

# Il ruolo dell'inanellamento nella ricerca scientifica

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**ISPRA**

Gargnano BS, 6 luglio 2022



# Inanellamento: tecnica di studio dell'avifauna

## OBIETTIVO STORICO (DALLA GRECIA ANTICA AL 1899):

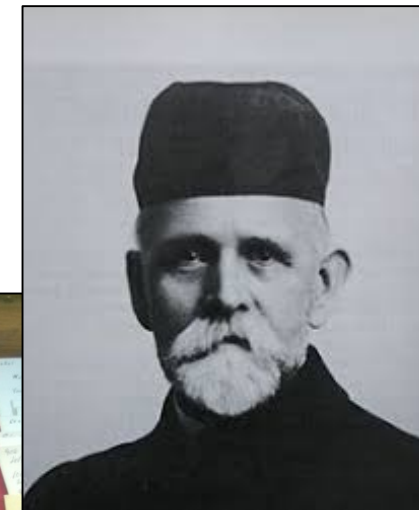
- identificazione individuale

## FASE 1: Marcaggio

- Cattura
- Identificazione della specie
- **Marcaggio** con anelli/altri metodi
- Raccolta dati
- Rilascio

## FASE 2: Reincontro/i

- ...
- ...
- ...



# Principali risultati dell'attività di inanellamento: dati demografici

## Parametri demografici:

- Sopravvivenza (Longevità)
- Età di riproduzione
- Tasso di ritorno (Filopatria natale o riproduttiva)
- Dinamica di popolazione (Produttività, Reclutamento, Abbondanza, Trend)

## Informazioni biogeografiche:

- Determinazione aree riproduzione/svernamento/sosta
- Rotte migrazione/Flyway

## Informazioni Ciclo biologico:

- Determinazione Ciclo Annuale: Tempi di migrazione/riproduzione/svernamento
- Rapporto giovani/adulti



Wisdom: Albatro di Laysan *Phoebastria immutabilis*

# Principali risultati dell'attività di inanellamento: dati biologici/ambientali

## Raccolta dati biologi primari:

- Sesso
- Età
- Morfometrie
- Condizioni fisiche (grasso, peso, ematocrito)
- Muta
- Piumaggio

## Raccolta dati biologi secondari (da sangue, saliva, penne, feci, rigurgiti):

- Isotopi (catena trofica, origine geografica)
- Genomica
- Malattie avifauna (Influenza, Arbovirosi ...)

## Raccolta dati ambientali:

- Uso/Selezione dell'habitat



# EURING Analytical Meetings

<https://euring.org/meetings/analytical-meetings/analytical-meeting-proceedings>



ROBINSON AND GARDNER

Methods in Ecology and Evolution | 5

**TABLE 1** Contributions to euring analytical meetings by broad topic

	1986	1989	1992	1994	1997	2000	2003	2007	2009	2013	2017
Movements/ Distribution	3	2	5	5	2	1	5	5	2	3	3
Population dynamics/ Abundance	1	2	2	4	1	3	6	5	4		3
Survival estimation	3	1	3	8	7	6	1	1			
Survival methods	6	4	6	5	3	1	2	1	1	2	2
Model fit and assumptions	3	1	4	7	3	7	4	8		3	4
Software		1	1	4	6	2	2	3	2		2
Monitoring/ conservation			1	3	4	3	8	6	5	5	8
Model selection			1	2	2				1	1	1
Integrated analyses			3		1	1	1	5	2	4	6
Multi-state/event models				1	2	5	5	6	5	2	3
Reproductive parameters					1		2	2		1	
Bayesian methods						1	4	5	1		2
Individual variation						6	3	2	2	3	
Occupancy/Unmarked							1	2		4	10
Spatially explicit models								2	2	3	3
Disease ecology									2		1

Contributions 1986–2013 were taken from published proceedings (<https://euring.org/meetings/analytical-meetings/analytical-meeting-proceedings>), for 2017 from the conference programme and titles were classified by reference to the title, or abstract if necessary.



# Parametri demografici

Primi anni '60: Modelli cattura – ricattura di Cormack, Jolly e Seber

Oggi: Williams, Nichols e Conroy

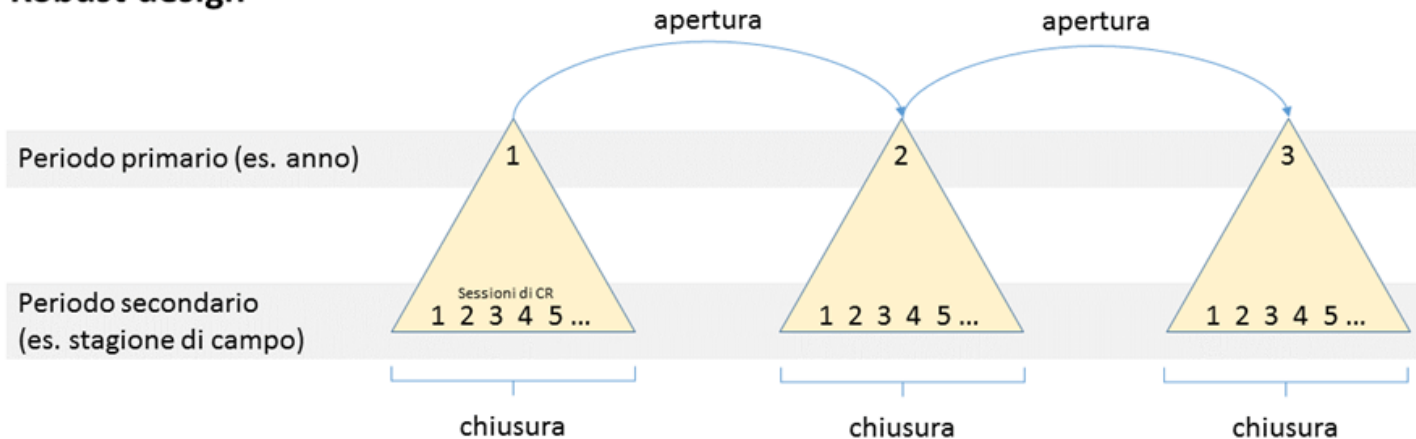


# Modelli di cattura-ricattura: opportunità e limiti

Da Tenan S. in prep.



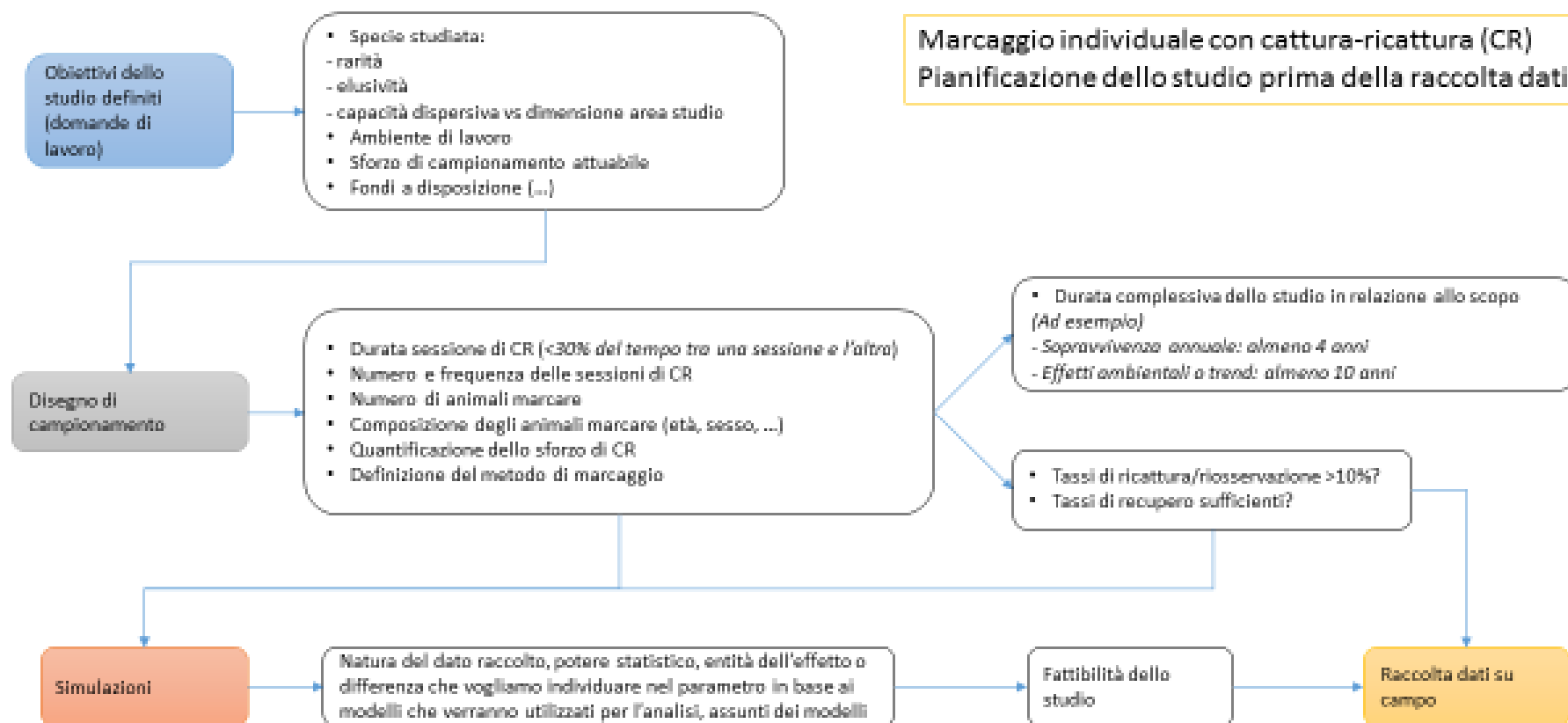
## Robust design



1. Indipendenza individui
2. Identità individui
3. Indipendenza eventi ricattura
4. Permanenza del marcaggio e invariabilità funzionale
5. Marcaggio influente su comportamento
6. Ricatture istantanee (sessioni cattura brevi)
7. Popolazione chiusa durante le sessioni
8. **Soglia minima ricatturati per sessione: 10%**
9. Almeno 3 sessioni per stimare un parametro di sopravvivenza

