Knowledge gains and gaps in Aquatic Warbler conservation

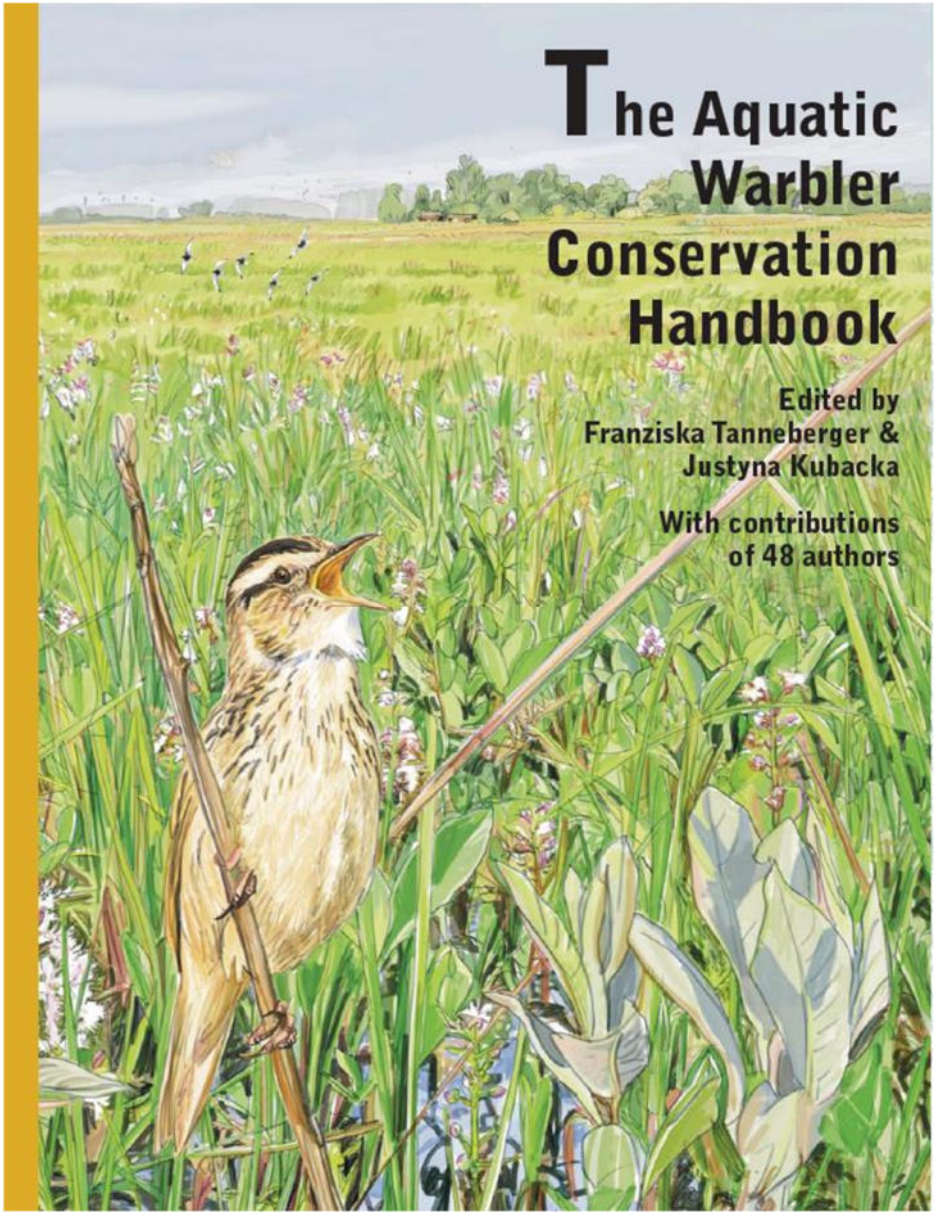
Dr. Susanne Arbeiter

University of Greifswald, Greifswald Mire Centre

Förderverein Naturschutz im Peenetal e. V.

Aquatic Warbler conservation

- State of knowledge until 2018
- Knowledge gained since 2018?



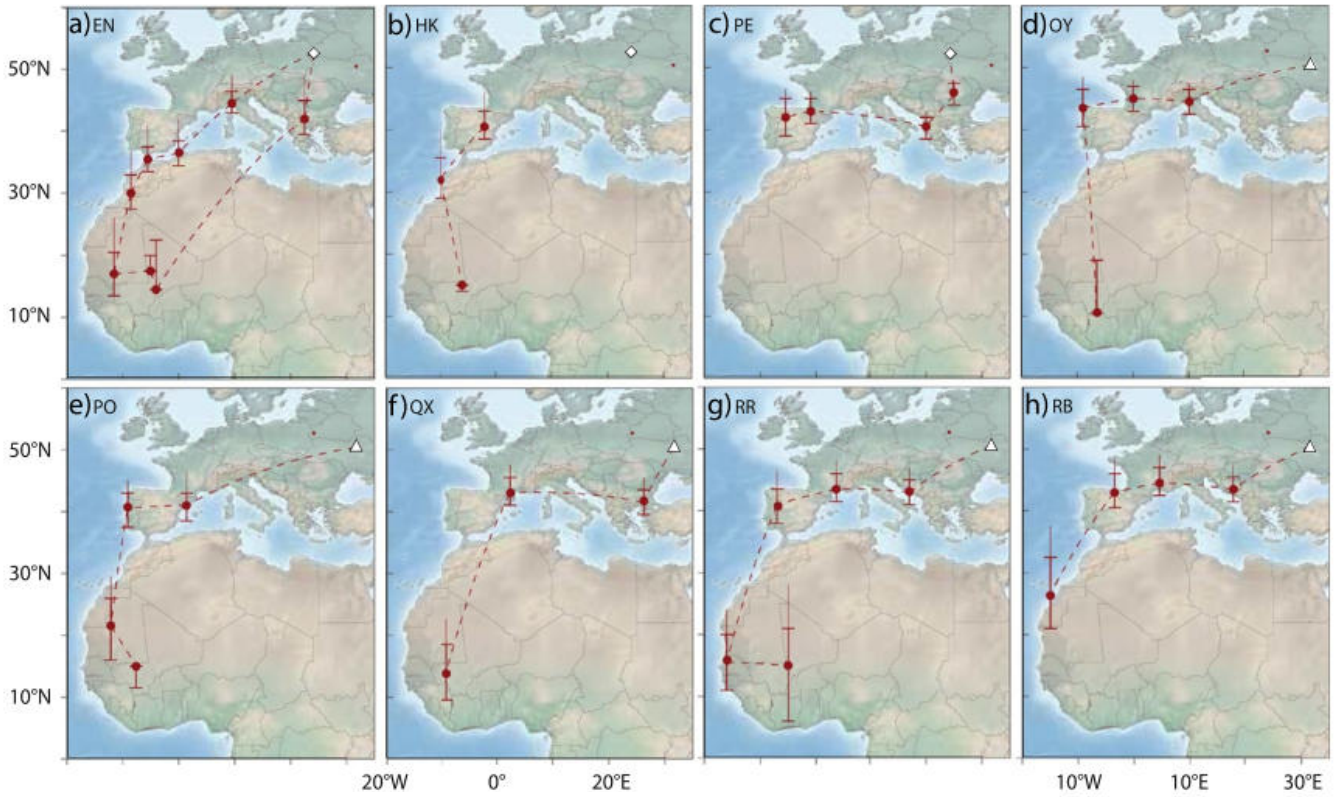
Knowledge gains

Migration

Geolocator study:

Breeding sites Belarus / Ukraine

- Migration route south of the Alps
- Stop-over Iberian peninsula



Bird Conservation International, page 1 of 12. © BirdLife International, 2018
doi:10.1017/S0959270918000357

Identifying migration routes and non-breeding staging sites of adult males of the globally threatened Aquatic Warbler *Acrocephalus paludicola*

VOLKER SALEWSKI, MARTIN FLADE, SIMEON LISOVSKI, ANATOLII POLUDA, OLEKSANDER ILIUKHA, GRZEGORZ KILJAN, ULADZIMIR MALASHEVICH and STEFFEN HAHN

Salewski et al. 2019

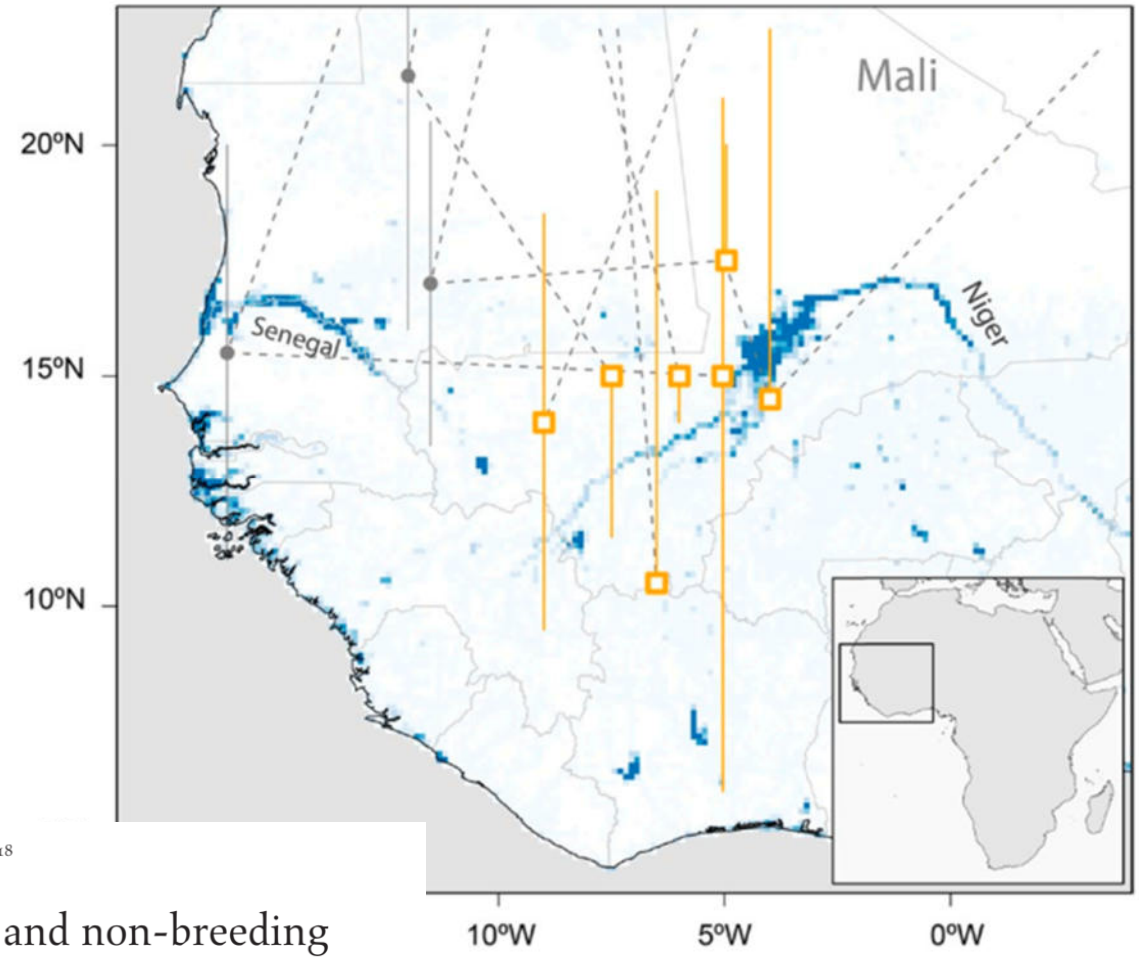
Knowledge gains

Wintering site

Geolocator study:

Breeding sites Belarus / Ukraine

- Staging sites in Sahel
- Wintering in Mali, Inner Niger Delta



Bird Conservation International, page 1 of 12. © BirdLife International, 2018
doi:10.1017/S0959270918000357

