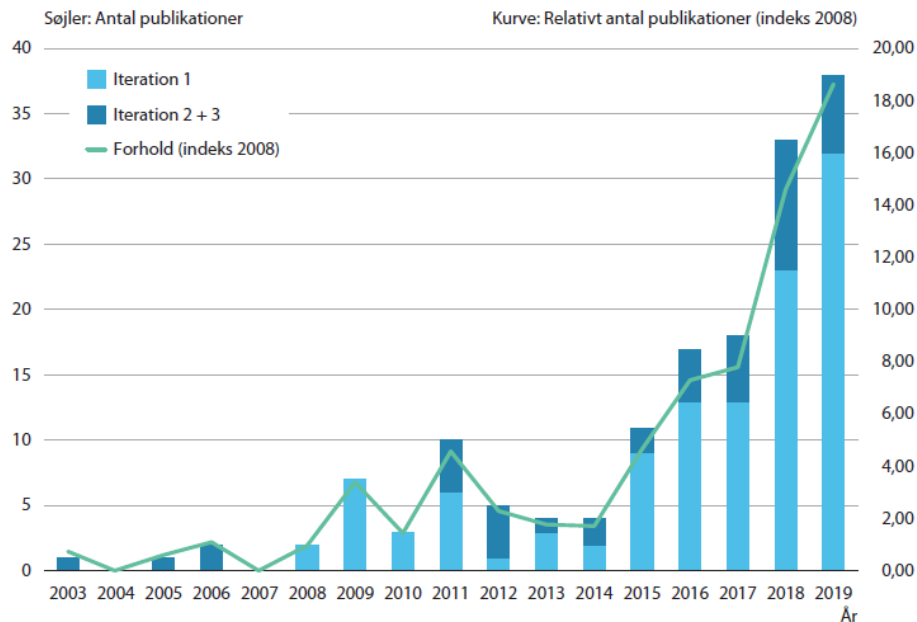


Citizen Science – *as research method*

- Highly educated, interested and motivated public
- Powerful pocket computers
- Collection at large spatial and temporal data scales
- Entirely new research questions
- Motivate and educate the public
- Project design key