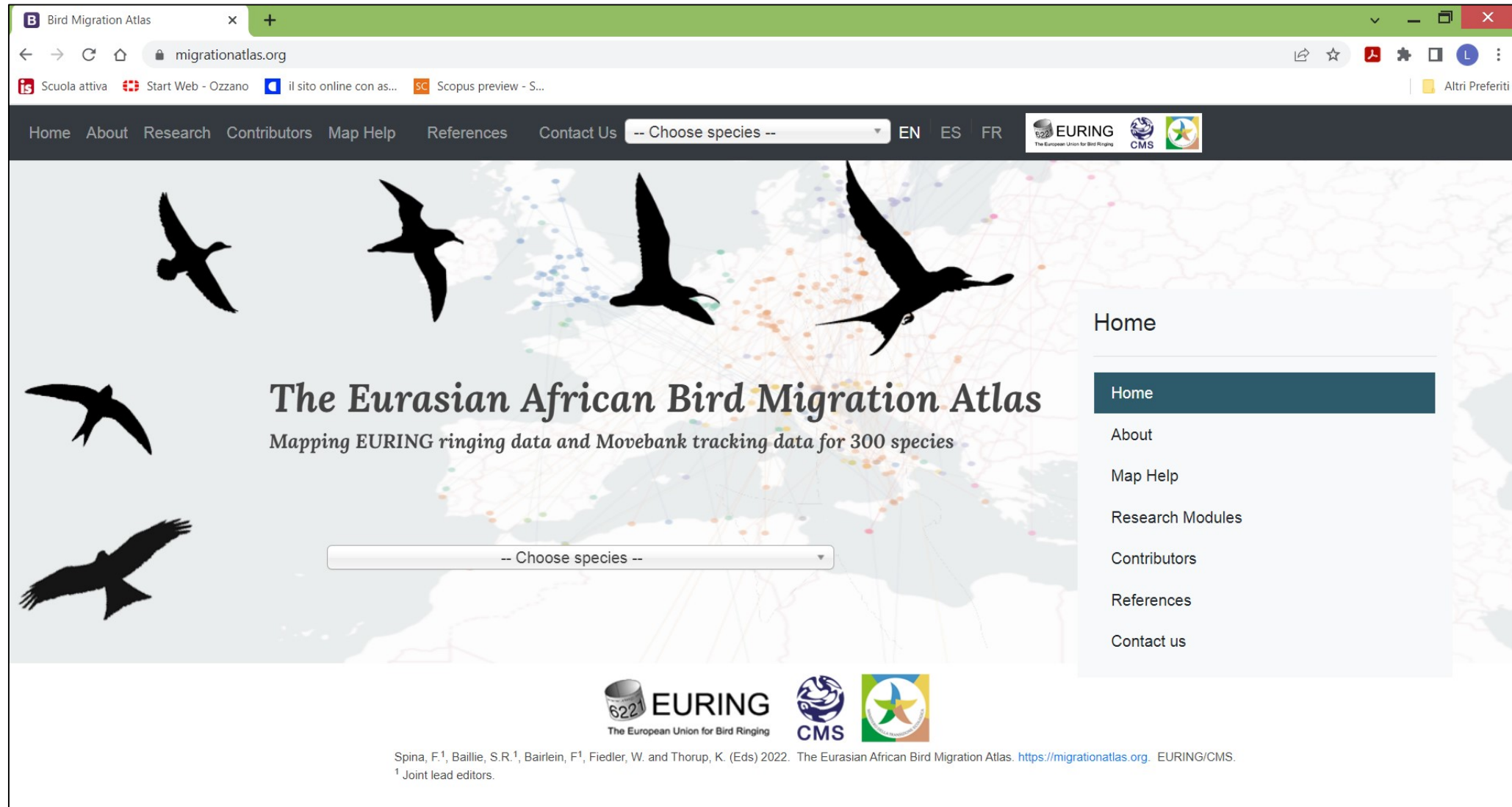
# Modello di cattura-ricattura: Pianificazione dello studio

Da Tenan S. in prep.





# The Eurasian African Bird Migration Atlas



The screenshot shows the homepage of the Bird Migration Atlas website. The browser's address bar displays "migrationatlas.org". The website's navigation bar includes links for Home, About, Research, Contributors, Map Help, References, and Contact Us, along with a species selection dropdown and language options (EN, ES, FR). Logos for EURING, CMS, and the European Union are present. The main content area features a map of Europe and Africa with bird migration routes, overlaid with silhouettes of various birds. The title "The Eurasian African Bird Migration Atlas" is prominently displayed, followed by the subtitle "Mapping EURING ringing data and Movebank tracking data for 300 species". A species selection dropdown is located below the subtitle. A sidebar on the right lists the main navigation links. The footer contains logos for EURING, CMS, and the European Union, along with the names of the joint lead editors and the year of publication.

Bird Migration Atlas

migrationatlas.org

Scuola attiva Start Web - Ozzano il sito online con as... Scopus preview - S...

Home About Research Contributors Map Help References Contact Us -- Choose species -- EN ES FR

EURING The European Union for Bird Ringing CMS

**The Eurasian African Bird Migration Atlas**  
Mapping EURING ringing data and Movebank tracking data for 300 species

-- Choose species --

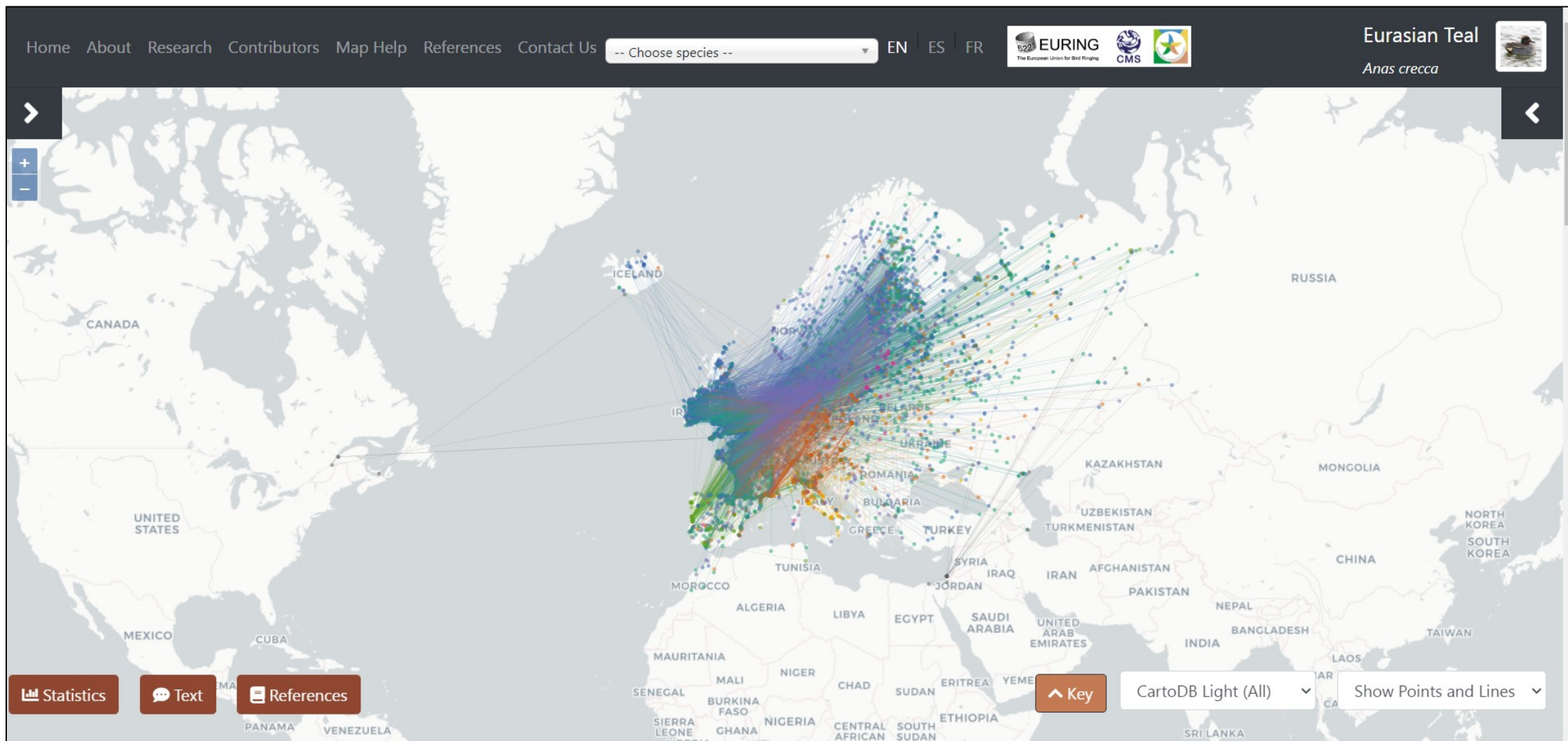
Home

- Home
- About
- Map Help
- Research Modules
- Contributors
- References
- Contact us

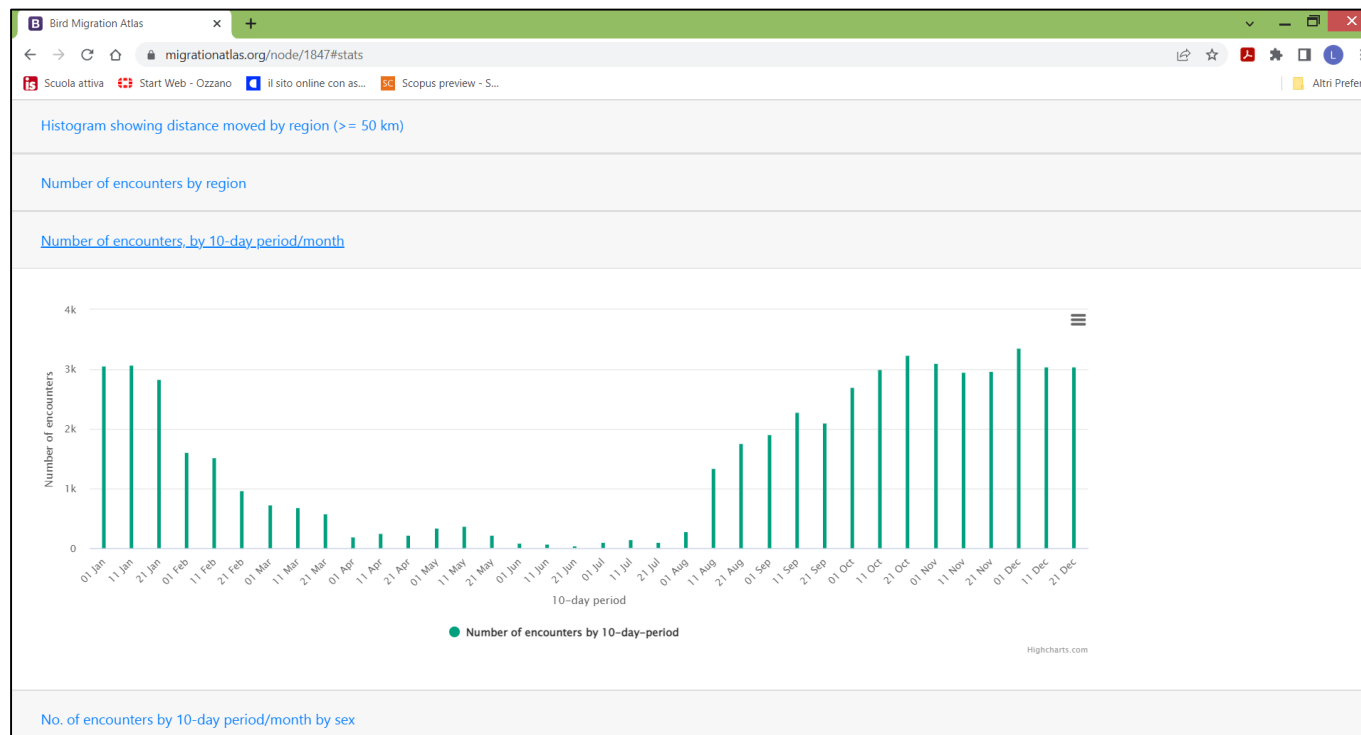
EURING The European Union for Bird Ringing CMS

Spina, F.<sup>1</sup>, Baillie, S.R.<sup>1</sup>, Bairlein, F.<sup>1</sup>, Fiedler, W. and Thorup, K. (Eds) 2022. The Eurasian African Bird Migration Atlas. <https://migrationatlas.org>. EURING/CMS.  
<sup>1</sup> Joint lead editors.