Identifying migration routes and non-breeding staging sites of adult males of the globally threatened Aquatic Warbler *Acrocephalus paludicola*

VOLKER SALEWSKI, MARTIN FLADE, SIMEON LISOVSKI, ANATOLII POLUDA, OLEKSANDER ILIUKHA, GRZEGORZ KILJAN, ULADZIMIR MALASHEVICH and STEFFEN HAHN

Salewski et al. 2019

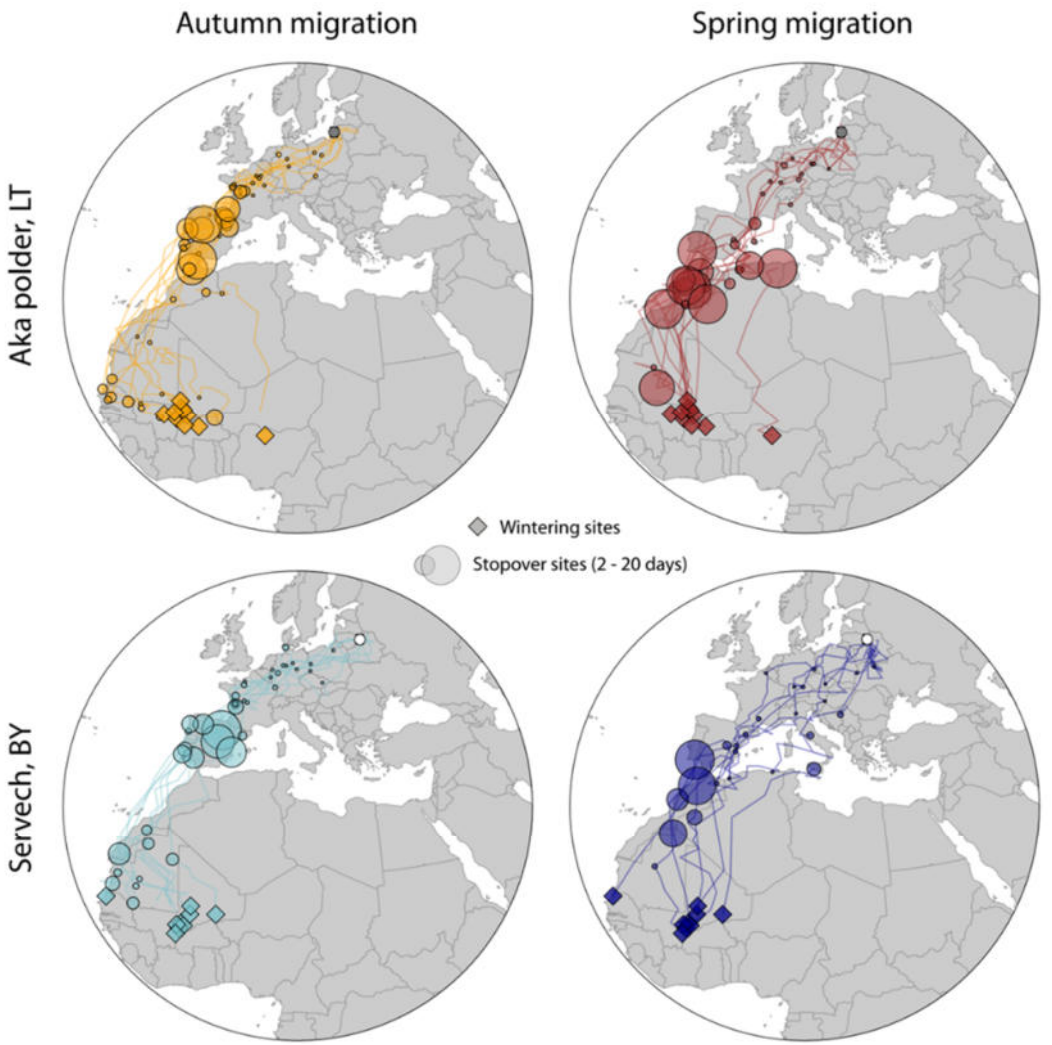
Knowledge gains

Migration

Geolocator study:

Breeding sites Belarus / Lithuania

- Autumn stop-over France and Iberian peninsula
- Long spring stop-over in Morocco and Algeria



bioRχiv THE PREPRINT SERVER FOR BIOLOGY *submitted*

Migration routes and wintering sites of the Aquatic Warblers *Acrocephalus paludicola* breeding in Lithuania and North Belarus

Flade et al. 2024

Martin Flade, Simeon Lisovski, Vytauras Eigirdas, Benedikt Giessing, Fréderic Jiguet, Oskars Keišs, Maxim Nemtchinov

doi: https://doi.org/10.1101/2023.10.10.561376

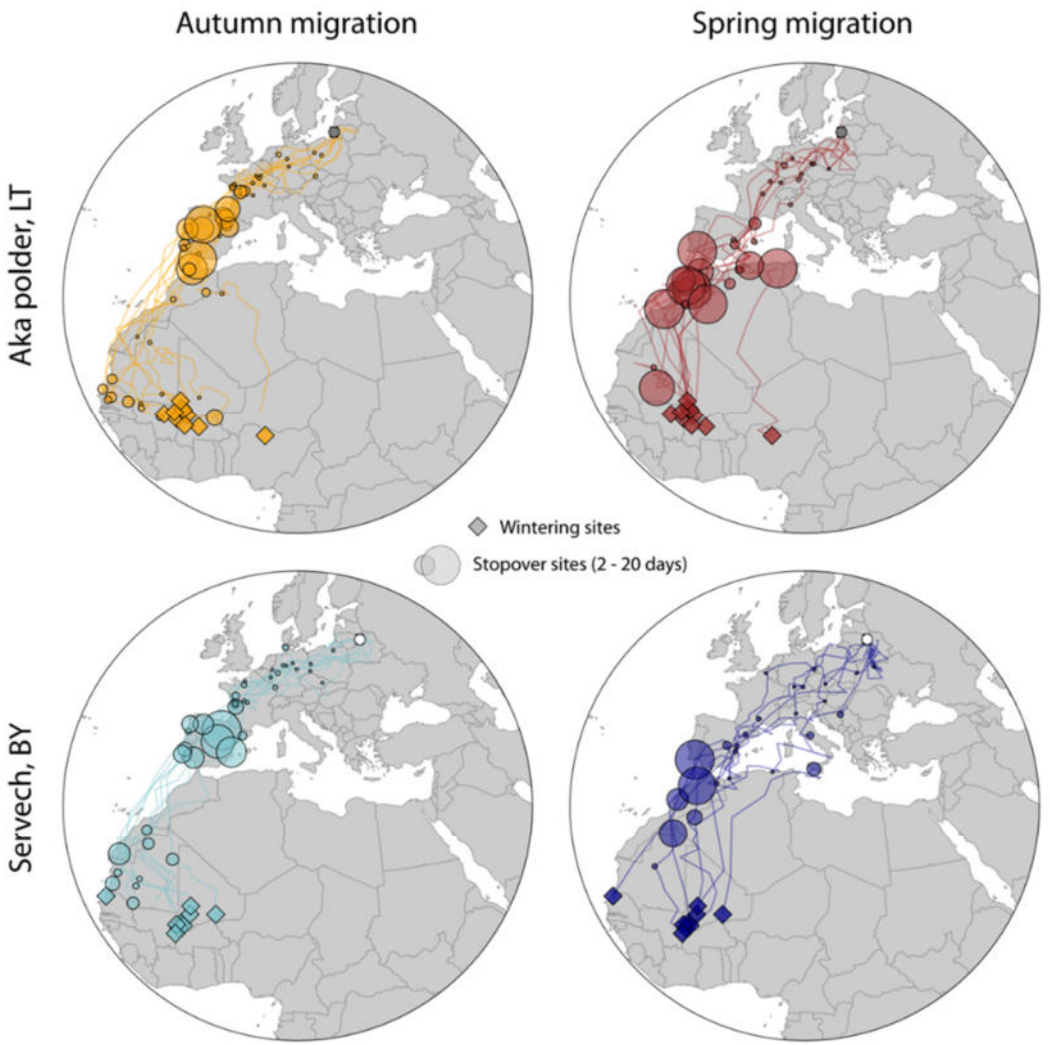
Knowledge gained

Wintering site

Geolocator study:

Breeding sites Belarus / Lithuania

- Wintering in Mali, Inner Niger Delta



bioRχiv THE PREPRINT SERVER FOR BIOLOGY *submitted*

Migration routes and wintering sites of the Aquatic Warblers *Acrocephalus paludicola* breeding in Lithuania and North Belarus

Flade et al. 2024

Martin Flade, Simeon Lisovski, Vytauras Eigirdas, Benedikt Giessing, Fréderic Jiguet, Oskars Keišs, Maxim Nemtchinov

doi: https://doi.org/10.1101/2023.10.10.561376

Knowledge gains

Annual life cycle

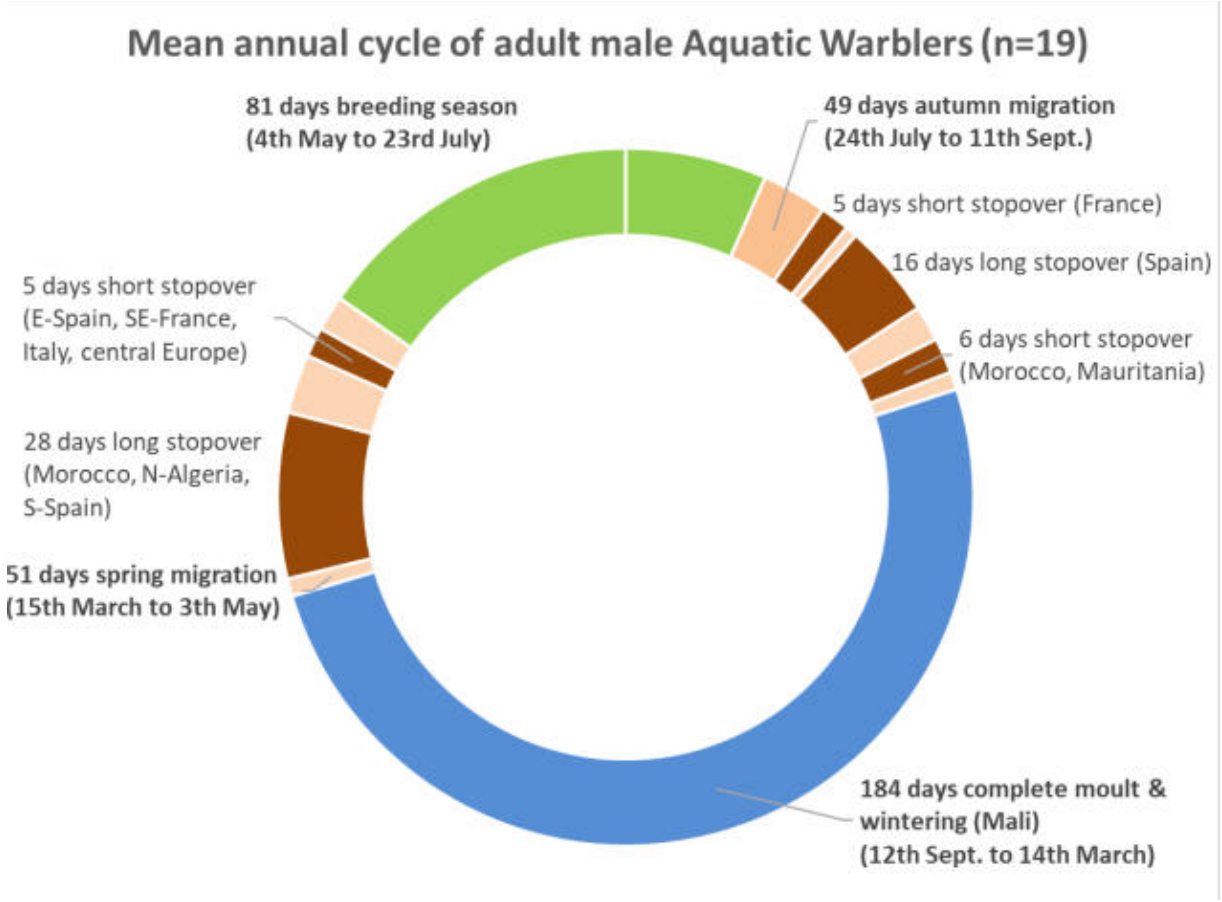
Geolocator study:

Breeding sites Belarus / Lithuania

~ 80 days at breeding site

~ 180 days at wintering site

~ 100 days on migration



bioRχiv THE PREPRINT SERVER FOR BIOLOGY *submitted*

Migration routes and wintering sites of the Aquatic Warblers *Acrocephalus paludicola* breeding in Lithuania and North Belarus

Flade et al. 2024

Martin Flade, Simeon Lisovski, Vytauras Eigirdas, Benedikt Giessing, Fréderic Jiguet, Oskars Keišs, Maxim Nemtchinov

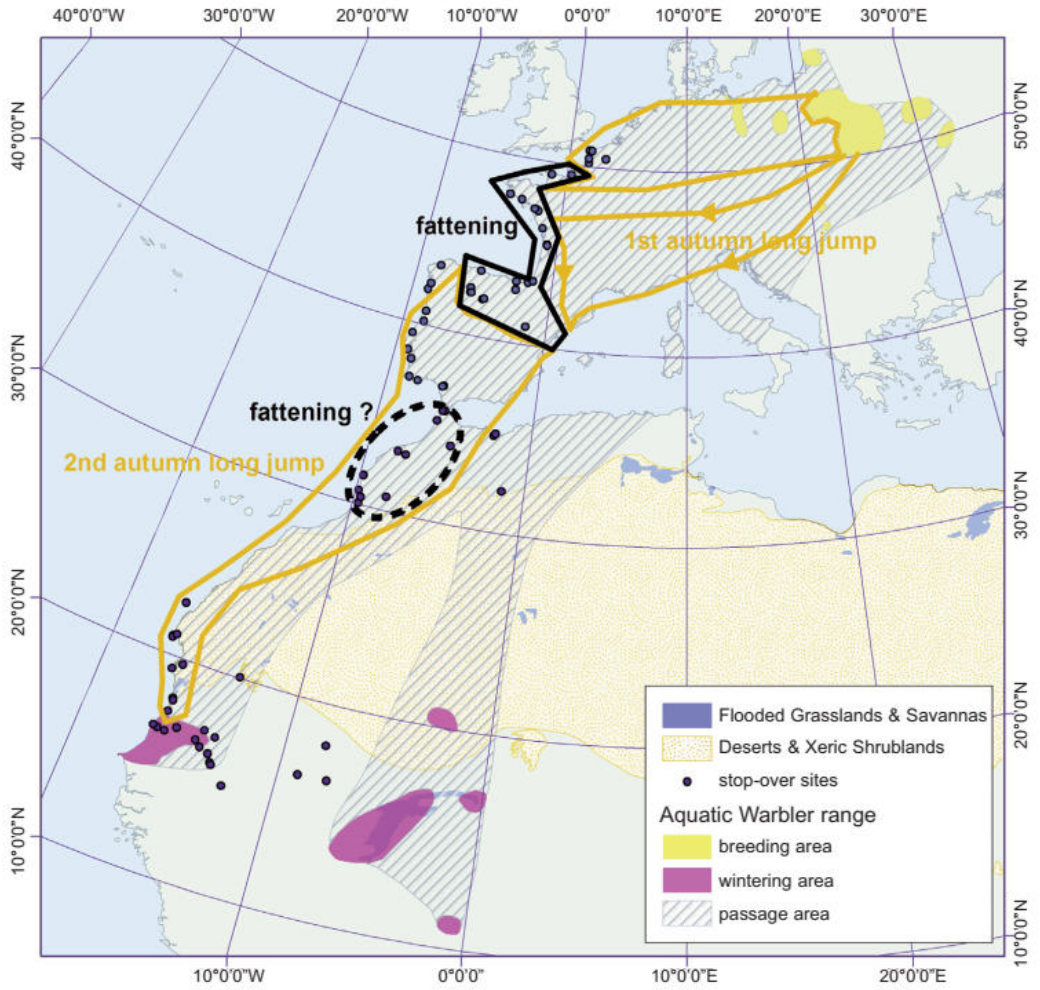
doi: https://doi.org/10.1101/2023.10.10.561376

Knowledge gains

Migration and stop-over

- France and Iberian peninsula imortant for refueling
- Most individuals not able to cross Sahara during one non-stop flight

→ importance of North Africa



ACTA ORNITHOLOGICA
Vol. 55 (2020) No. 1

Autumn migration strategy and stop-over sites of the globally threatened Aquatic Warbler *Acrocephalus paludicola* on the Atlantic flyway migration route

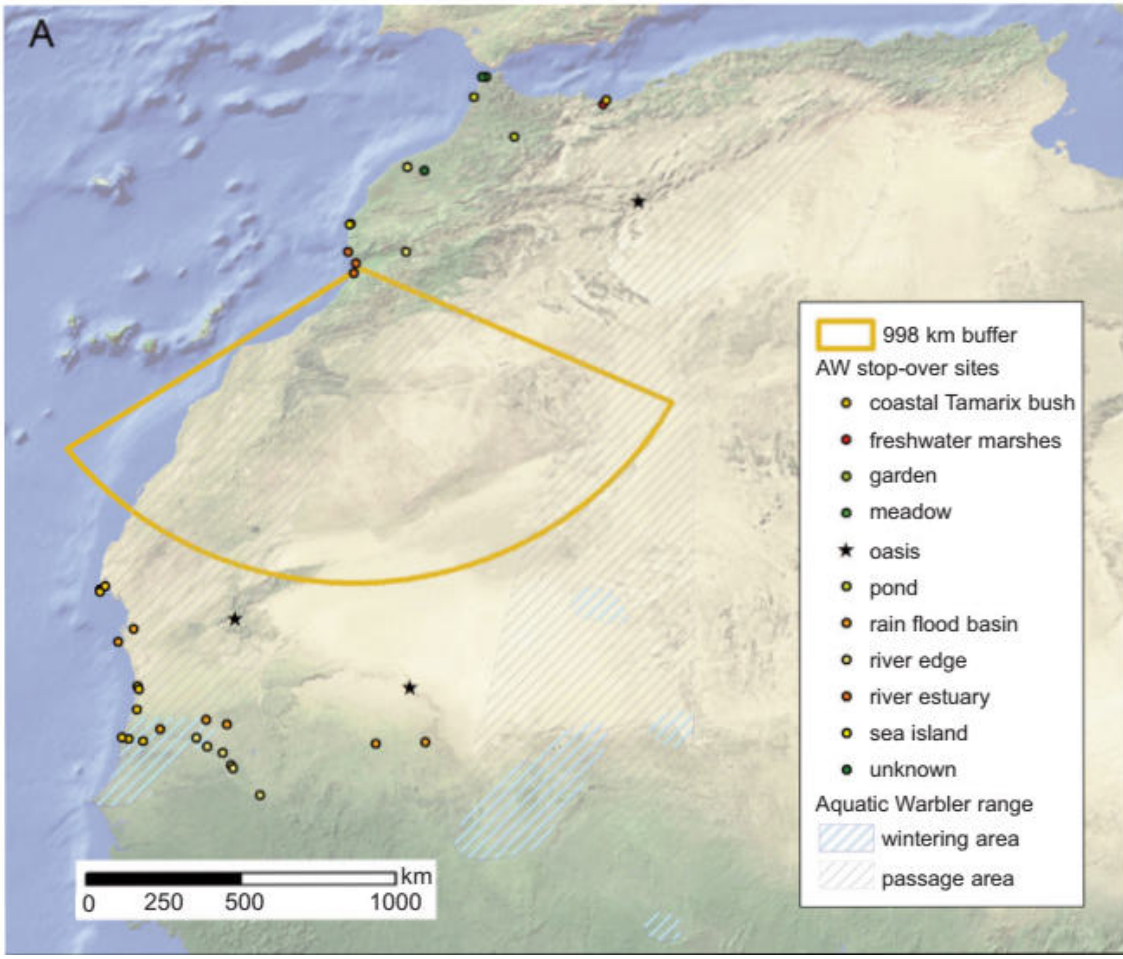
Dariusz JAKUBAS[1] & Magdalena LAZARUS[2]

Jakubas & Lazarus 2020

Knowledge gains

Migration and stop-over

- Stop-over sites in North-Africa important for crossing the Sahara



ACTA ORNITHOLOGICA
Vol. 55 (2020) No. 1

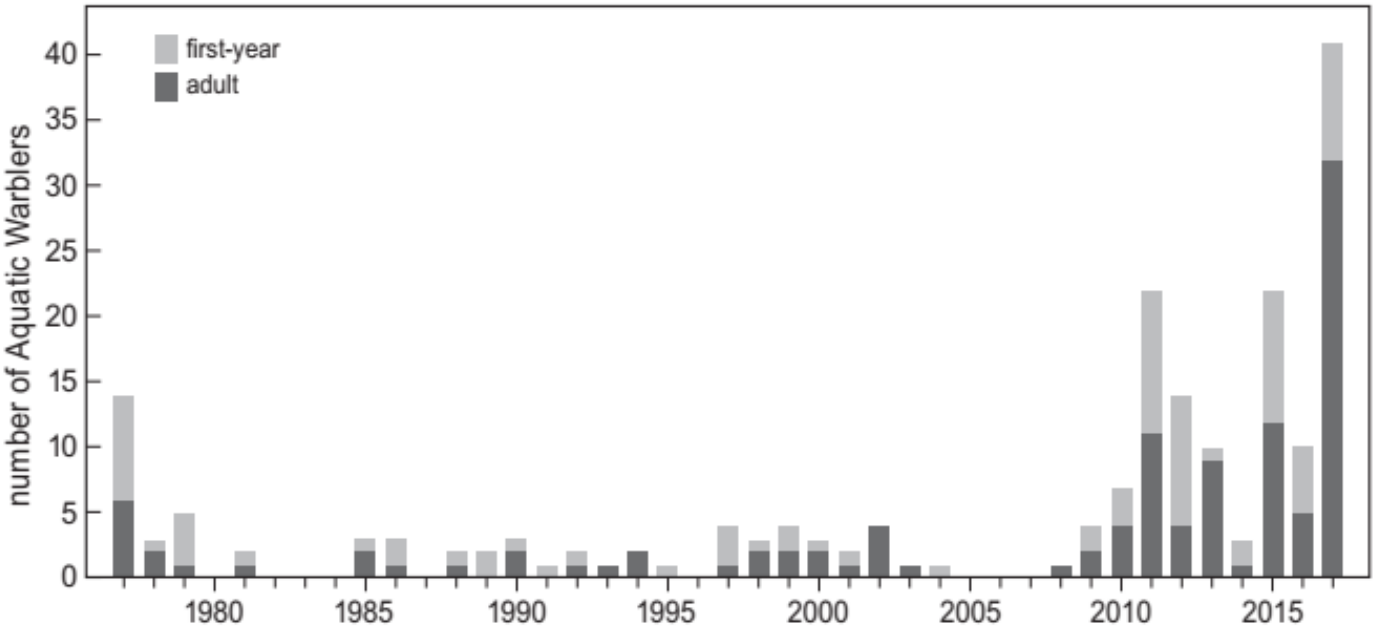
Autumn migration strategy and stop-over sites of the globally threatened Aquatic Warbler *Acrocephalus paludicola* on the Atlantic flyway migration route