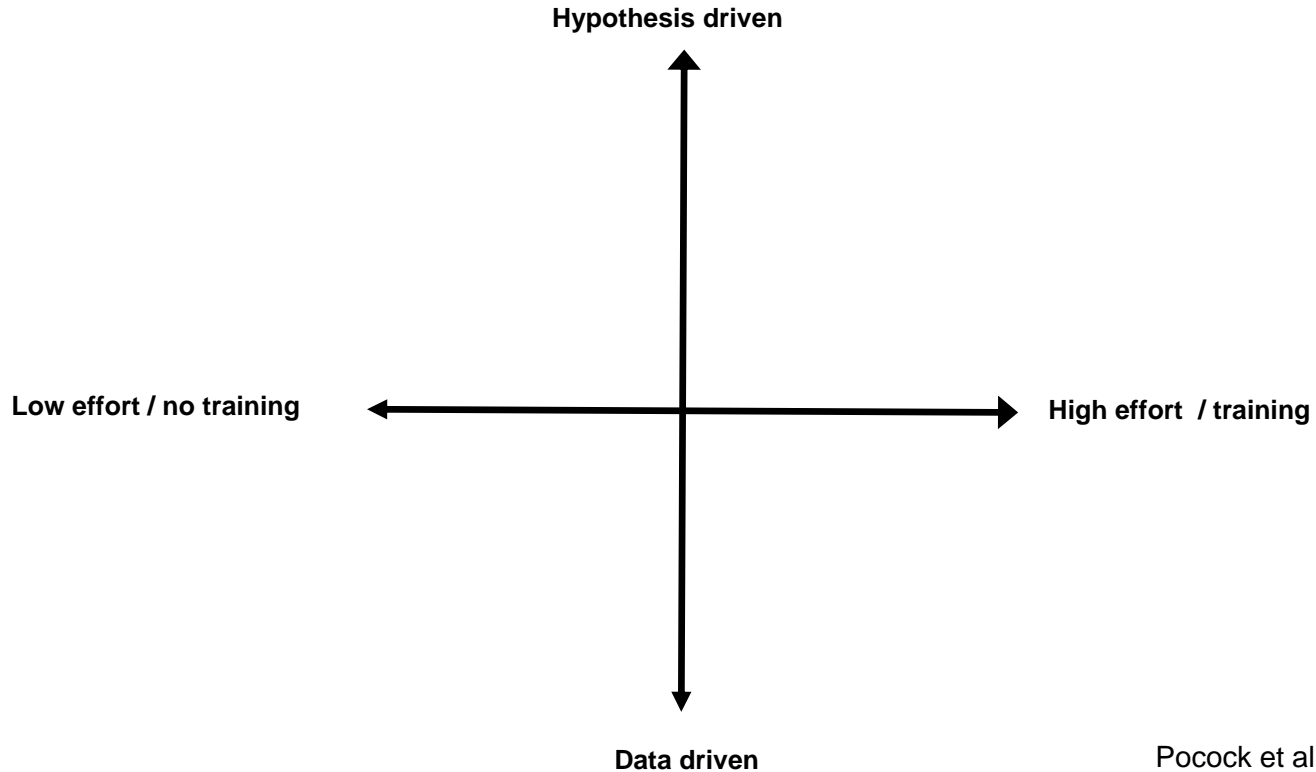


Citizen Science landscape (Denmark)



Figur 2. Aktørtyper repræsenteret i danske citizen science-projekter (n=64).