# The Eurasian African Bird Migration Atlas



# The Eurasian African Bird Migration Atlas

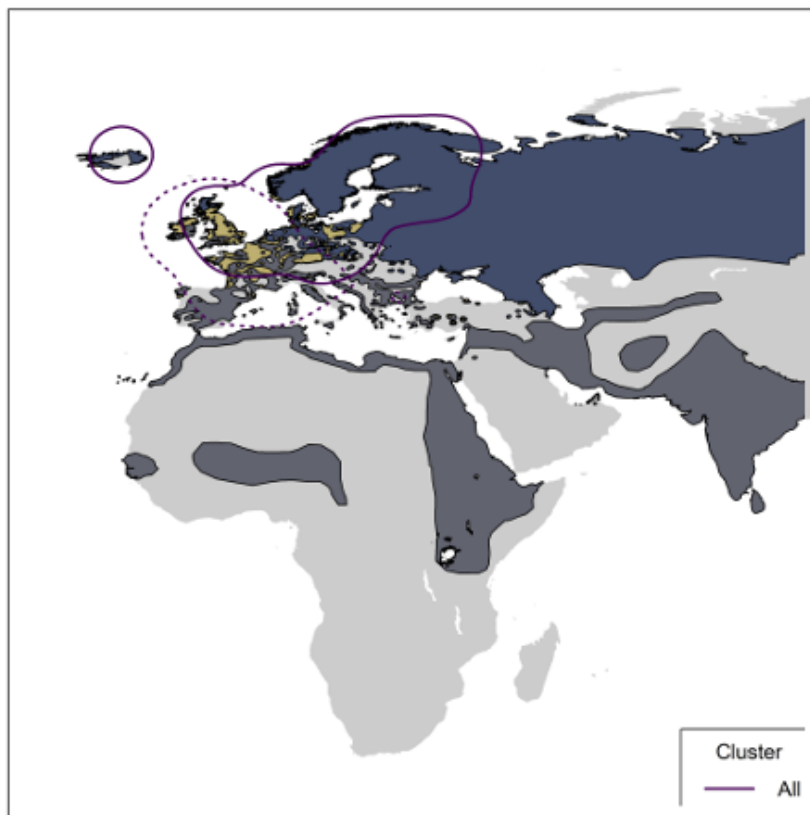




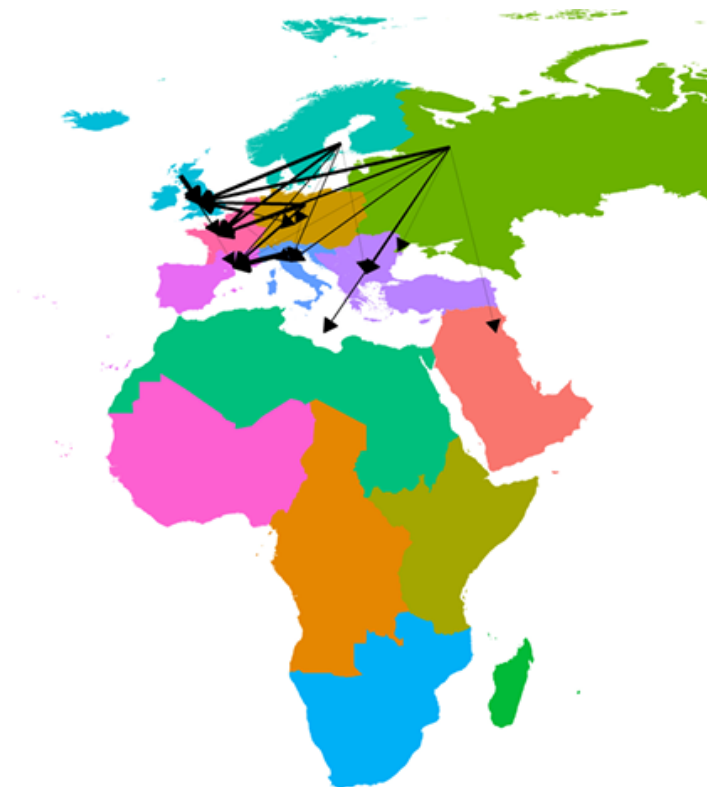
# The Eurasian African Bird Migration Atlas: Modulo di ricerca 'Connettività migratoria'

Roberto Ambrosini & Niccolò Fattorini

Department of Environmental Science and Policy,  
University of Milan  
Via Celoria 26, 20133 Milano (Italy)



**Figure 01840-1.** Map showing 95% kernel contours of of first-level clusters identified by the migratory connectivity analysis, if any, or 95% kernel contours of all encounters, in case of no clustering structure. Solid lines indicate the clusters in the breeding range, dotted lines those in the non-breeding range. Different contour colours correspond to different clusters, as reported in legend. The species distribution range is also shown (breeding range: blue; non-breeding range: dark grey; resident range: beige; from BirdLife International, 2019).



**Figure 01840-6.** Map showing pre-defined regions in different colours, with black arrows linking centroids of individual encounters in different regions. Arrow width is proportional to transition probability.



# The Eurasian African Bird Migration Atlas: Modulo di ricerca 'Stagioni migratorie delle specie cacciabili'

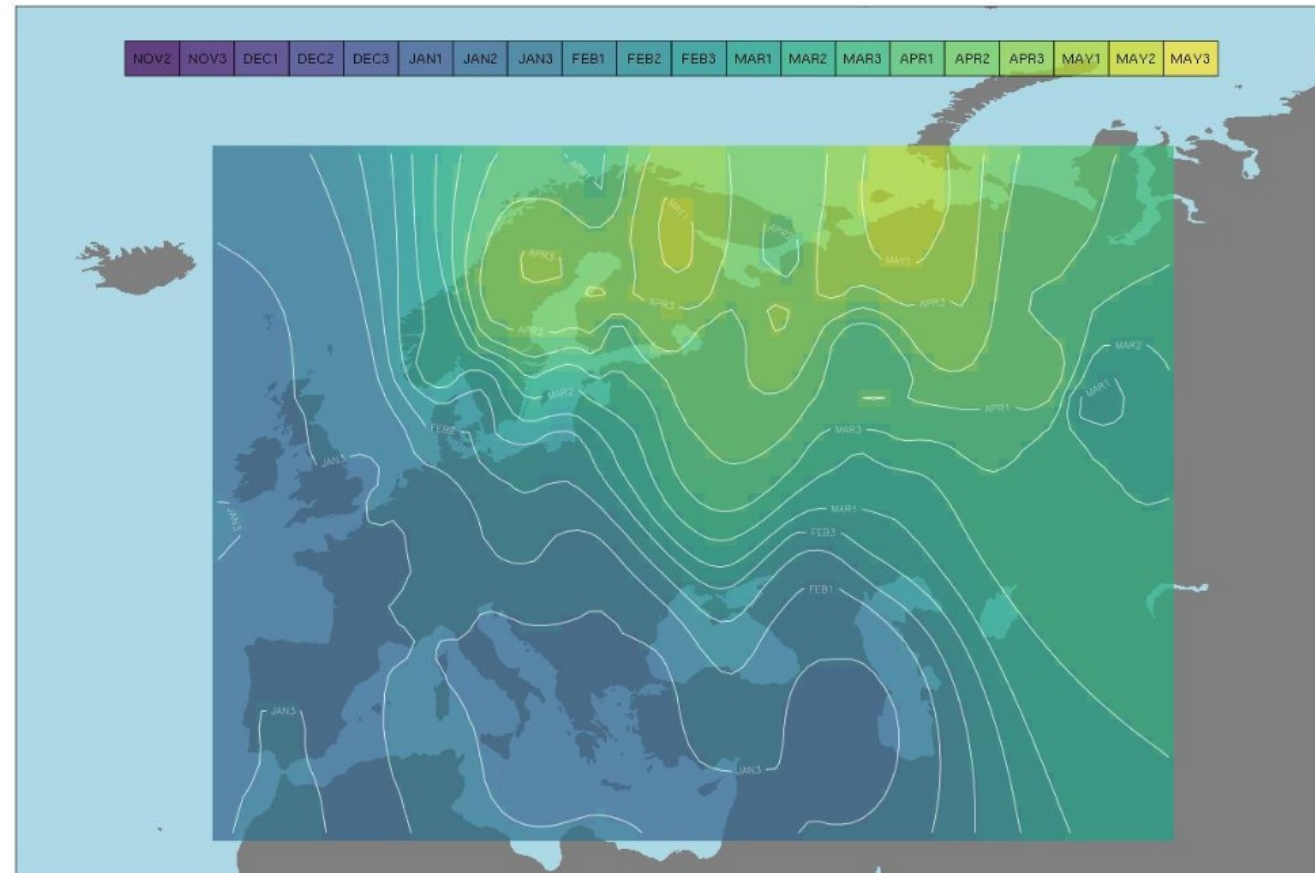


Fig. 2: Onset of pre-nuptial migration of Eurasian Teal. The map shows the date when 5% of individuals are on migration (total number of ring encounters used: 30,454). Colours represent ten-day periods (period 1 corresponds to 1-10 January); lines show the isochrones.

Franz Bairlein, Frank Mattig and Roberto Ambrosini

Institute of Avian Research, Wilhelmshaven, Germany  
University of Milan, Milan, Italy



# The Eurasian African Bird Migration Atlas: Modulo di ricerca 'Stagioni migratorie delle specie cacciabili'

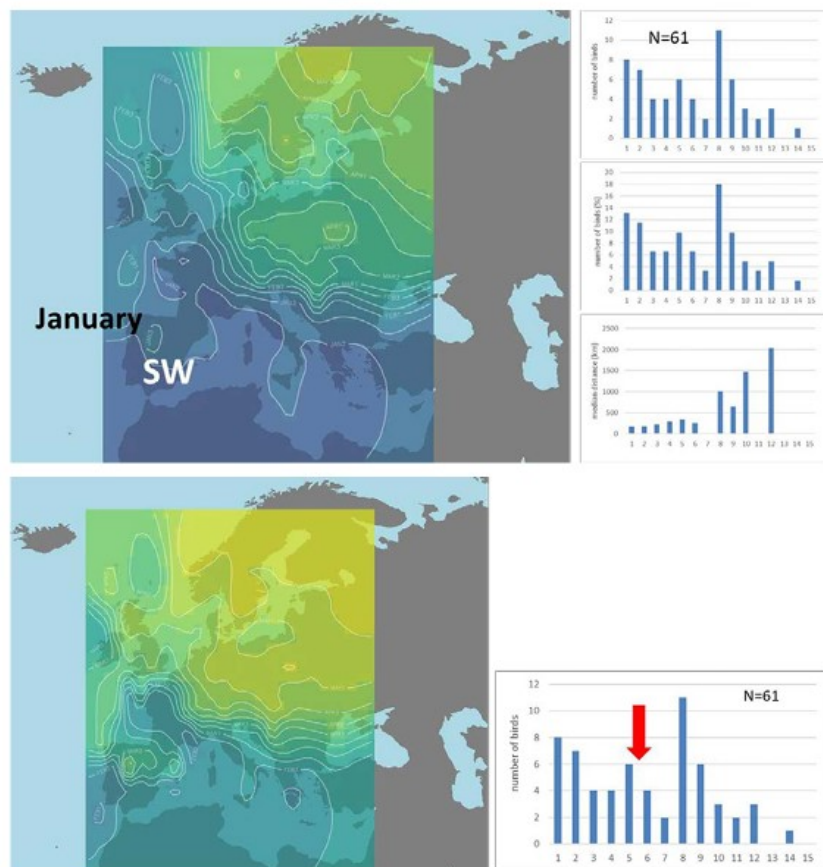


Fig. 12: Comparison of both methods for onset (top panel) as well as median date (low panel) of return migration of Song Thrush for the South-west region.