Dariusz JAKUBAS[1] & Magdalena LAZARUS[2]

Jakubas & Lazarus 2020

Knowledge gains

Migration and stop-over



Autumn migration of Aquatic Warblers *Acrocephalus paludicola* in Portugal revisited

Júlio Manuel Neto[1,2,*] & Luís P. da Silva[3,4]

Neto & Silva 2024

Knowledge gains

Breeding ecology

	Chełm	Biebrza (Handbook)
Nest survival	57%	62%
Fledging success	77%	
	2.7 fledglings / nest	3.2 fledglings / nest
Nest density	1.3 nests / 10 ha	6 nests / 10 ha
	max. 16.5 nests / 10 ha	max. 18 nest / 10 ha

Bird Conservation International

www.cambridge.org/bci

Breeding ecology of the globally threatened Aquatic Warbler *Acrocephalus paludicola* in calcareous fens at the south-western range limit

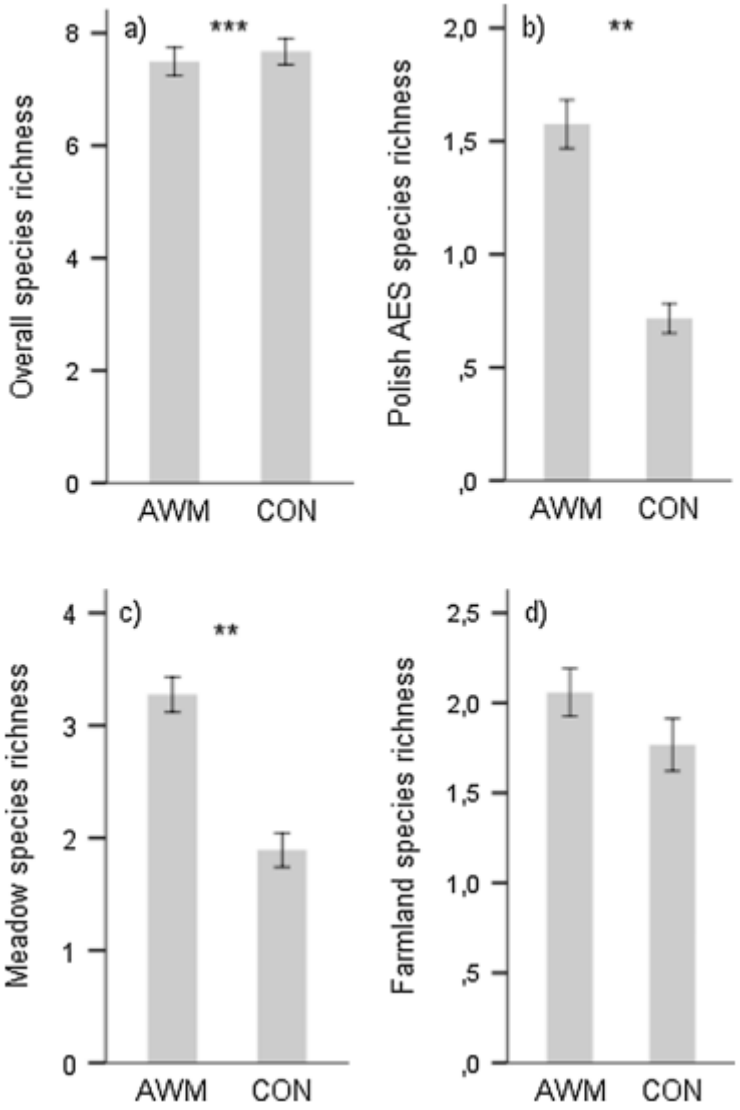
Joanna Wołoszkiewicz[1], Justyna Kubacka[2] and Janusz Kloskowski[1]

Wołoszkiewicz et al. 2024

Knowledge gains

Habitat management

- Agri-environmental measures designed for Aquatic Warblers had positive effects for other bird species



Contents lists available at ScienceDirect

Biological Conservation

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

Effect of agri-environment measure for the aquatic warbler on bird biodiversity in the extensively managed landscape of Biebrza Marshes (Poland)

Michał Budka[a,*], Marek Jobda[b], Paweł Szałański[b], Hubert Piórkowski[b]

Budka et al. 2019

Knowledge gains

Full count Biebrza

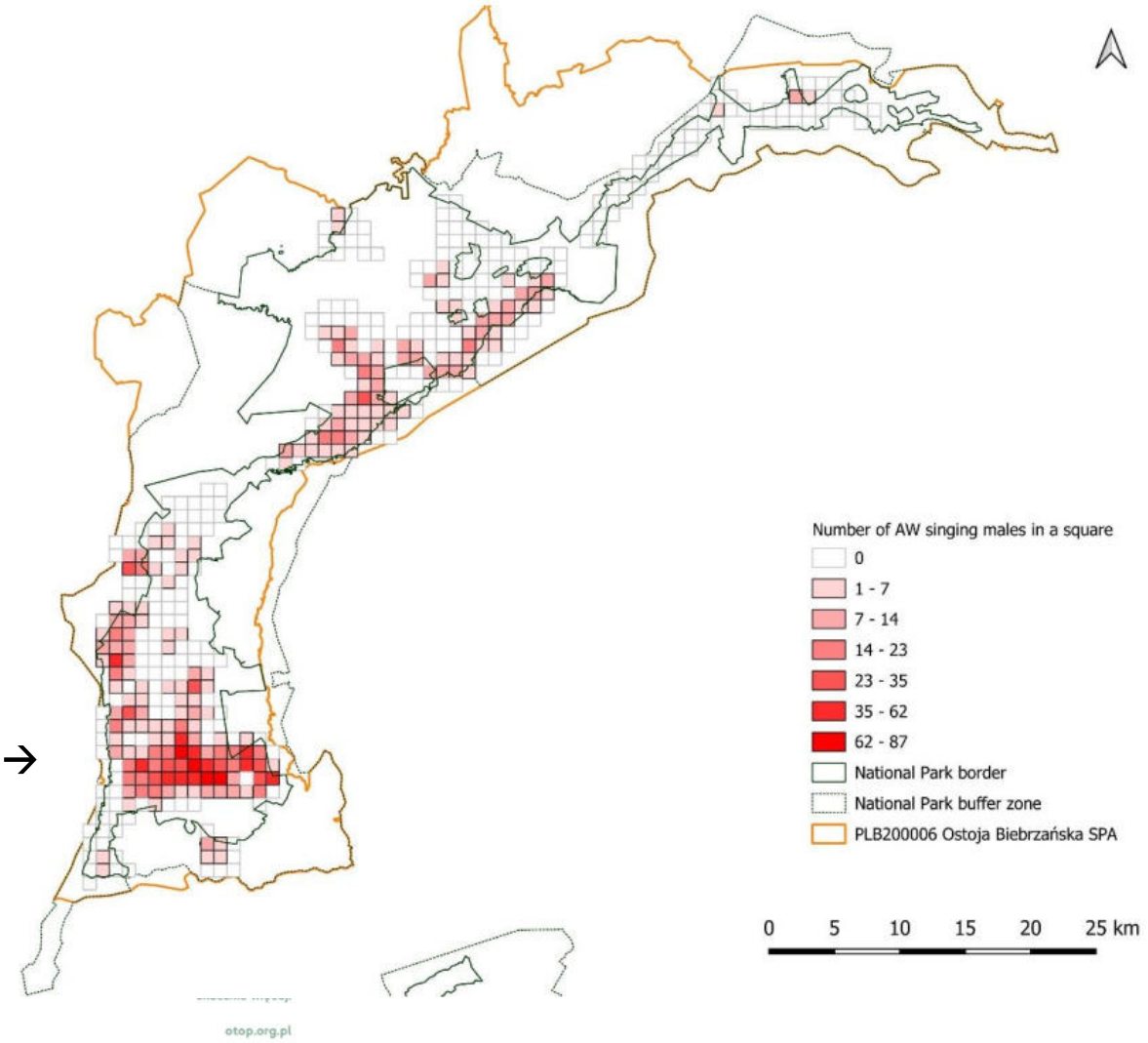
2007: 2136 sM

2012: 2671 sM

2024: 2411 sM

average: 1.2 sM / 10 ha

max. 9 sM / 10 ha →

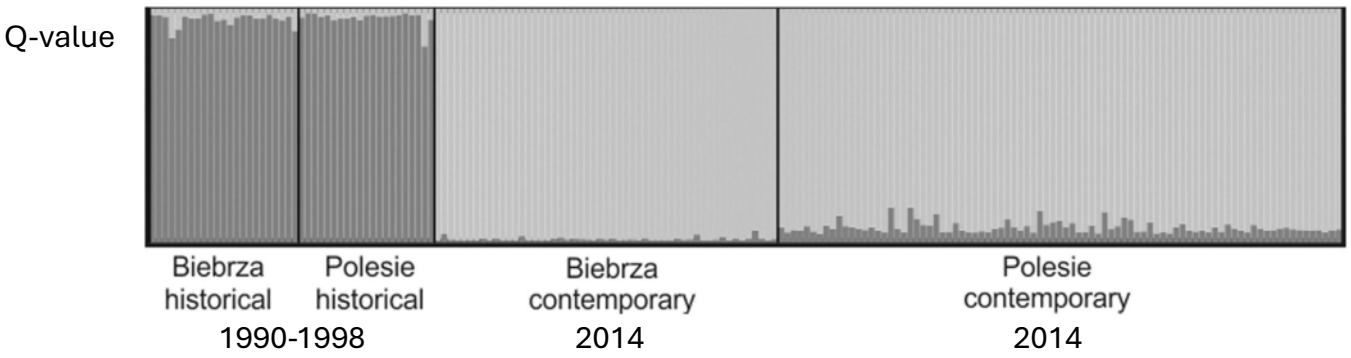


Population of Aquatic Warbler in Biebrza Valley in 2024

Stasiak & Szczęch 2024

Knowledge gains

Genetics



- Reduction in genetic diversity
- High gene flow between distant breeding sites (250 km)

IBIS
BOU international journal of avian science
Ibis (2024), **166**, 232–251
doi: 10.1111/ibi.13250

Low genetic diversity and high gene flow in the Aquatic Warbler (*Acrocephalus paludicola*), a threatened marshland songbird with a fragmented breeding range