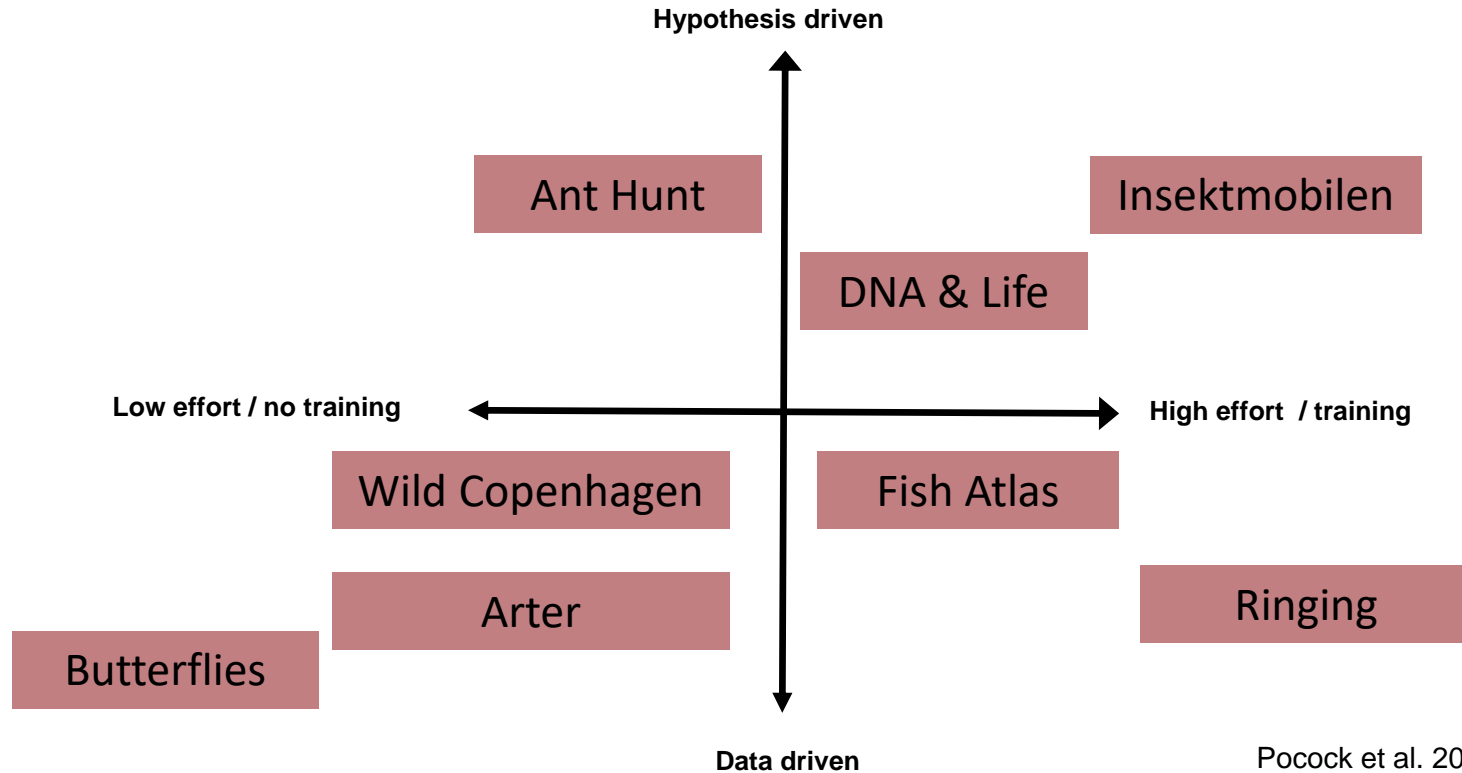
Citizen Science projects



Pocock et al. 2014



Citizen Science projects



Pocock et al. 2014



Target groups



Target groups



Ant Hunt



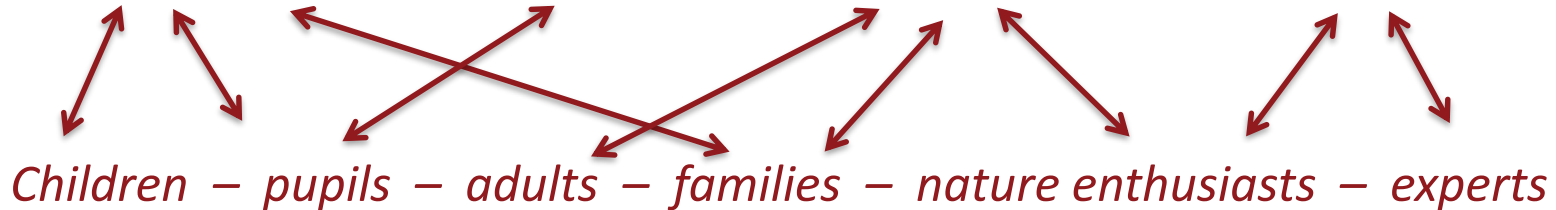
DNA & Life



Insectmobile



Ringing

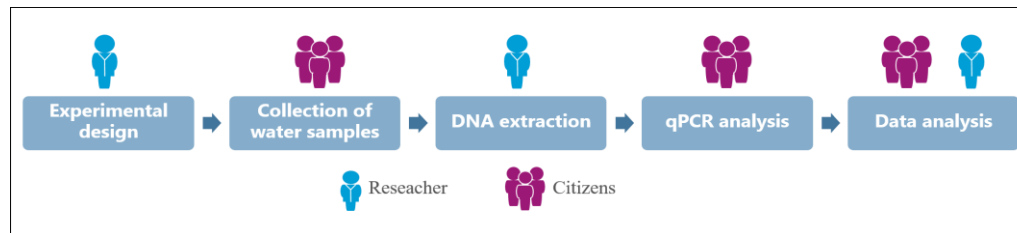


DNA & Liv

Aim: Species occurrence and competition patterns across freshwater gradients in Danish amphibians

Field and lab work.

Target group: High school students



Tøttrup et al. 2021, *Citizen Science: Theory and Practice*

DNA & liv

Lærercitat

*To ting der gør dette forløb meget attraktivt for vores bioteknologielever er 1) at de får muligheden for at deltage i et **reelt forskningsprojekt** og er med til at analysere og indsamle viden, og 2) at de får muligheden for **selv at arbejde eksperimentelt** med en moderne DNA-teknologi som vi ikke selv har adgang til.*