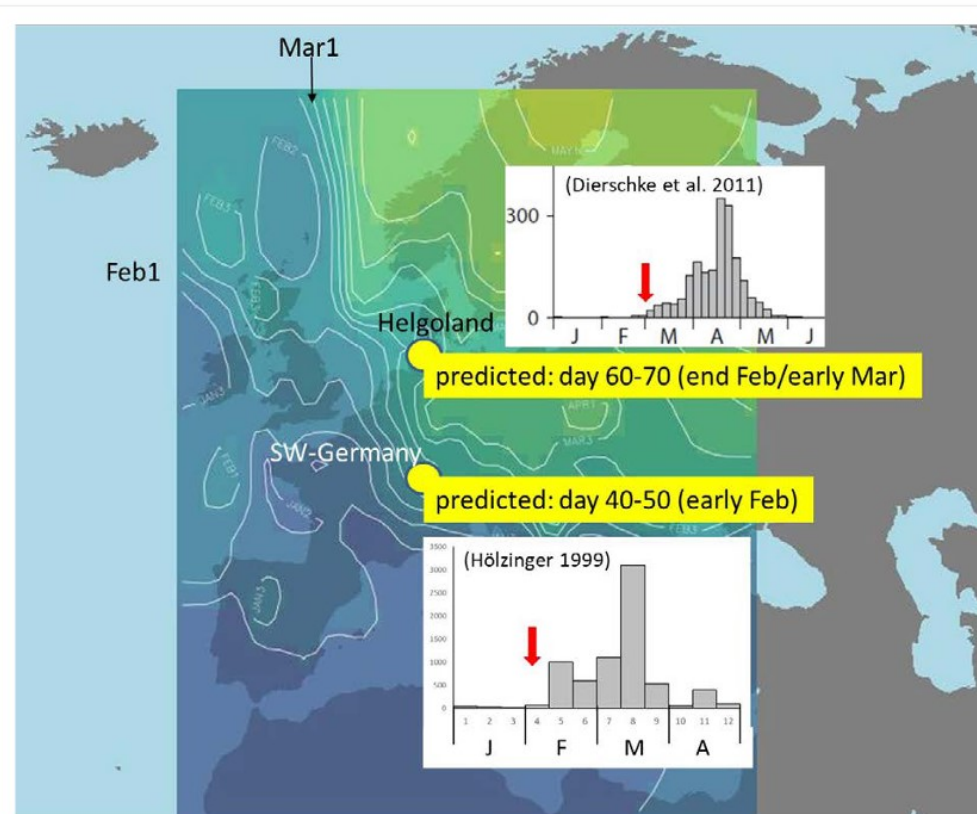


Fig. 10: Comparison of the results of modelling the onset of migration in Song Thrush with published data of spring passage of Song Thrush at two locations in Germany (Helgoland: trapping data; SW-Germany: observations). Predicted onsets by the model match the trapping/observational data (red arrows).

Franz Bairlein, Frank Mattig and  
Roberto Ambrosini

Institute of Avian Research,  
Wilhelmshaven, Germany  
University of Milan, Milan, Italy



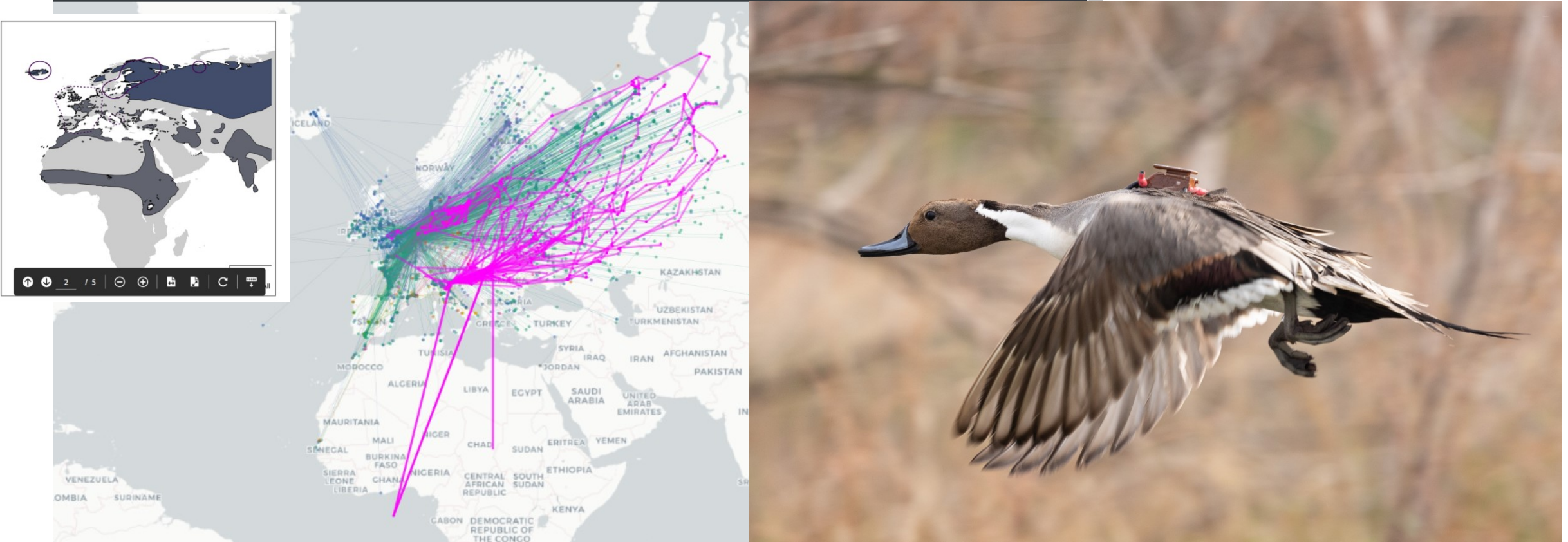


# The Eurasian African Bird Migration Atlas: Integrazione con dati Movebank

Us  EN ES FR

 EURING The European Union for Bird Ringing  CMS 

Northern Pintail  
*Anas acuta* 



# Bio-logging: un investimento per il futuro

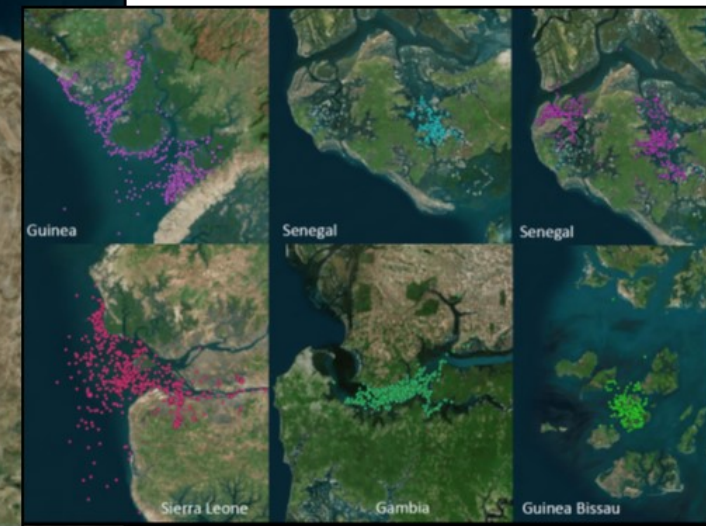
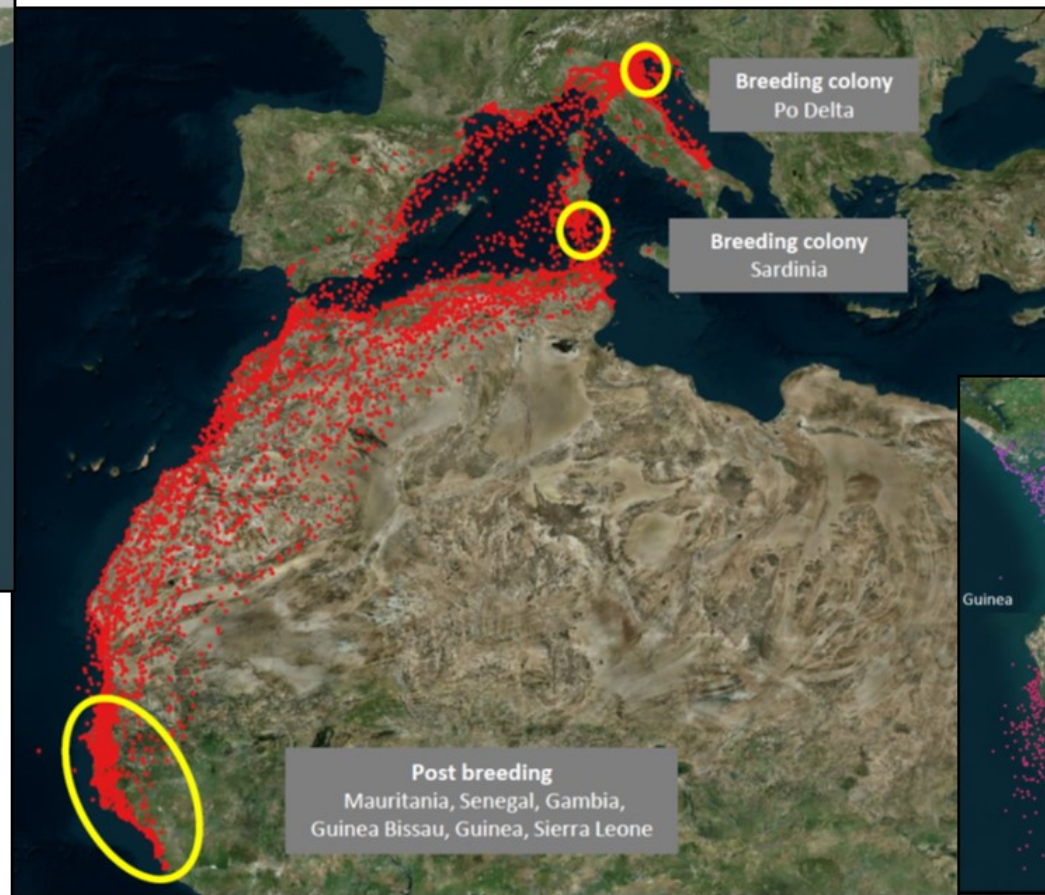




# Una popolazione, due continenti



Scridel et al. in prep.