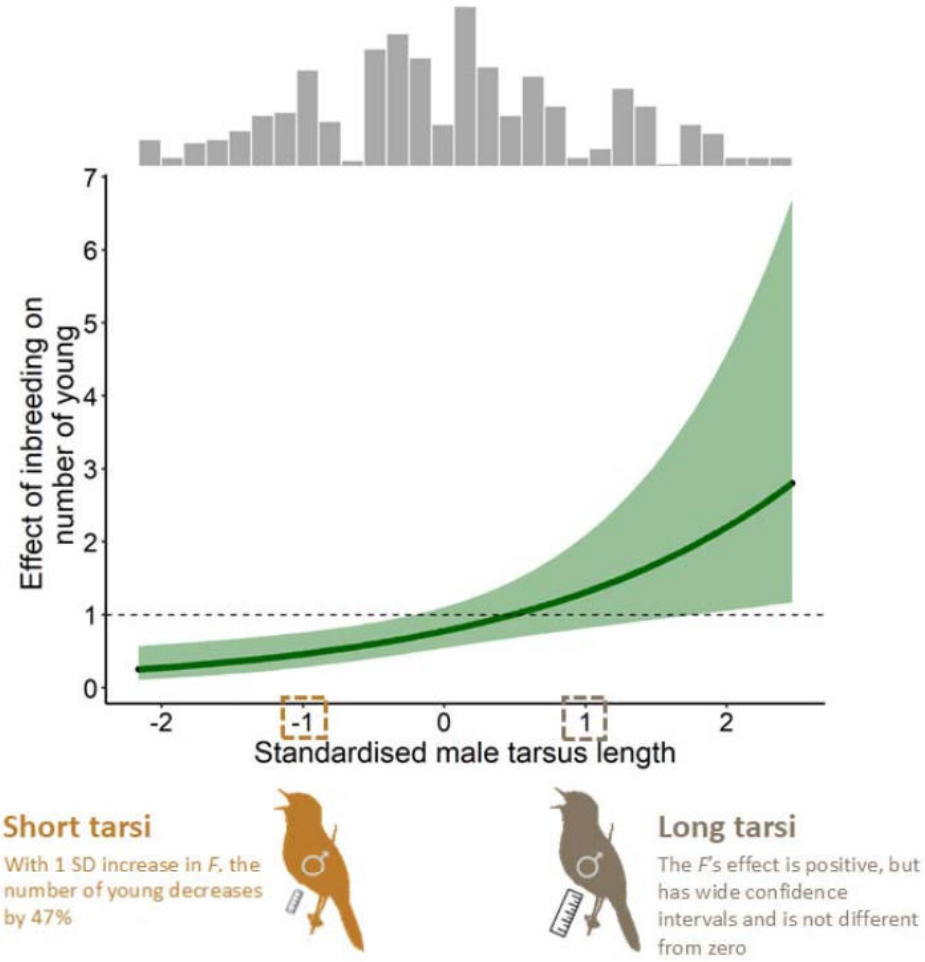
JUSTYNA KUBACKA,*[1] ANNA DUBIEC,[1] JUDITH KORB,[2] VOLKER SALEWSKI,[3] ANDRZEJ DYRCZ,[4] JULIEN FOUCHER,[5] BENEDIKT GIESSING,[6] BERND LEISLER,[6] KARL SCHULZE-HAGEN,[7] MICHAEL WINK[7] & HANNA PANAGIOTOPOULOU[1]

Kubacka et al. 2024

Genetics

- Inbreeding coefficient rather low
- Most inbred individuals had lower breeding success (males) compared to least inbred

→ but negative inbreeding effect only in small-bodied individuals



bioRχiv THE PREPRINT SERVER FOR BIOLOGY *under review, Heredity*

It is hard to be small: Inbreeding depression depends on the body size in a threatened songbird

Kubacka et al. 2024

Justyna Kubacka, Larissa S. Arantes, Magdalena Herdegen-Radwan, Tomasz S. Osiejuk, Sarah Sparmann, Camila J. Mazzoni

doi: https://doi.org/10.1101/2024.04.21.590470

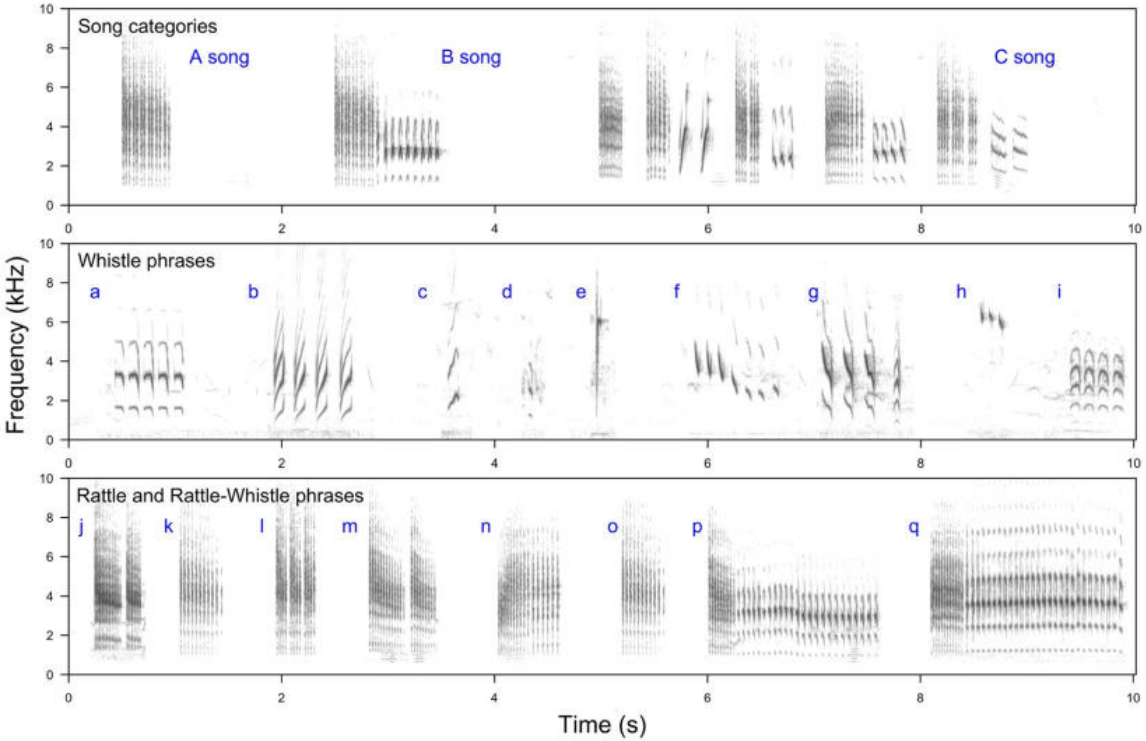
Knowledge gains

Song

- Complex song repertoire

mean: 155 (18 – 300) phrases

- C-song: Courtship song
- A/B-song: to deter other males



scientific reports

OPEN

Male song of the Aquatic Warbler, a promiscuous bird without paternal care, is more complex than previously thought

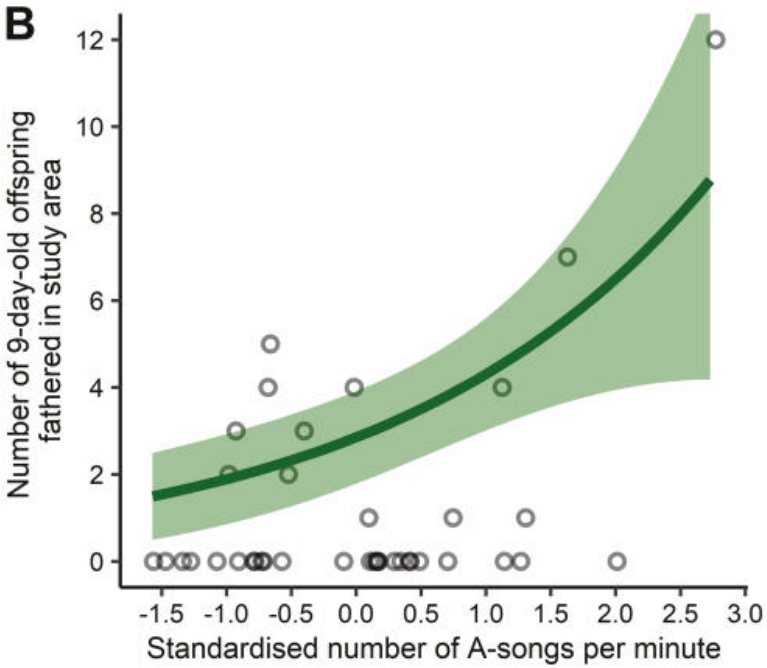
Tomasz S. Osiejuk & Justyna Kubacka

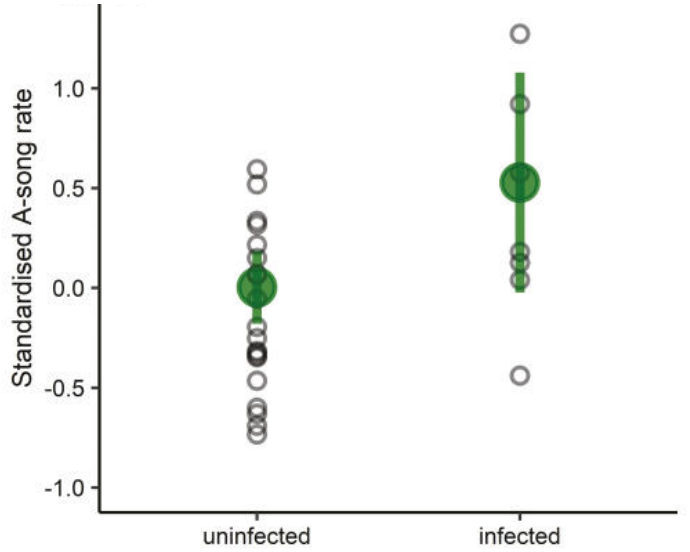
Osiejuk & Kubacka 2023

Knowledge gains

Song and blood parasites

- A-song (aggressive towards other males) rate positively correlates with breeding success
- but also with infection with avian malaria





Ornithology, 2025, 142, 1–17
https://doi.org/10.1093/ornithology/ukae045
Advance access publication 13 September 2024
Research Article

Ornithology

Agonistic song rate positively correlates with male breeding success and avian malaria infection in *Acrocephalus paludicola* (Aquatic Warbler), a promiscuous songbird with female-only parental care

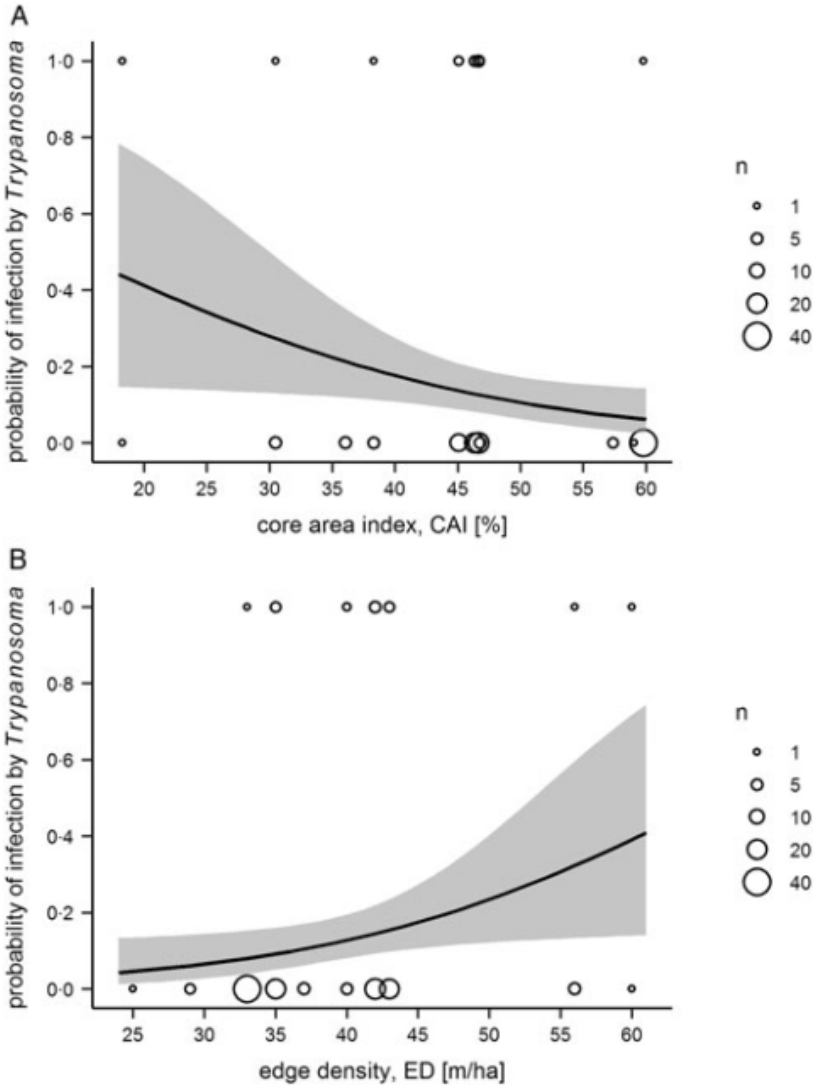
Justyna Kubacka,[1,*] Anna Dubiec,[1] Larissa Souza Arantes,[2,3] Magdalena Herdegen-Radwan,[4] Camila J. Mazzoni,[2,3] Sarah Sparmann,[2,5] and Tomasz S. Osiejuk[4]