DNA & Liv

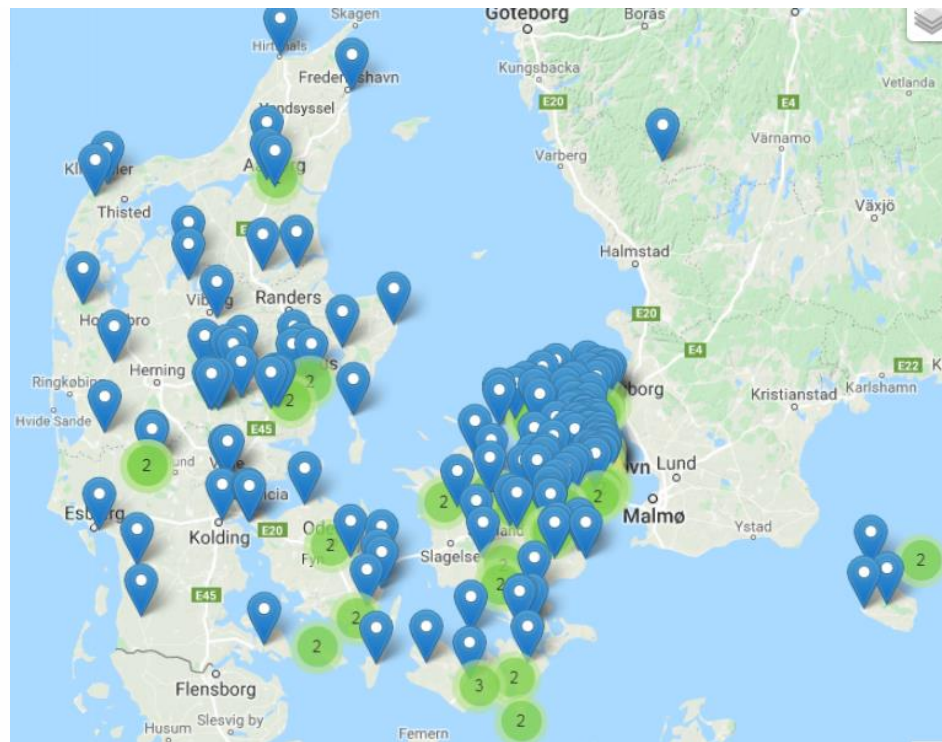
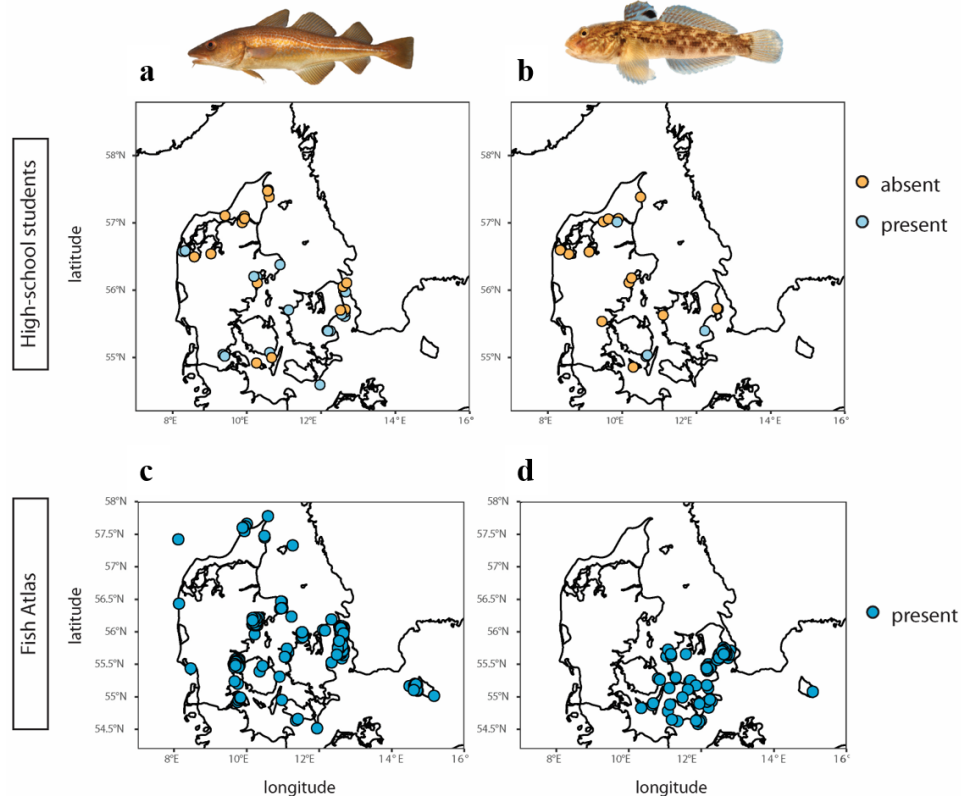


CITIZEN SCIENCE:
THEORY AND PRACTICE

Citizens in the Lab:
Performance and Validation
of eDNA Results

CASE STUDIES

Tøttrup et al. 2021, *Citizen Science: Theory and Practice*



Next Generation Lab

Fortidens materialer med fremtidens metoder

Statens
Naturhistoriske
Museum

KØBENHAVNS
UNIVERSITET



GLOBE Institute

novo
nordisk
fonden

Next Generation Lab

Eleverne arbejder med ægte arkæologiske genstande, som de kulturhistoriske museer ikke selv har ressourcer til at håndtere