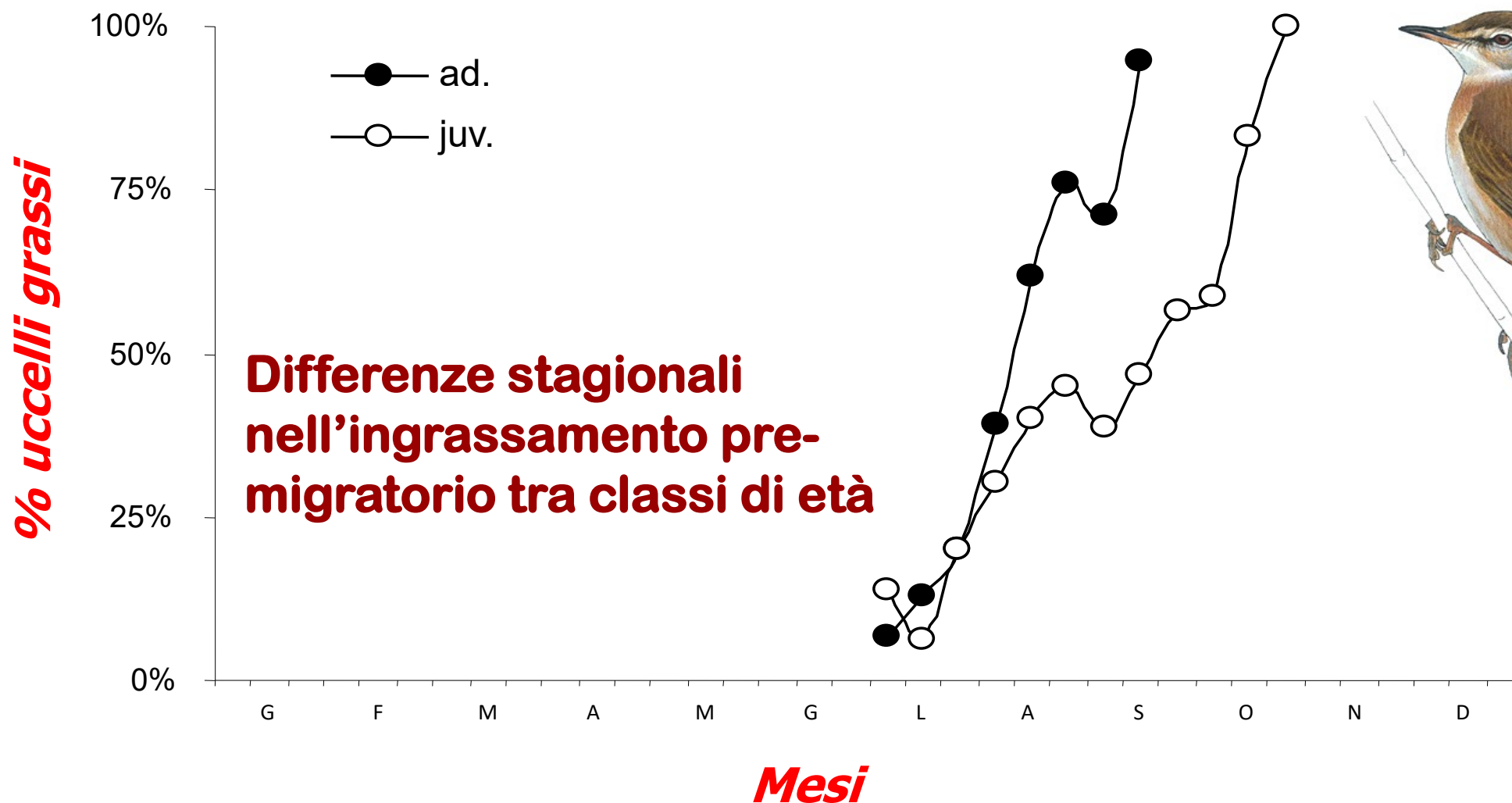




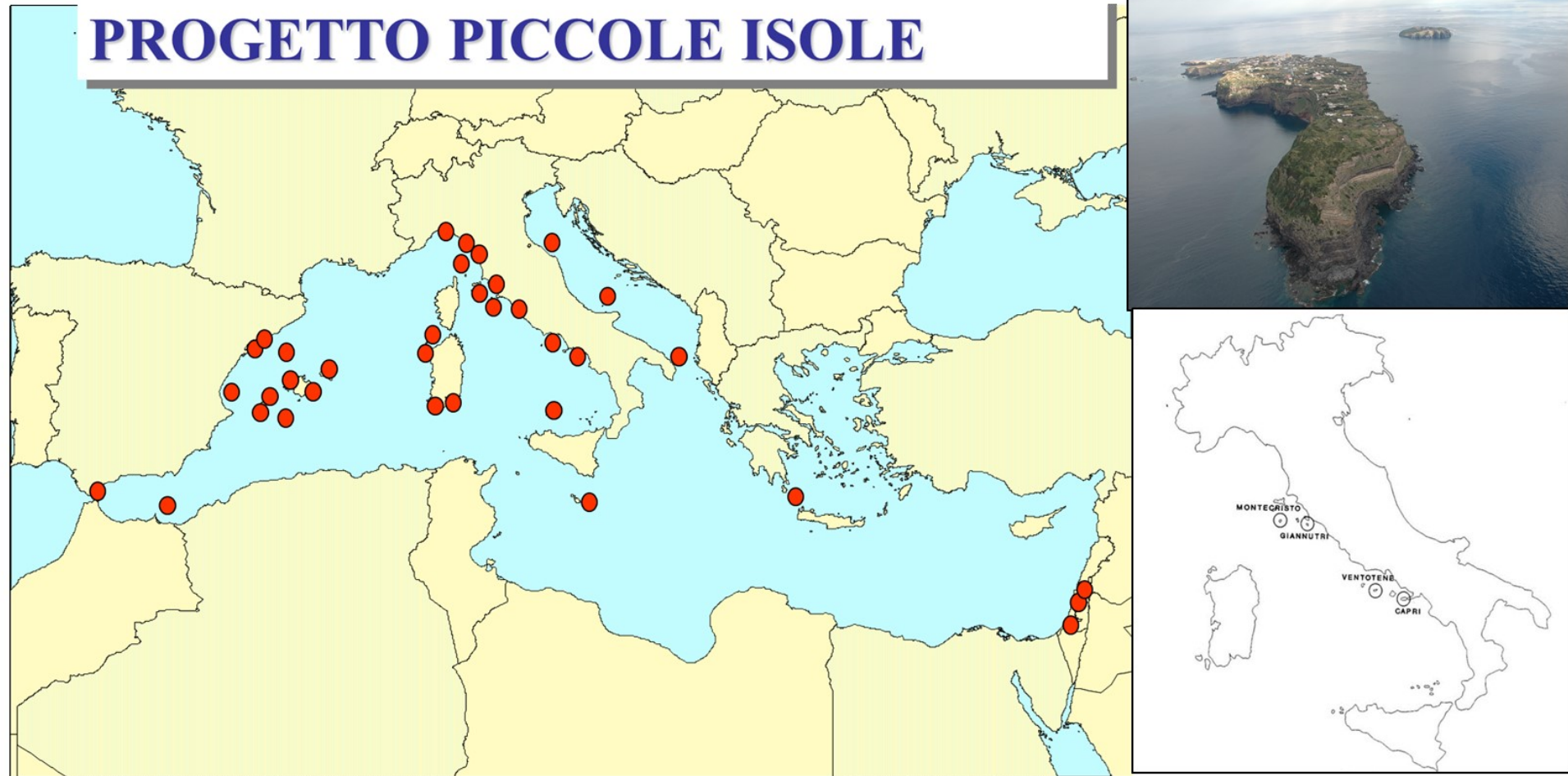
# Analisi e reportistica attività Centro Inanellamento italiano