Kubacka et al. 2025

Knowledge gains

Landscape and blood parasites

- Birds breeding in large areas less infected
- Habitat fragmentation increases the prevalence for blood parasite infections



Parasitology

cambridge.org/par

Research Article

Kubacka et al. 2019

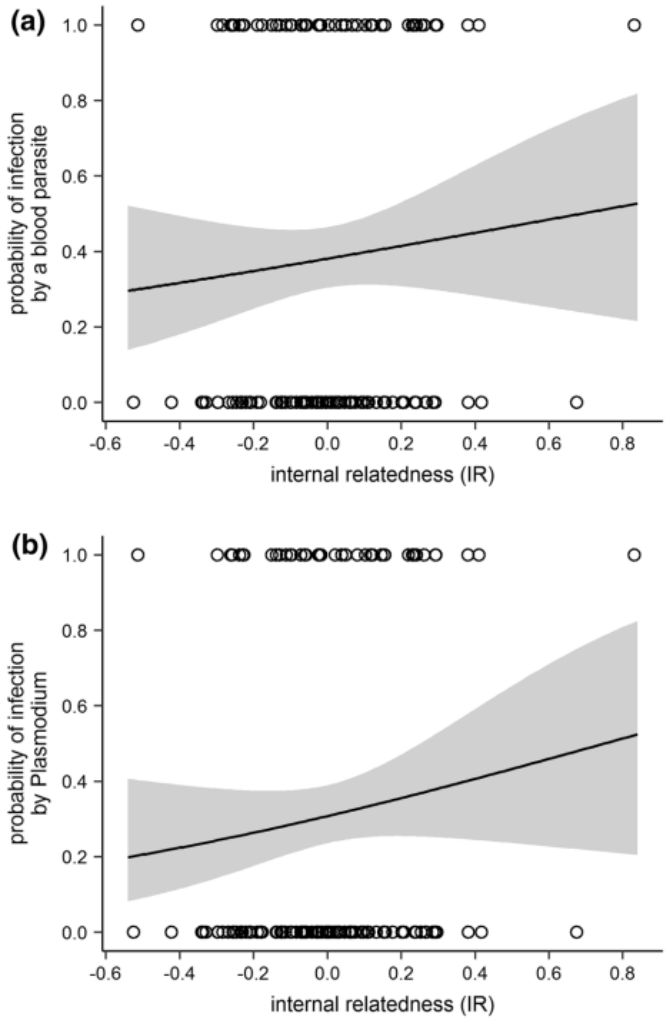
Correlates of blood parasitism in a threatened marshland passerine: infection by kinetoplastids of the genus *Trypanosoma* is related to landscape metrics of habitat edge

Justyna Kubacka[1], Alina Gerlée[2], Julien Foucher[3], Judith Korb[4] and Edyta Podmokła[5]

Knowledge gains

Genetics and blood parasites

- Infection with blood parasites increased with internal relatedness
- but no support of overall negative inbreeding effect on blood parasitism



Journal of Ornithology
https://doi.org/10.1007/s10336-020-01753-0

ORIGINAL ARTICLE

Heterozygosity and fitness in a threatened songbird: blood parasite infection is explained by single-locus but not genome-wide effects

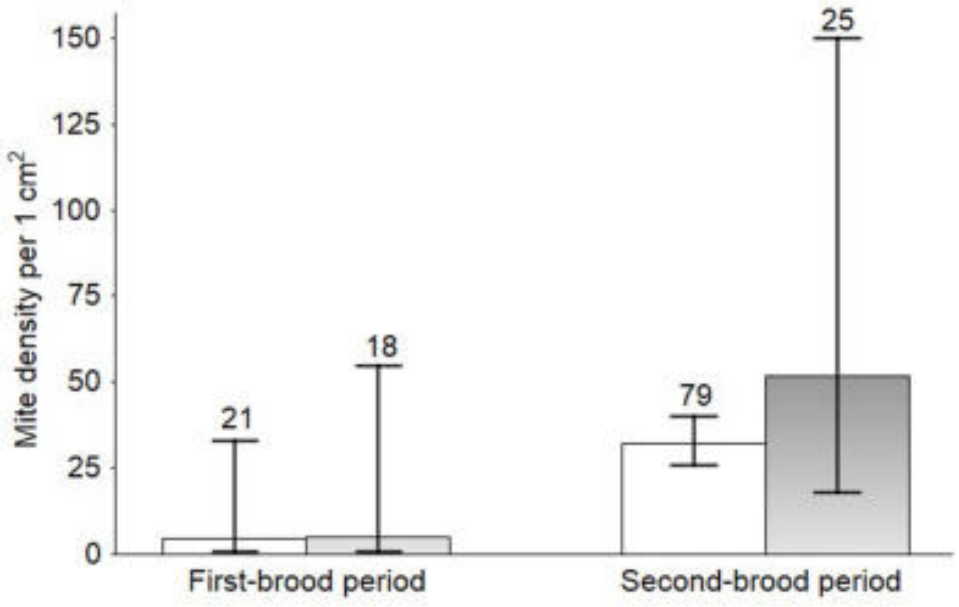
Justyna Kubacka[1] · Edyta Podmokła[2] · Judith Korb[3] · Anna Dubiec[1]

Kubacka et al. 2020

Knowledge gains

Parasites

- Feather mite prevalence increased during breeding season
- higher mite loads on females
- no effect on breeding success



Contents lists available at ScienceDirect

International Journal for Parasitology: Parasites and Wildlife

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

Wołoszkiewicz et al. 2024

Patterns of feather mite (Acariformes: Astigmata) prevalence and load in a promiscuous bird during the breeding season

Joanna Wołoszkiewicz [a], Jacek Dabert [b], Sandra Kaźmierczak [a], Janusz Kloskowski [a,*]

Knowledge gains

Translocation method

- Pilot study in Lithuania 2018/2019

→ develop and test the method

- Translocations to Pomerania since 2023

→ start reinforcement of Pomeranian population

Morkvėnas et al. 2025

Animal Conservation ZSL

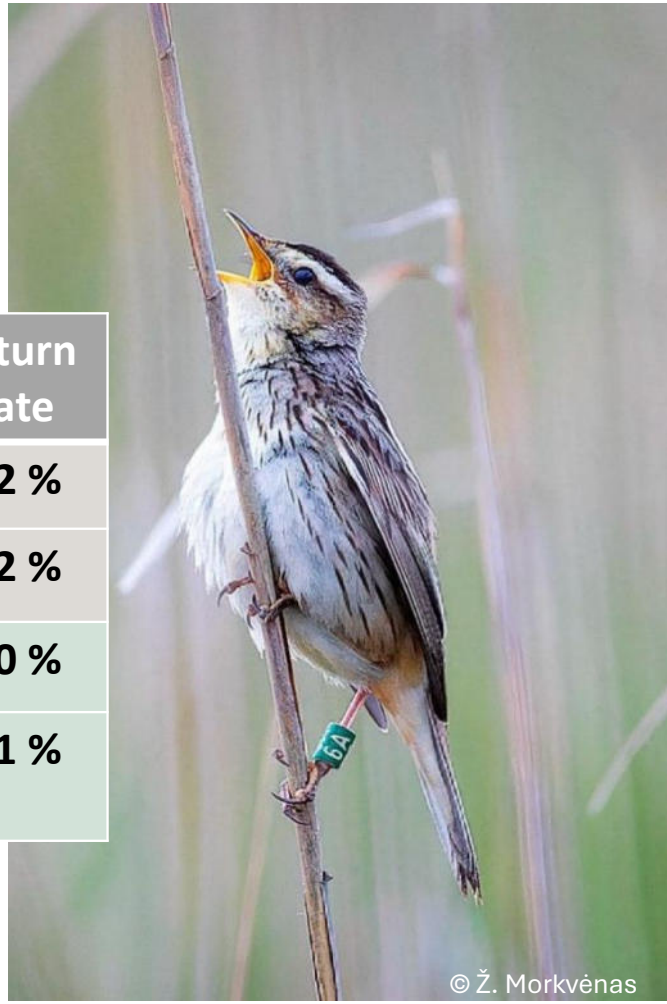
ORIGINAL RESEARCH

Successful Translocation of a Long-Distance Migrating Passerine—New Impetus for the Conservation of the Globally Threatened Aquatic Warbler

Žymantas Morkvėnas, Susanne Arbeiter, Aleksandr Kozulin, Gintaras Riauba, Dzmitry Zhurauliou, Vitali Yakovich, Franziska Tanneberger

Return rates after translocation

	Release site	Observations in subsequent year	return rate
2018-2019	Zuvintas (LT)	**11** (9 ♂ 2 ♀)	**22 %**
2019-2020	Zuvintas (LT)	**6** (3 ♂ 3 ♀) + 3 ♂ from 2018	**12 %**
2023-2024	Rozwarowo (PL)	**5** (3 ♂ 2 ♀)	**10 %**
2024-2025	Rozwarowo (PL)	**7** (5 ♂ 2 ♀) + 1 ♀ from 2023, 1 ♀ unringed 3 ♂ unringed	**21 %**



Knowledge gains

First-year survival

Mark-recapture survival analysis

Apparent survival (Phi)	Detection probability
0.30 (0.20-0.44)	♂ 0.85 ± 0.13
	♀ 0.24 ± 0.13
♂ 0.29 (0.16-0.48)	
♀ 0.23 (0.08-0.52)	

© Ž. Morkvėnas

Morkvėnas et al. 2025

Animal Conservation ZSL

ORIGINAL RESEARCH

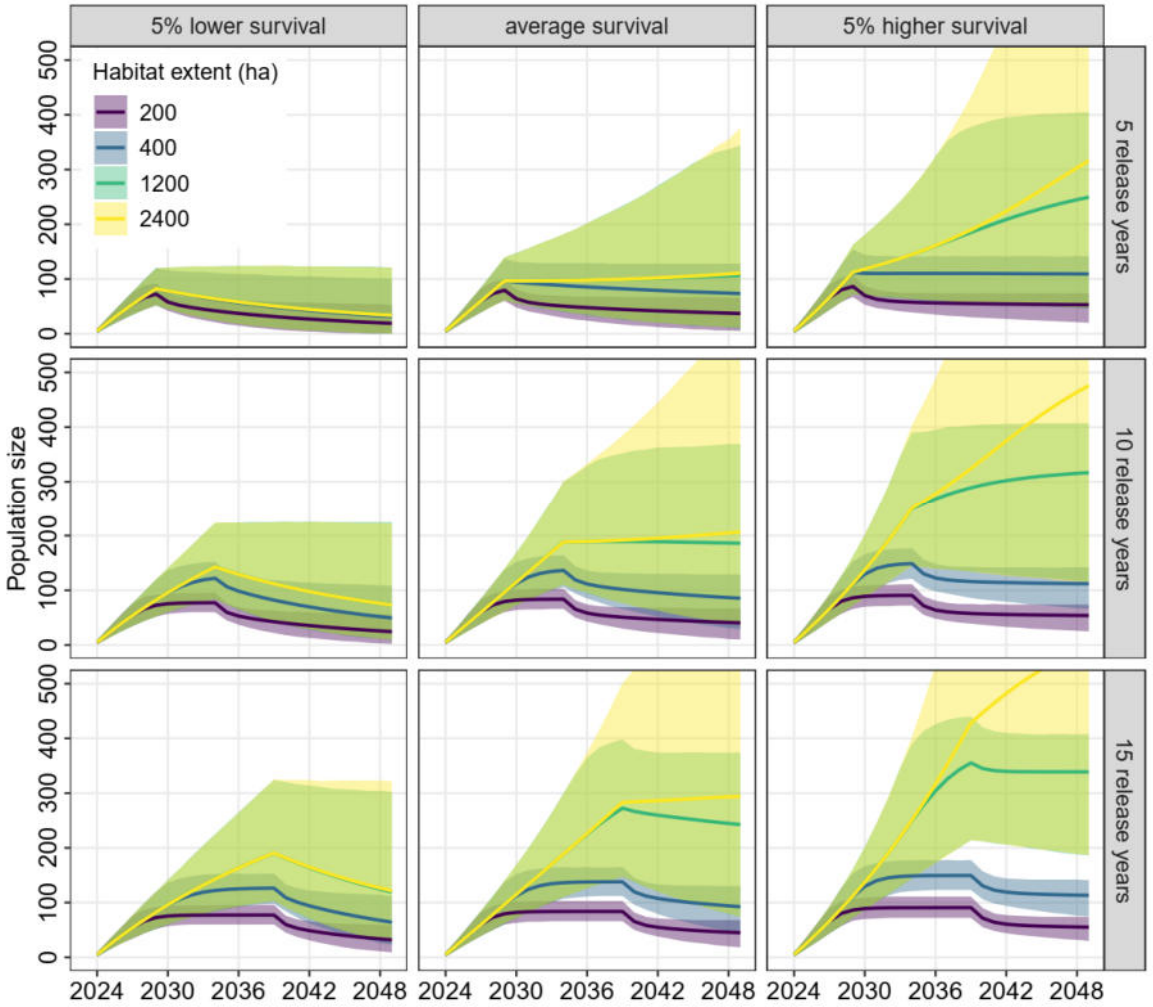
Successful Translocation of a Long-Distance Migrating Passerine—New Impetus for the Conservation of the Globally Threatened Aquatic Warbler