Antiquity 2021, Vol. 0 (0): 1-8
<https://doi.org/10.15184/aj.2021.170>

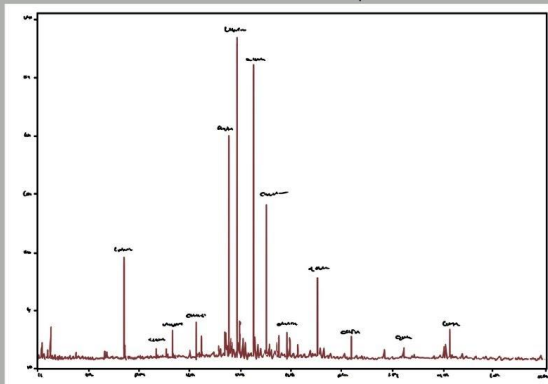
Project Gallery



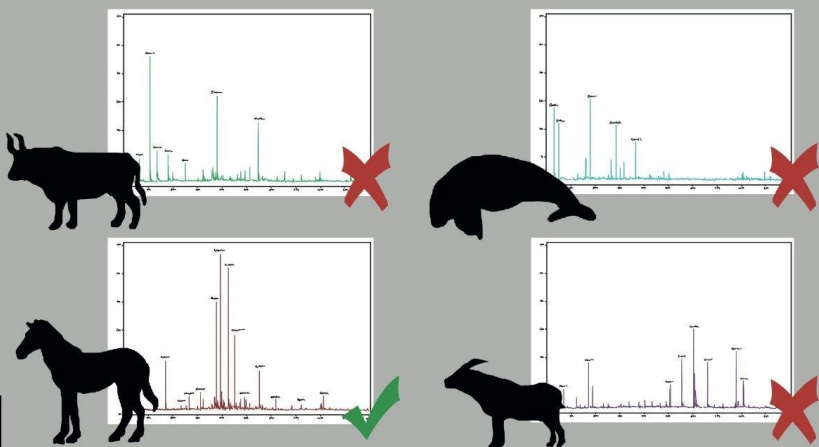
Next Generation Lab puts Denmark's past in the hands of its future

Luise O. Brandt^{1*}, Marie R. Lillemark², Maria Rytter², Matthew J. Collins¹ & Anders P. Tøttrup²

¹ The GLOBE Institute, University of Copenhagen, Denmark
² Natural History Museum of Denmark, University of Copenhagen, Denmark
* Author for correspondence: luise.brandt@sund.ku.dk



Comparison with reference database

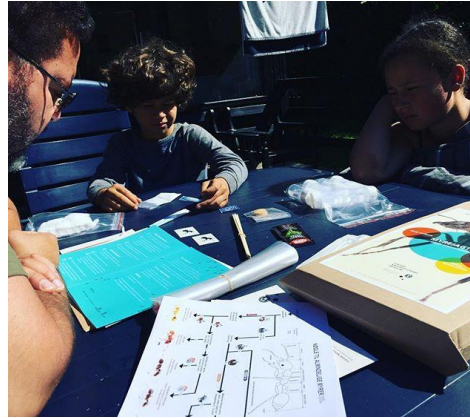


Ant Hunt

Aim: Mapping distributions, food choice, co-occurrence and dominance patterns across habitats