# Cannareccione: ads vs juv (N= 9.660)



# Progetto Piccole Isole: *1988-2022* *35 anni (78 pubblicazioni prodotte)*

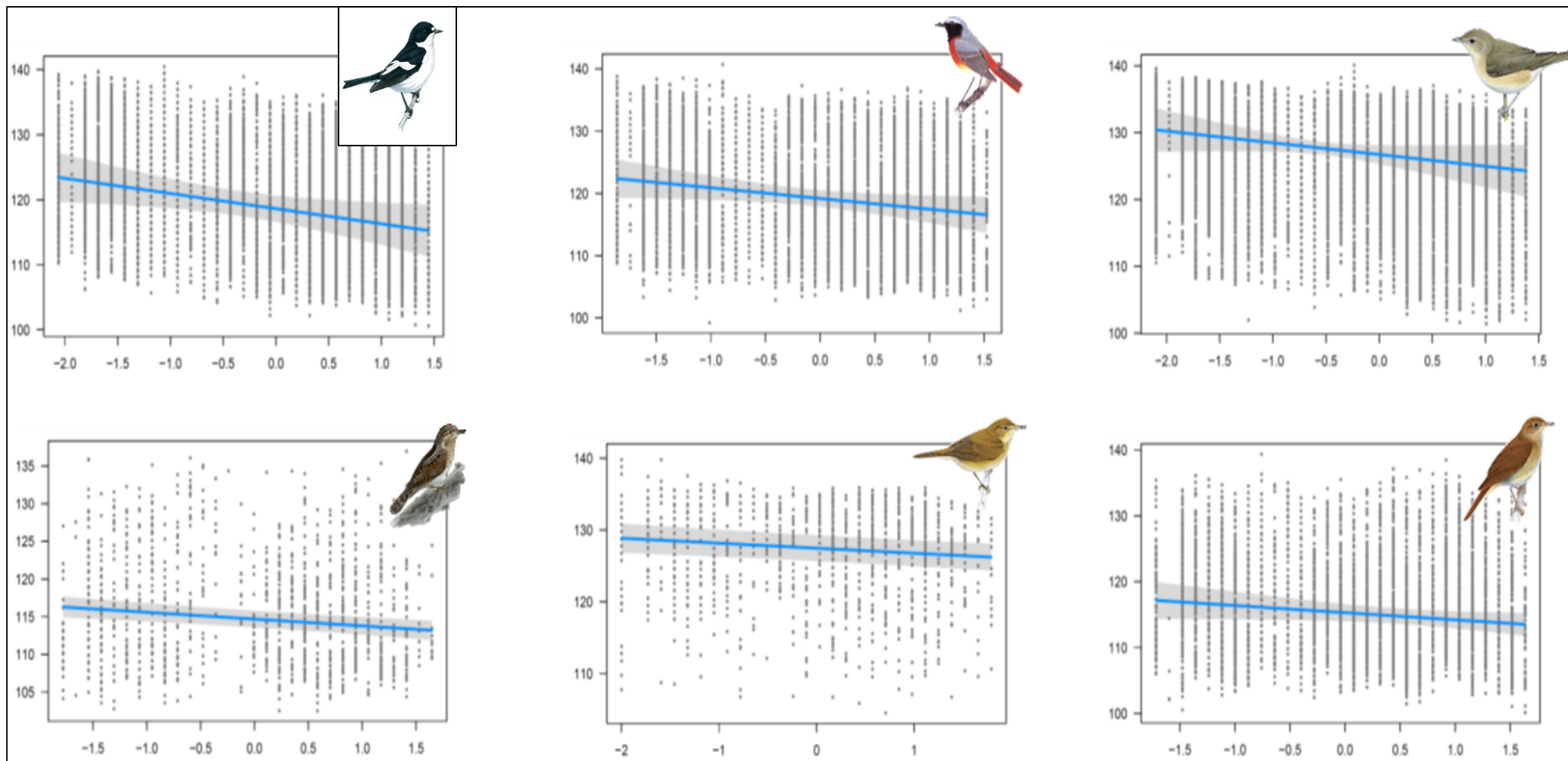




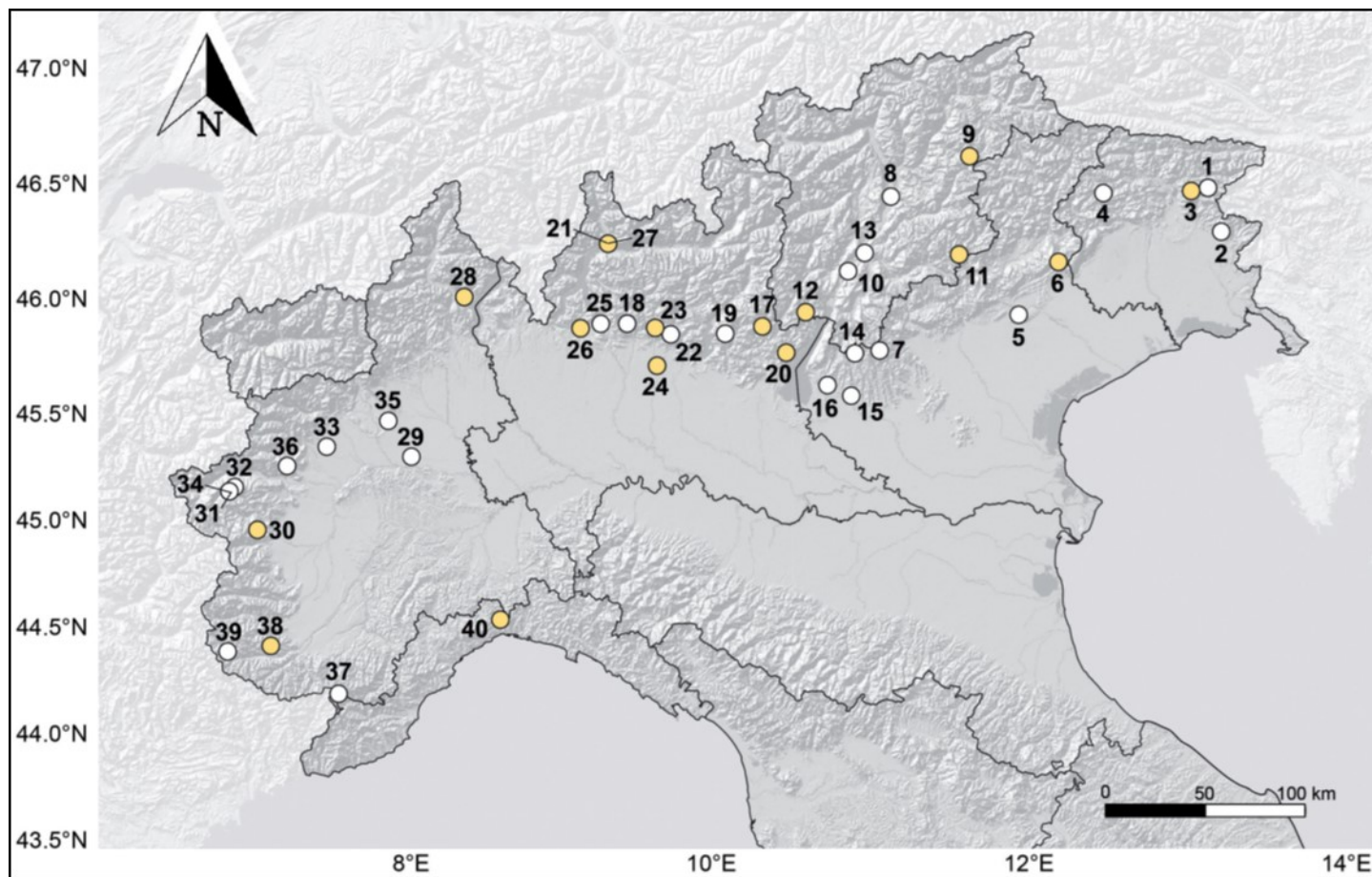
# Indicatore della variazione pre-nuziale della data di migrazione

## Monitoraggio degli effetti del cambiamento climatico

Cecere et al. Annuario Dati Ambientali 2021.



# Progetto Alpi: 1997-2022 - 25 anni



# Obiettivi Progetto Alpi



MuSe

Studio di fattibilità  
operativa, ambientale, economica  
e sociale per la  
realizzazione di un  
progetto di  
protezione e  
valorizzazione  
del patrimonio  
culturale e  
paesaggistico  
della regione  
Alpi.





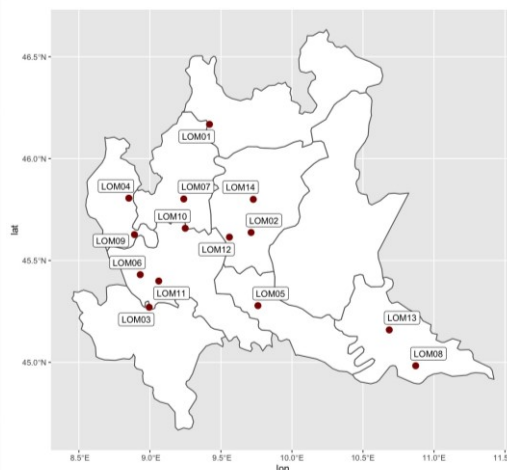
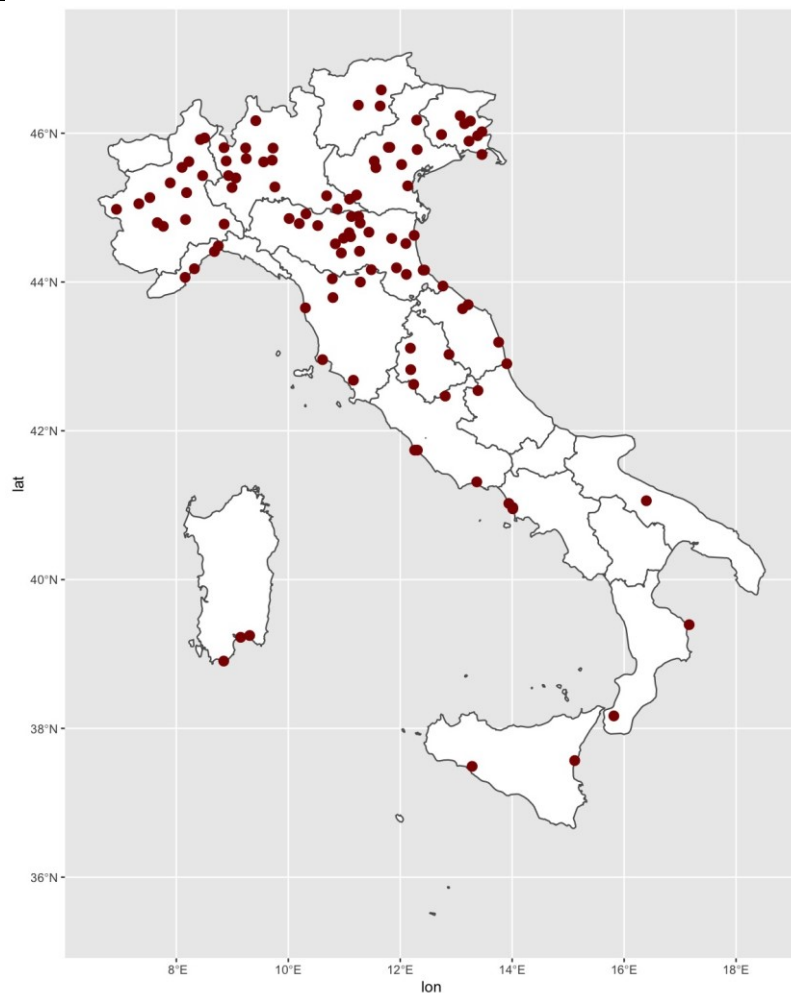
# Progetto MonITRing: dal 2015

Pirrello et al. in prep.

MonITRing	Codice	Periodo	Stazioni attive nel 2022	
			Italia	Lombardia
sessione riproduttiva	130	1 mag - 31 lug	8	3
sessione invernale-primaverile	120	1 dic - 31 mag	13	1
sessione estivo-autunnale	110	1 mag - 30 nov	7	1
annuale	100	1 gen - 31 dic	50	5
<b>totali</b>			78	10

Stazione	Referente	Tipologia 2022	Inanellatori	Habitat	Metri lineari	Periodo attività
LOM01	Aceti	-	4	Zone boscate	120	15-18
LOM02	Aguzzi	120	11	Zone caratterizzate da vegetazione arbustiva/erbacea	300	15-22
LOM03	Bonazzi	100	4	Zone boscate	156	19-22
LOM04	Gagliardi	-	1	Zone caratterizzate da vegetazione arbustiva/erbacea	84	15-18
LOM05	Lavezzi	100	6	Zone boscate	180	15-22
LOM06	Longo	100	2	Ambiente misto	288	15-22
LOM07	Ornaghi	130	9	Canneto e zone umide	120	15-22
LOM08	Perbellini	110	1	Zone boscate	120	15-22
LOM09	Piacentini	100	2	Zone boscate	180	15-22
LOM10	Piacentini	-	2	Zone agricole eterogenee	96	15-20
LOM11	Romagnoli	130	3	Canneto e zone umide	282	15-16, 18-19, 22
LOM12	Rota	100	2	Zone boscate	288	18-22
LOM13	Sbravati	130	1	Canneto e zone umide	216	15-19, 21-22
LOM14	Schiavi	-	1	Zone boscate	100	15-20