Žymantas Morkvėnas, Susanne Arbeiter, Aleksandr Kozulin, Gintaras Riauba, Dzmitry Zhurauliou, Vitali Yakovich, Franziska Tanneberger

Knowledge gains

Population model

- Integrated population model including count data and demographic data
- project future population development after translocation
- Variation in survival, habitat extent and different duration of translocations



Arbeiter et al., *under review*

Ornithological Applications

Reinforcement is not enough to establish a viable population of the globally threatened Aquatic Warbler Acrocephalus paludicola at the margin of its breeding range

--Manuscript Draft--

Knowledge gaps to be closed to improve Aquatic Warbler conservation

Knowledge gaps

Translocation method and population recovery

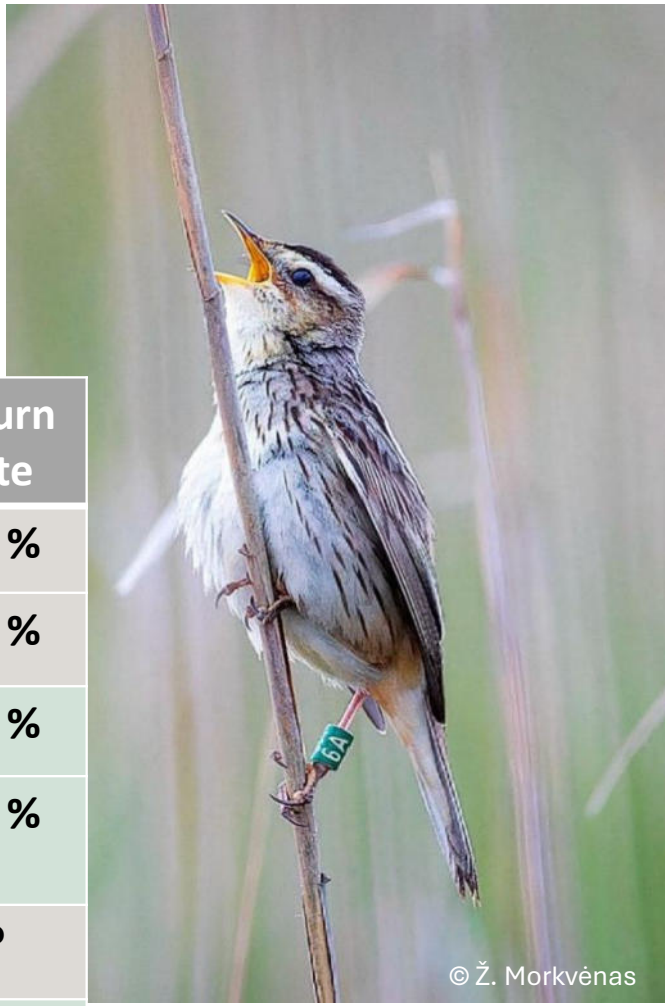
- Optimize food and nutrition of chicks
- Long-distance transport

- Carrying capacity of donor population
- What population size can be considered as self-sustaining ?

Knowledge gaps

Return rates after translocation
First-year / adult survival

	Release site	Observations in subsequent year	return rate
2018-2019	Zuvintas (LT)	**11** (9 ♂ 2 ♀)	**22 %**
2019-2020	Zuvintas (LT)	**6** (3 ♂ 3 ♀) + 3 ♂ from 2018	**12 %**
2023-2024	Rozwarowo (PL)	**5** (3 ♂ 2 ♀)	**10 %**
2024-2025	Rozwarowo (PL)	**7** (5 ♂ 2 ♀) + 1 ♀ from 2023, 1 ♀ unringed 3 ♂ unringed	**21 %**
2025-2026	Zuvintas (LT)	**?**	**?**
2026-2027	Rozwarowo (PL)	**?**	**?**

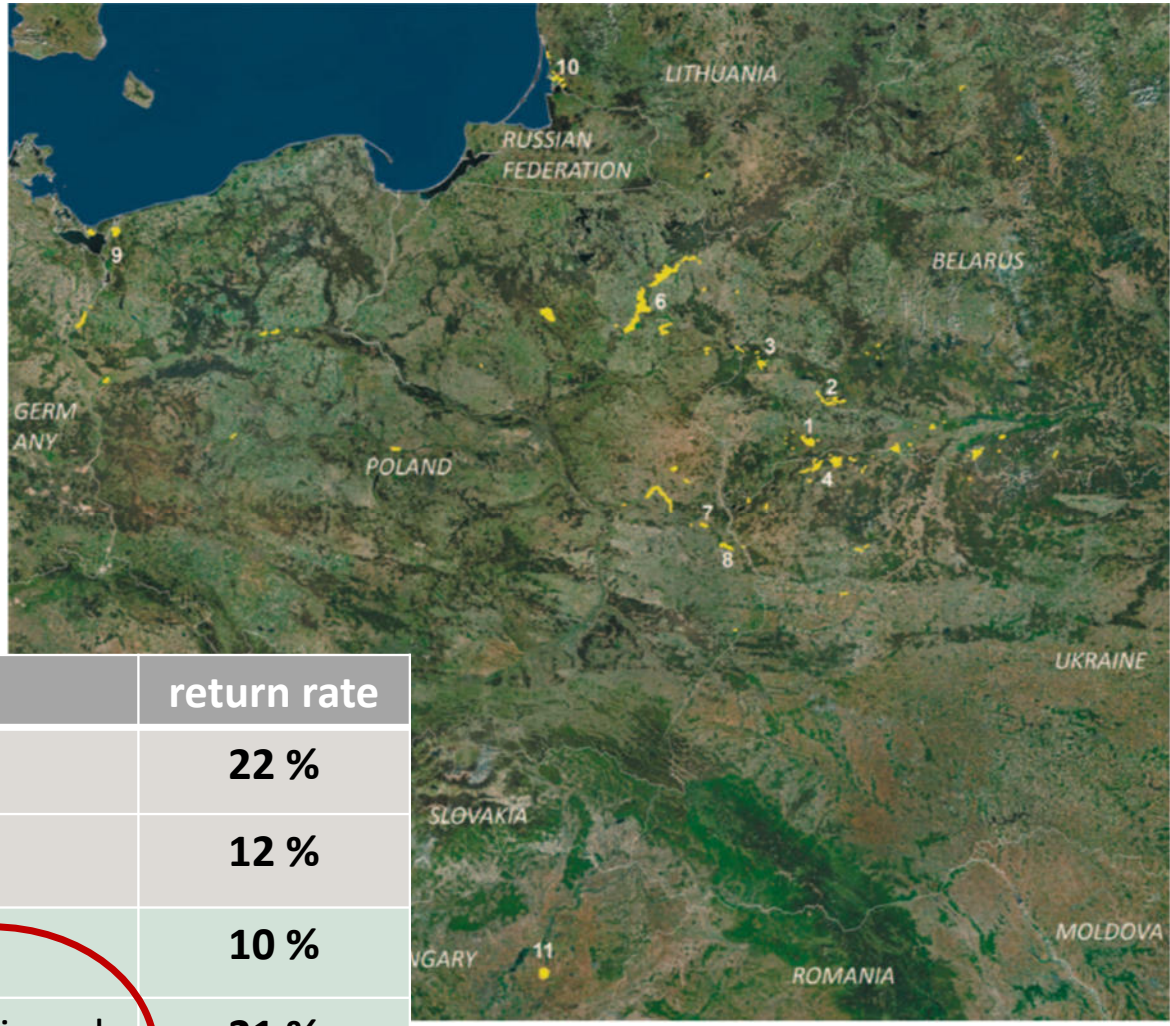


© Ž. Morkvėnas

Knowledge gaps

Natal dispersal

- Is natal dispersal female biased ?
- Dispersal distances ?