Feeding experiment

Target group: Children and families

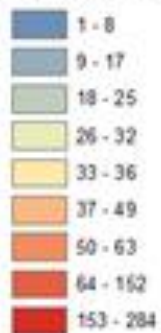


Ant Hunt

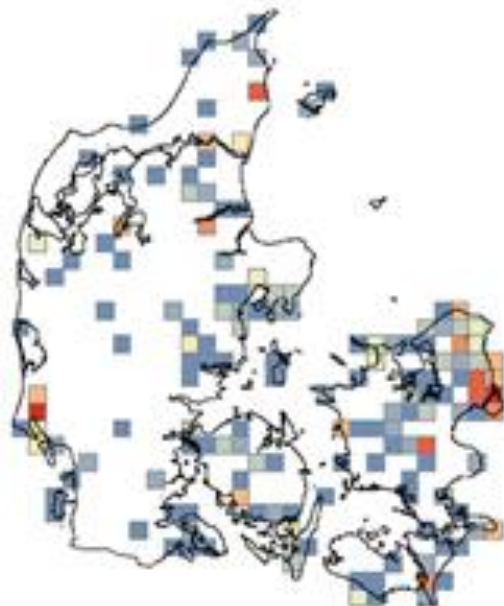
Collection since 2000



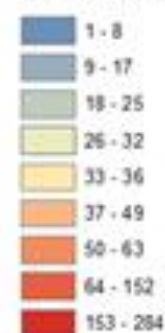
Observationer



Ant Hunt 2017 and 2018



Observationer



Ant Hunt

> PeerJ. 2020 Apr 8;8:e8850. doi: 10.7717/peerj.8850. eCollection 2020.

Monitoring the influx of new species through citizen science: the first introduced ant in Denmark

Julie K Sheard¹, Nathan J Sanders², Carsten Gundlach³, Sämi Schär⁴, Rasmus Stenbak Larsen⁵

Affiliations + expand

PMID: 32296601 PMCID: PMC7150537 DOI: 10.7717/peerj.8850

[Free PMC article](#)

Received: 19 October 2019 | Revised: 27 April 2020 | Accepted: 5 May 2020

DOI: 10.1111/jbi.13911

RESEARCH PAPER

Journal of
Biogeography

WILEY

Testing trade-offs and the dominance–impoverishment rule among ant communities

Julie K. Sheard¹  | Annika S. Nelson^{2,3}  | Jeppe D. Berggreen¹ | Raphael Boulay⁴  | Robert R. Dunn⁵  | Nathan J. Sanders⁶ 

Population ecology

Long-term trends in the occupancy of ants revealed through use of multi-sourced datasets

Julie K. Sheard¹, Carsten Rahbek^{1,2,3,4,5}, Robert R. Dunn⁶, Nathan J. Sanders⁷ and Nick J. B. Isaac⁸

BIOLOGY
LETTERS

royalsocietypublishing.org/journal/rsbl

Research



Cite this article: Sheard JK, Rahbek C, Dunn

STATENS NATURHISTORISKE MUSEUM

KØBENHAVNS UNIVERSITET

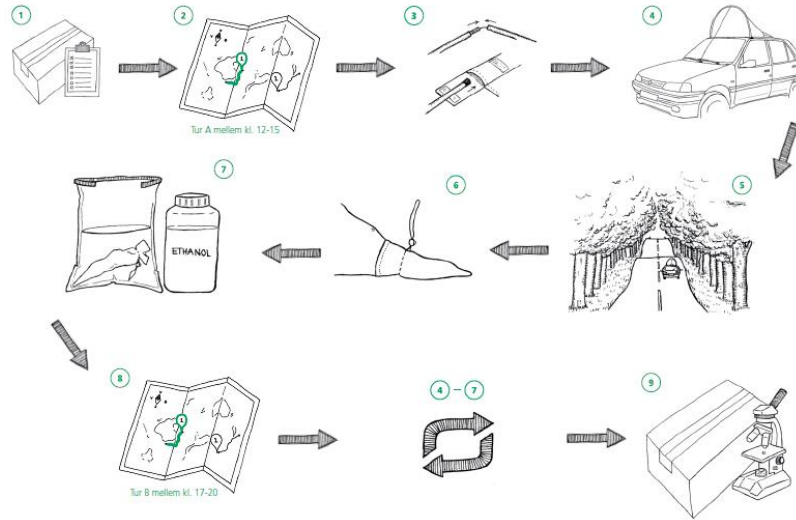


Insektmobilen

Aim: Mapping the distribution and abundance of insects across Denmark, national food web, effects of nature management