# Progetto MolTRing: dal 2015

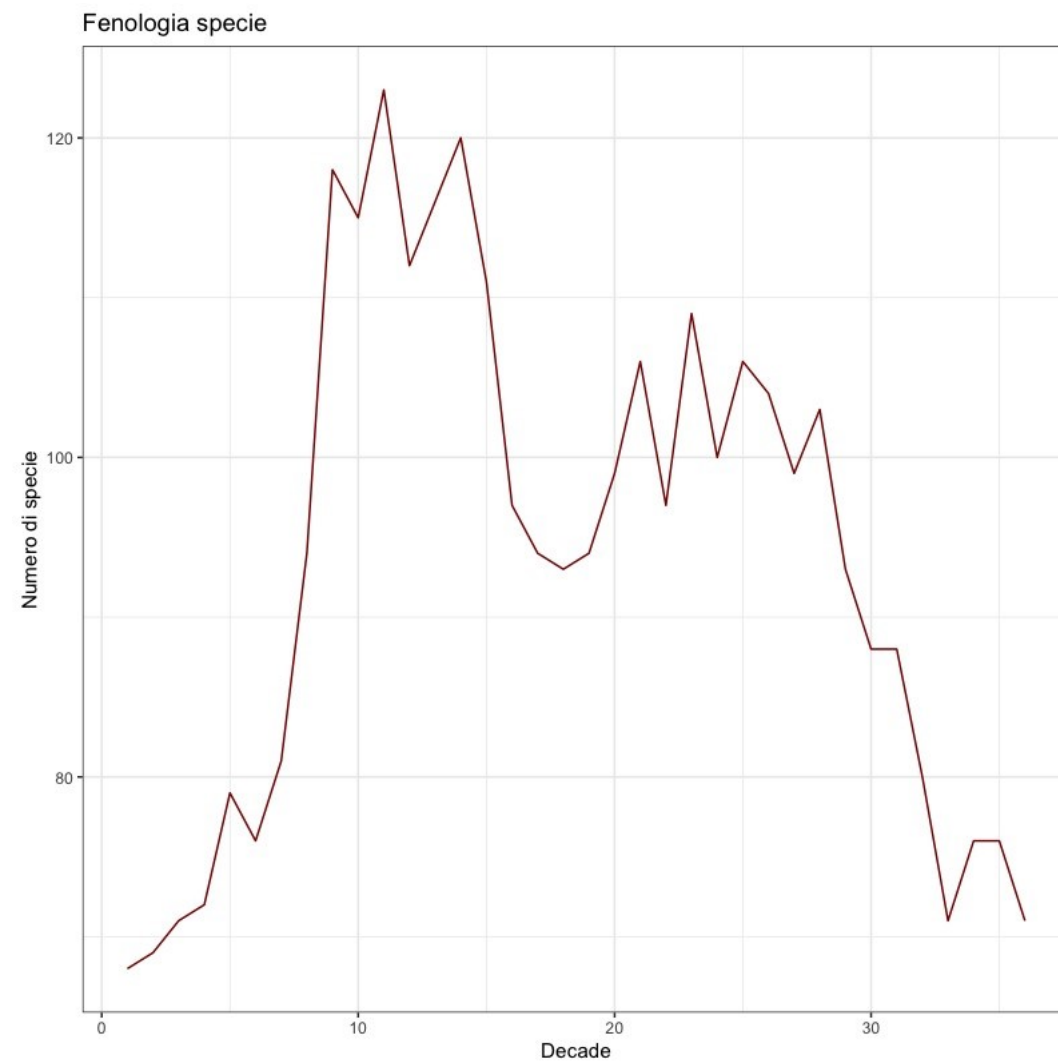
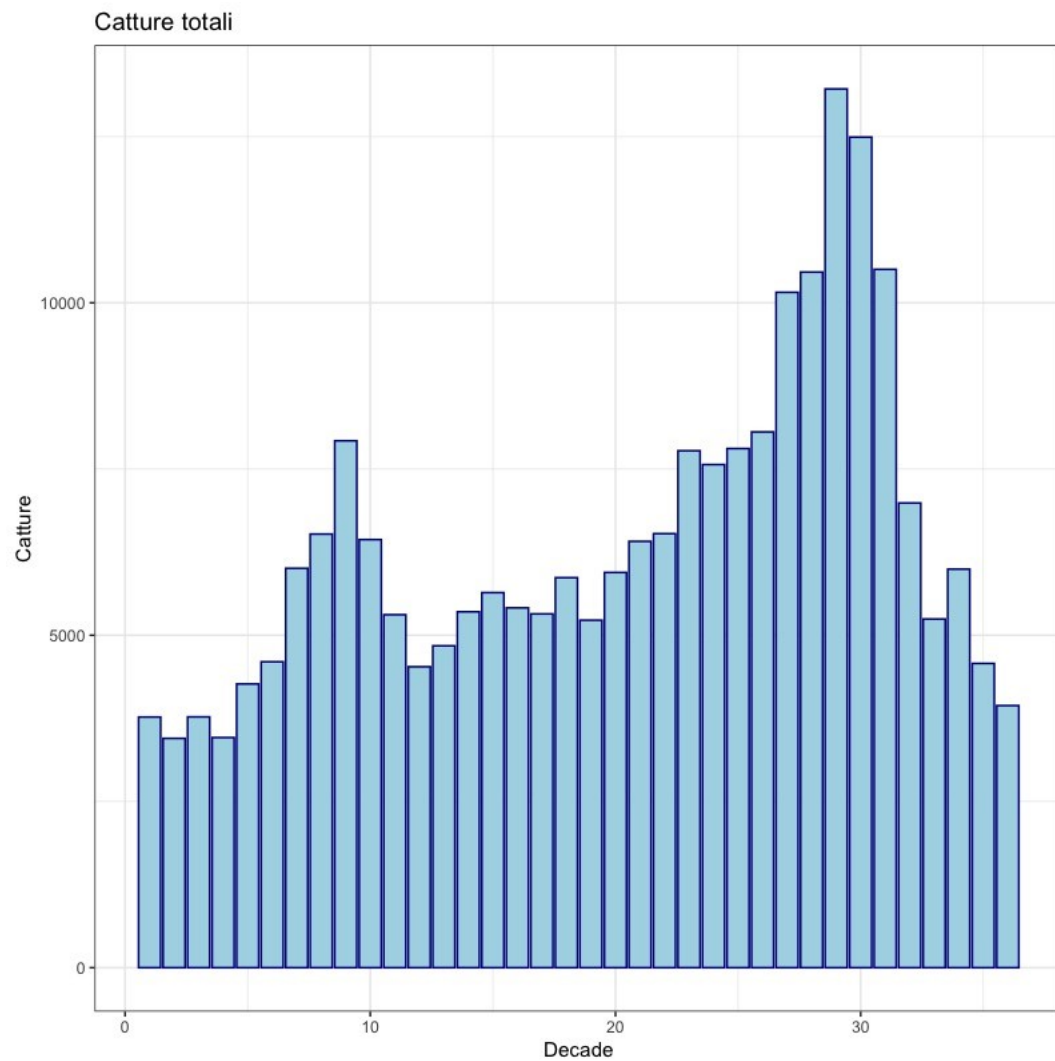


Pirrello et al. in prep.

Anno	Media Lombardia (min-max)	Media nazionale
2015	57 (22-83)	61
2016	64 (8-88)	65
2017	66 (33-91)	64
2018	48 (13-88)	53
2019	65 (19-94)	66
2020	70 (50-86)	56
2021	56 (30-83)	33

Performance progetto MonITRing  
(uscite effettuate / uscite previste)

# Progetto MonITRing: distribuzione catture/specie per decenni



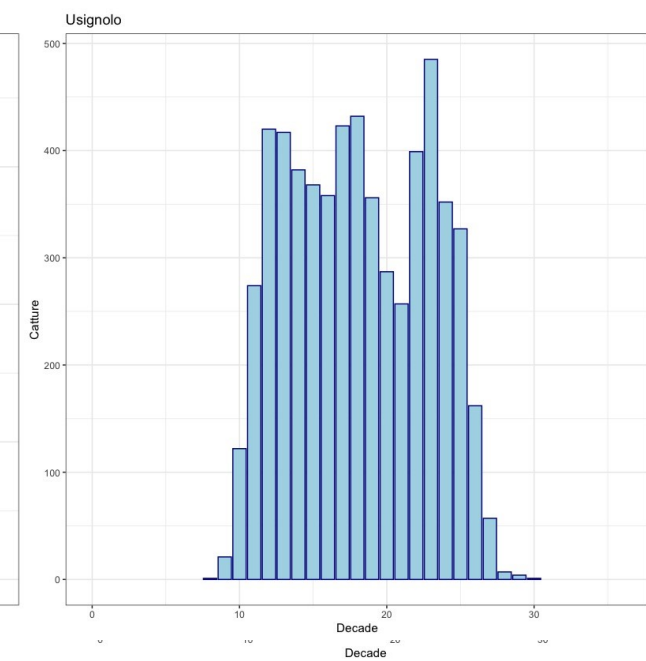
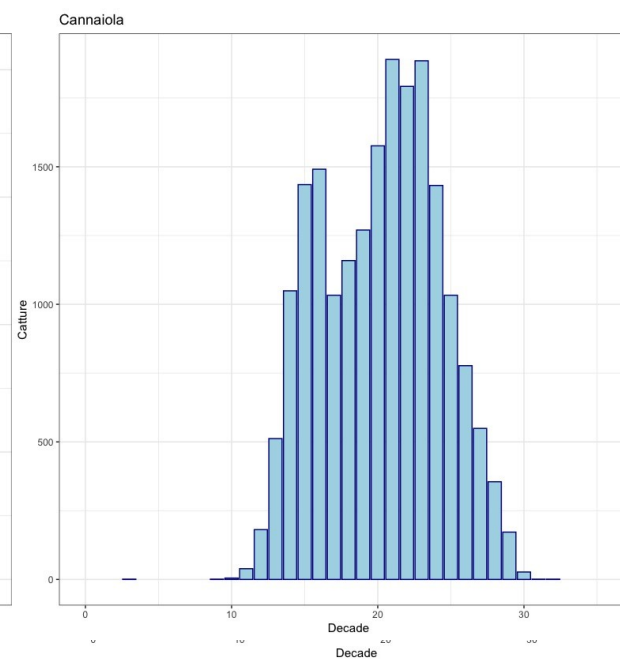
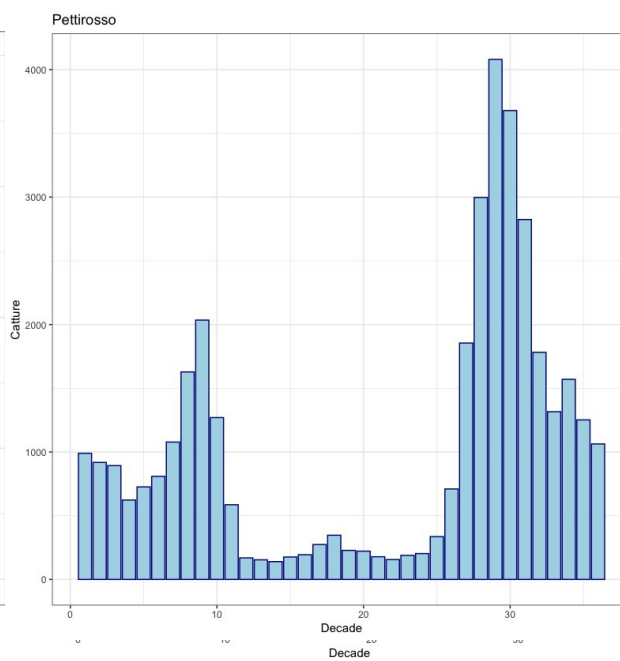
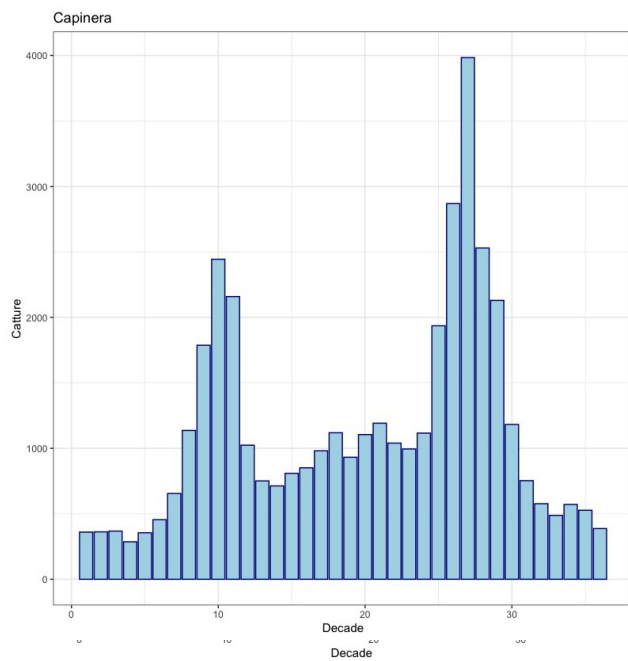