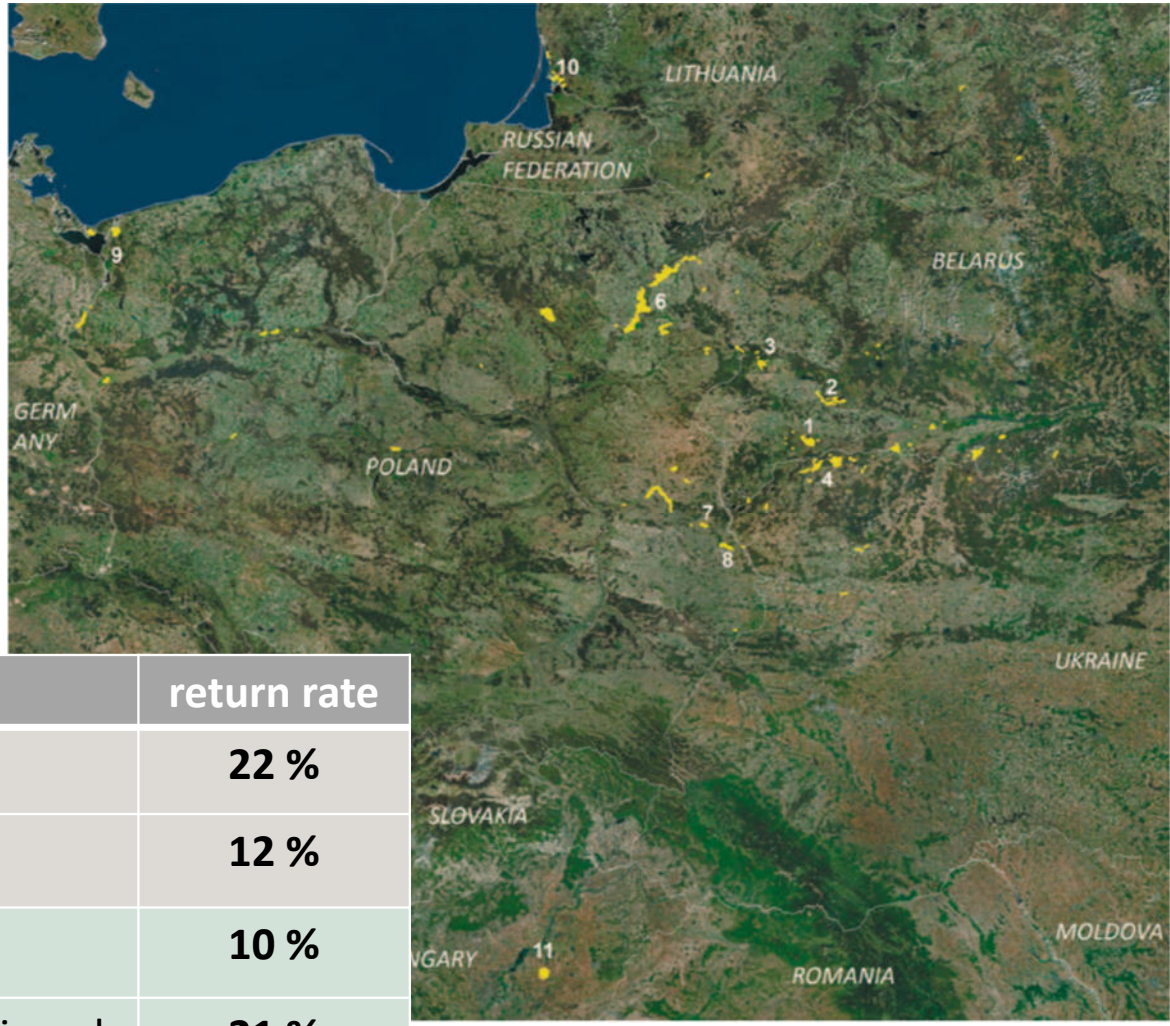


	Observations in subsequent year	return rate
2018 – 2019	**11** (9 ♂ 2 ♀)	**22 %**
2019 – 2020	**6** (3 ♂ 3 ♀) + 3 ♂ from 2018	**12 %**
2023 – 2024	**5** (3 ♂ 2 ♀)	**10 %**
2024 – 2025	**7** (5 ♂ 2 ♀) + 1 ♀ from 2023, 1 ♀ unringed 3 ♂ unringed	**21 %**

Knowledge gaps

Adult dispersal

- Where are the adults in their second year ?
- Dispersal distances ?



	Observations in subsequent year	return rate
2018 – 2019	**11** (9 ♂ 2 ♀)	**22 %**
2019 – 2020	**6** (3 ♂ 3 ♀) + 3 ♂ from 2018	**12 %**
2023 – 2024	**5** (3 ♂ 2 ♀)	**10 %**
2024 – 2025	**7** (5 ♂ 2 ♀) + 1 ♀ from 2023, 1 ♀ unringed 3 ♂ unringed	**21 %**

Knowledge gaps

Movements between breeding sites

- Exchange between sites during and between breeding seasons
- Connectivety of breeding sites

- Stepping stones to connect breeding sites
- Prioritize sites for habitat restoration

Breeding success and productivity

- Nest survival
- Fledgling survival

→ difference to former studies ?

- Number of fledged juveniles per female (core vs. peripheral breeding sites)

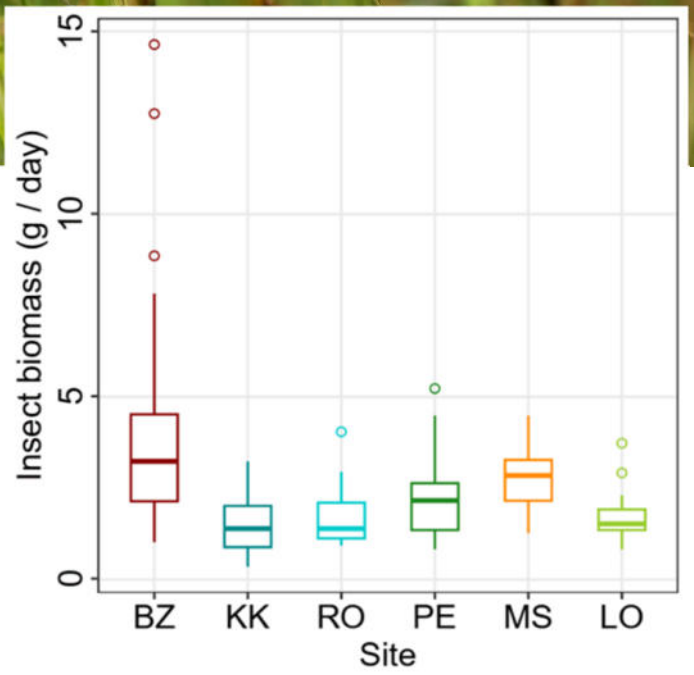
Predation

- What are predators of nests ?
- Predation rate of nests ?
- How is predation rate affected by habitat fragmentation ?
- How can management reduce predation ?

Knowledge gaps

Food availability

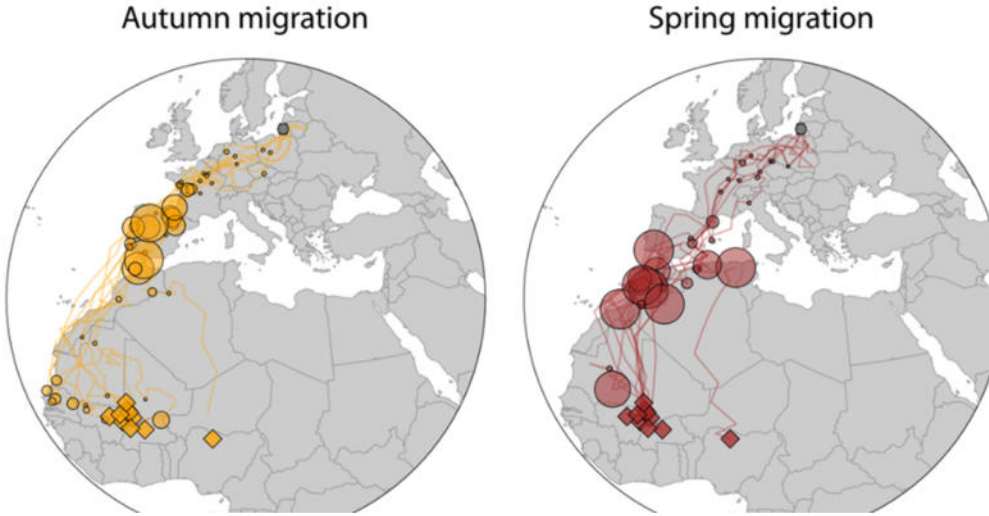
- First indication that insect abundance differs in Pomerania compared to core breeding area (Biebrza)
- more data / years needed
- Does it affect breeding density and fledging success?
- Is it a limitation for population stability / persistence ?



Knowledge gaps

Migration and stop-over sites

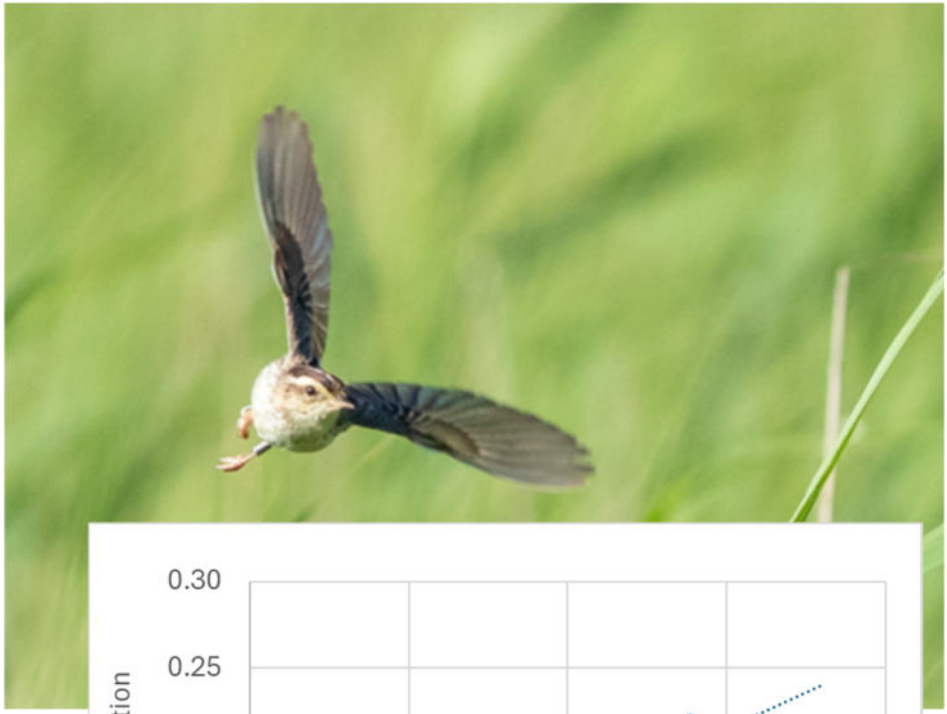
- Migration routes of translocated birds
- Identification of important stop-over sites
- Assess habitat conditions and threats during migration

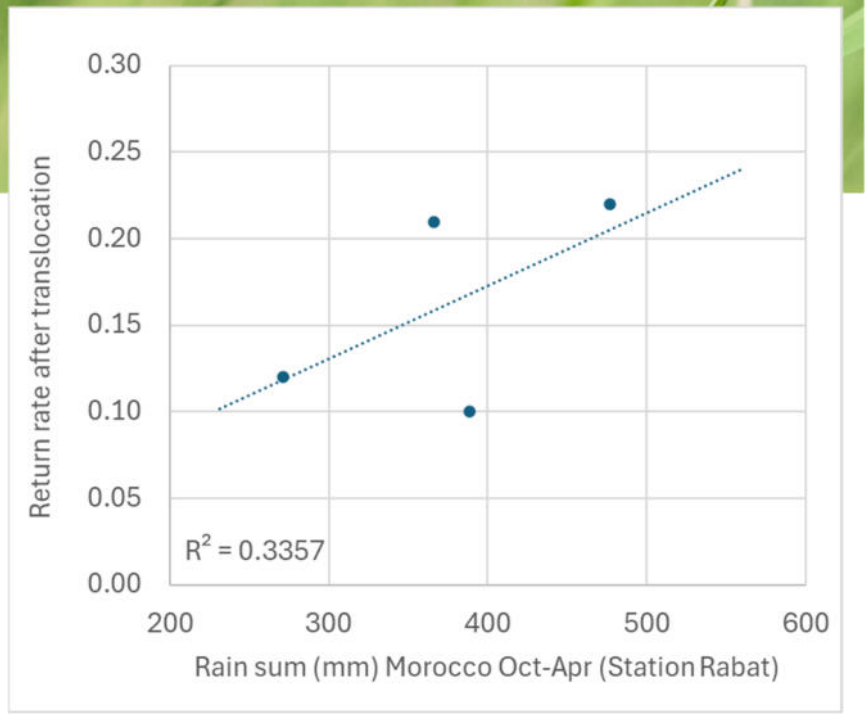


Knowledge gaps

Migration and stop-over sites

- Migration routes of translocated birds
- Identification of important stop-over sites
- Assess habitat conditions and threats during migration
- How does conditions on stop-over sites affect survival and return rate ?





Knowledge gaps

Stop-over sites

Expeditions to Morocco

- 2024 AWCT
- 2025 LIFE AWOM Project

- How to improve protection ?
- Cooperations and financing ?

Genetics

- Genetic monitoring in Pomerania to detect inbreeding effects in founders
- How genetic diversity affects return rates, survival, fitness and breeding success ?
- How genetic diversity develops over time ?

Knowledge gaps

Habitat management

How to implement long-term management to provide high quality habitat ?

- Hydrological measures
- Agri-environmental schemes
- How to protect nests from mowing ?

Knowledge gaps

Habitat management

- Impact of grazing in AW habitats ?
- Utilization of late-cut biomass
- new concepts like paludiculture ?
- Economical aspects to farmers ?
- Better cooperations with farmers ?

Thank you for your attention!