Target group: All people interested in nature

INSEKTMOBILEN WORKFLOW



Insektmobilen

BIOLOGY LETTERS

royalsocietypublishing.org/journal/rsbl

Research

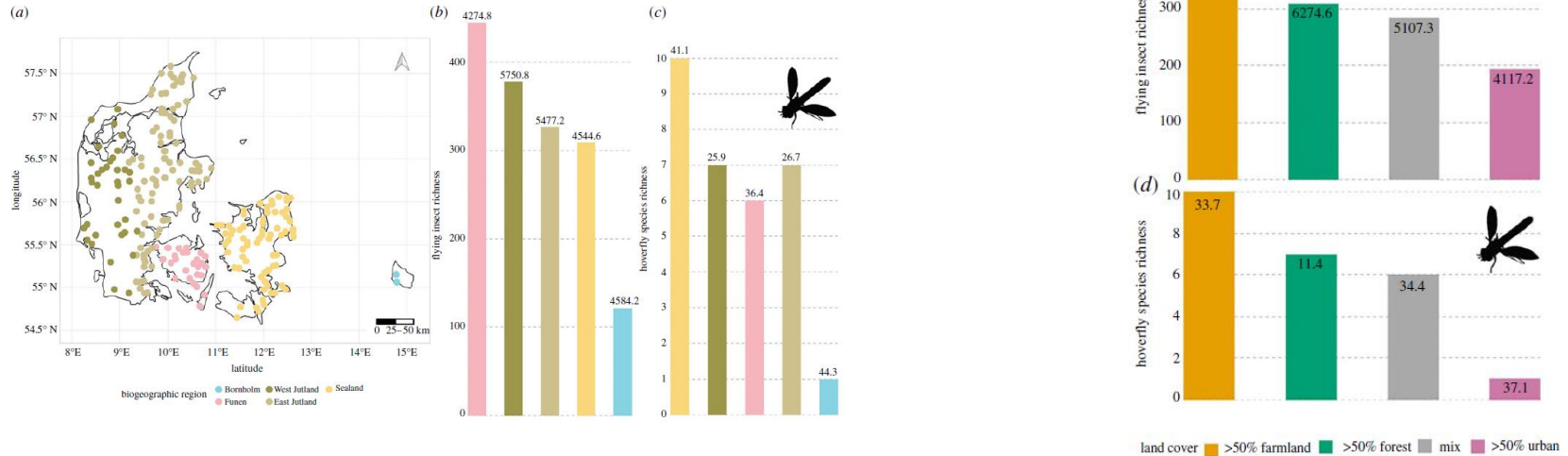


Cite this article: Svenningsen CS *et al.* 2021
Detecting flying insects using car nets and DNA

Community ecology

Detecting flying insects using car nets and DNA metabarcoding

Cecilie S. Svenningsen¹, Tobias Guldberg Frøslev², Jesper Bladt⁴,
Lene Bruhn Pedersen¹, Jonas Colling Larsen¹, Rasmus Ejrnæs⁴,
Camilla Fløjgaard⁴, Anders Johannes Hansen², Jacob Heilmann-Clausen³,
Robert R. Dunn⁵ and Anders P. Tøttrup¹





ARTER



STATENS
NATURHISTORISKE
MUSEUM



Miljø- og Fødevarerministeriet
Miljøstyrelsen

KØBENHAVNS
UNIVERSITET



NATURHISTORISK
MUSEUM AARHUS

AAGE V. JENSEN
NATURFOND



15. Juni Fonden

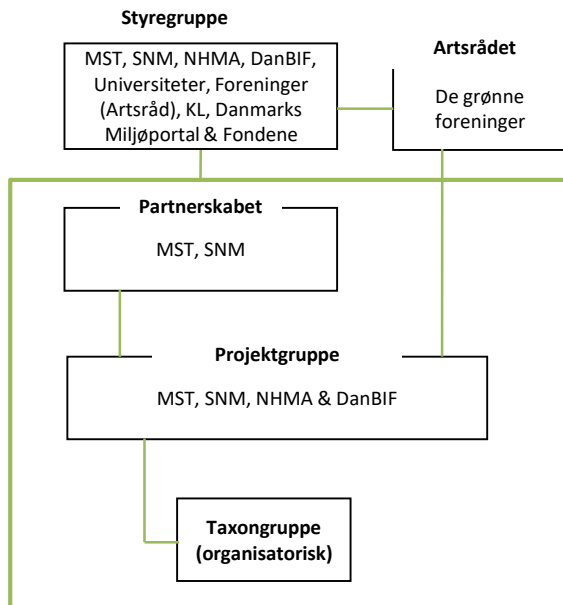
Arter er en national artsportal der samler data ét sted til gavn for forskning og forvaltning



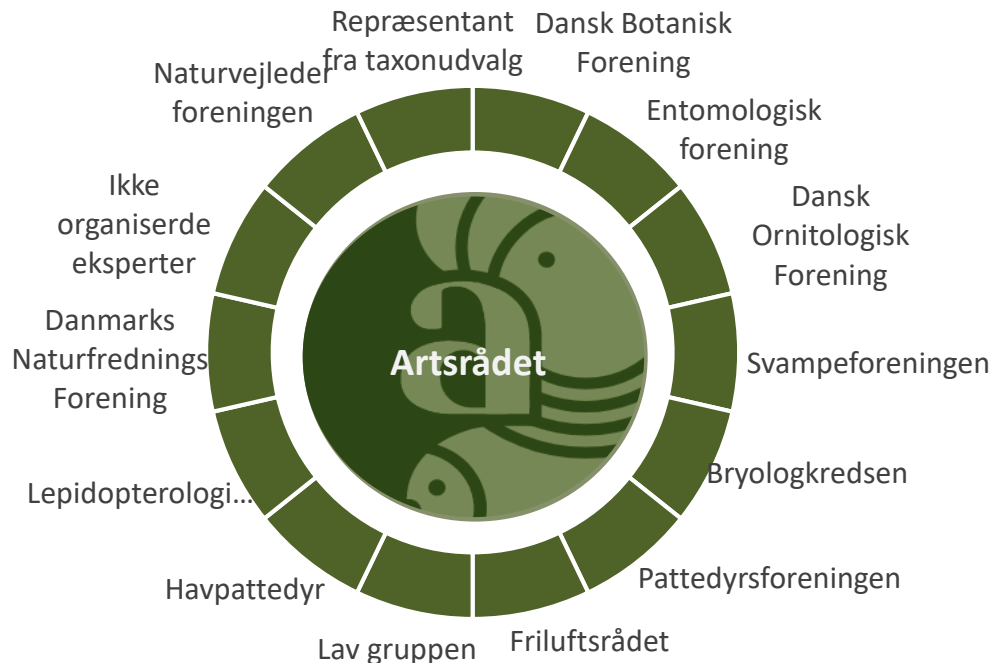
Formålet med Arter er at gøre data om biodiversitet offentligt tilgængeligt og sikre gennemsigtighed i **validering** og **ophav** for data



Styringsstruktur



Indenfor rammen vises den del af organisationen, som er ansat til at varetage udvikling og drift



Billedrettigheder har to grundhensyn



Formidling

CC-BY-NC

CC-BY

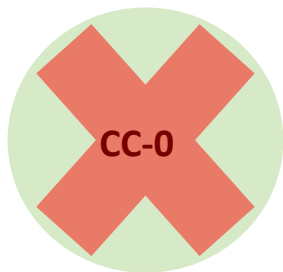
ALL RIGHTS
RESERVED

**Motivation
hos
artseksperter**

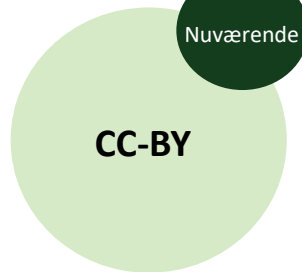
11/8/2021

Licenser på billeder

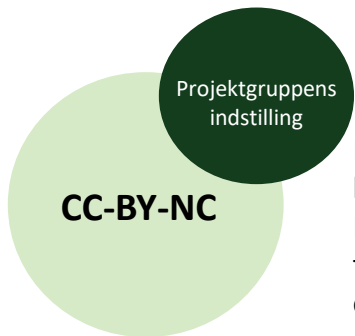
Licens på funddata vil være den nuværende licens (cc-by), så f.eks. konsulentvirksomheder også frit kan benytte data



Giver betingelsesløs adgang til at benytte et billede.



Billedet kan bruges frit, men brugeren og Arter skal krediteres, og brug skal ske i tråd med Arters formål.



Billedet må ikke benyttes til kommercielle formål. Ikke-kommercielle formål skal være i tråd med Arters formål, og brugeren og Arter skal krediteres.



Brugeren beholder fuld ophavsret til sit billede, og dette må ikke benyttes uden for Arter.

STATUS PÅ ARTER d. 22/10-2021

42.479.440
Fund samlet
på Arter

4.304
brugere

37.197 fund
på Arter

52 %
af fund er
validerede

19.542
validerede fund

65 %
af fund med
billeder er
validerede



03-11-2021

Foto: Jonas Ravn Jensen (Argyria argyria indberettet på Arter)

Validerede fund fordelt på artsgrupper