# Progetto MonITRing: Totali catture

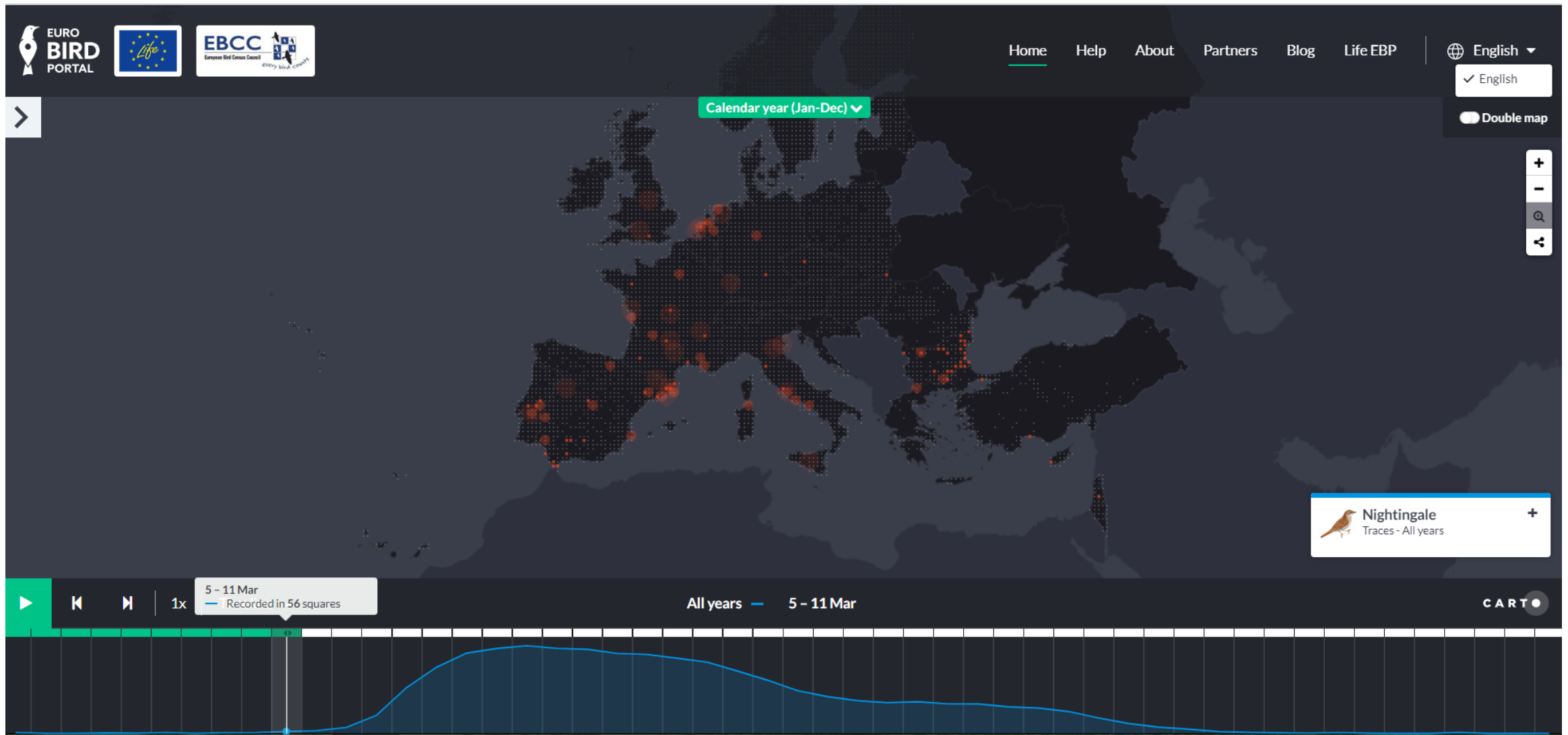
Specie	TOT catture
Sylvia atricapilla	35.688
Erithacus rubecula	28.169
Phylloscopus collybita	16.649
Acrocephalus scirpaceus	15.761
Turdus merula	11.628
Emberiza schoeniclus	10.360
Cyanistes caeruleus	7.474
Parus major	7.330
Aegithalos caudatus	6.437
Fringilla coelebs	5.660

Specie	TOT catture (Lombardia)
Sylvia atricapilla	2.392
Erithacus rubecula	2.000
Emberiza schoeniclus	1.696
Turdus merula	1.303
Phylloscopus collybita	1.204
Parus major	1.015
Passer montanus	990
Aegithalos caudatus	869
Fringilla coelebs	809
Cyanistes caeruleus	781

# Progetto MonITRing: distribuzione catture per decenni



# EuroBird Portal: usignolo

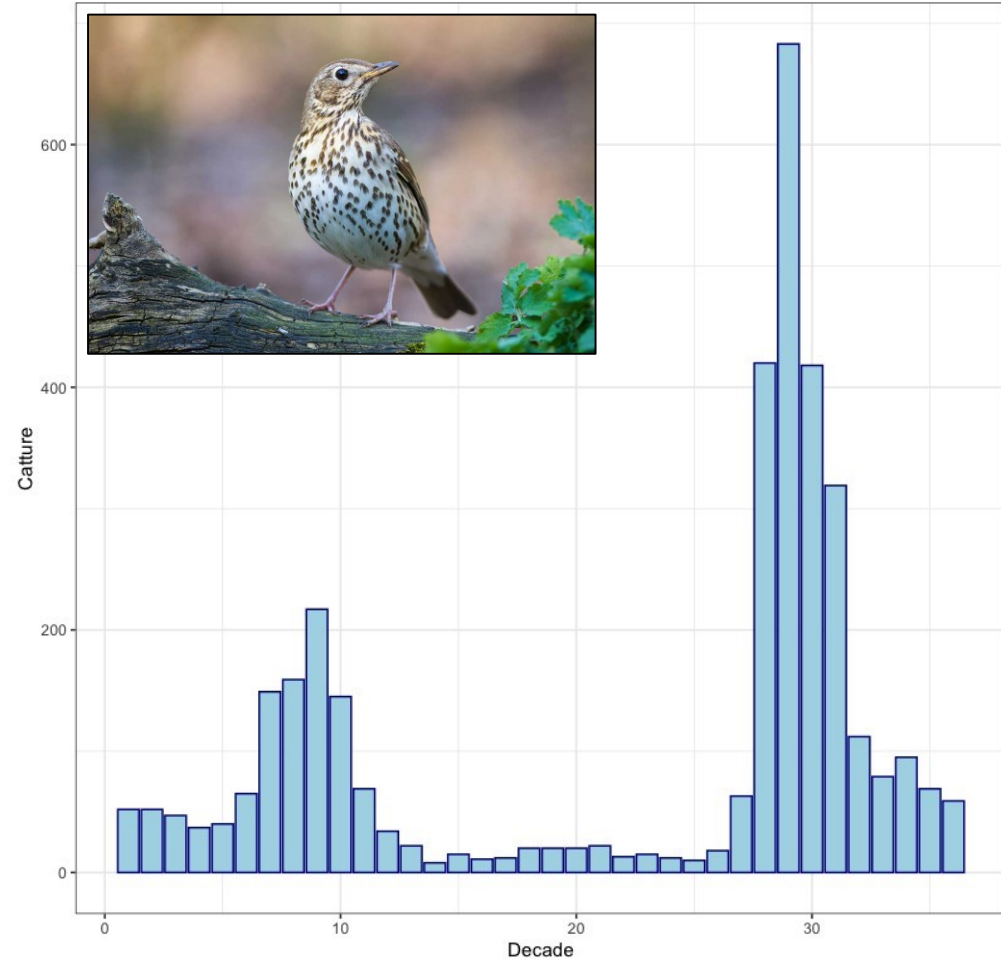




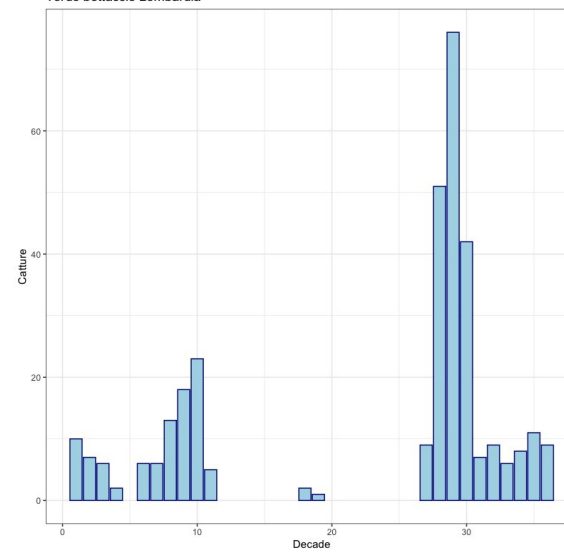
# Progetto MonITRing



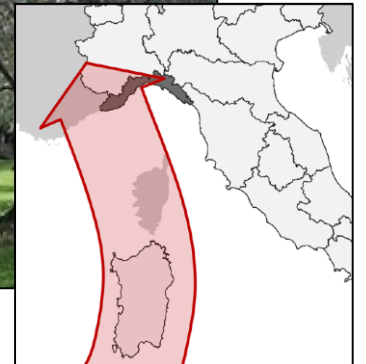
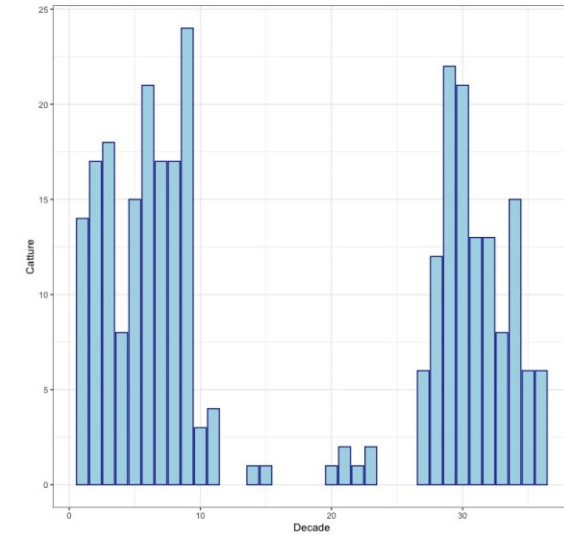
Tordo bottaccio



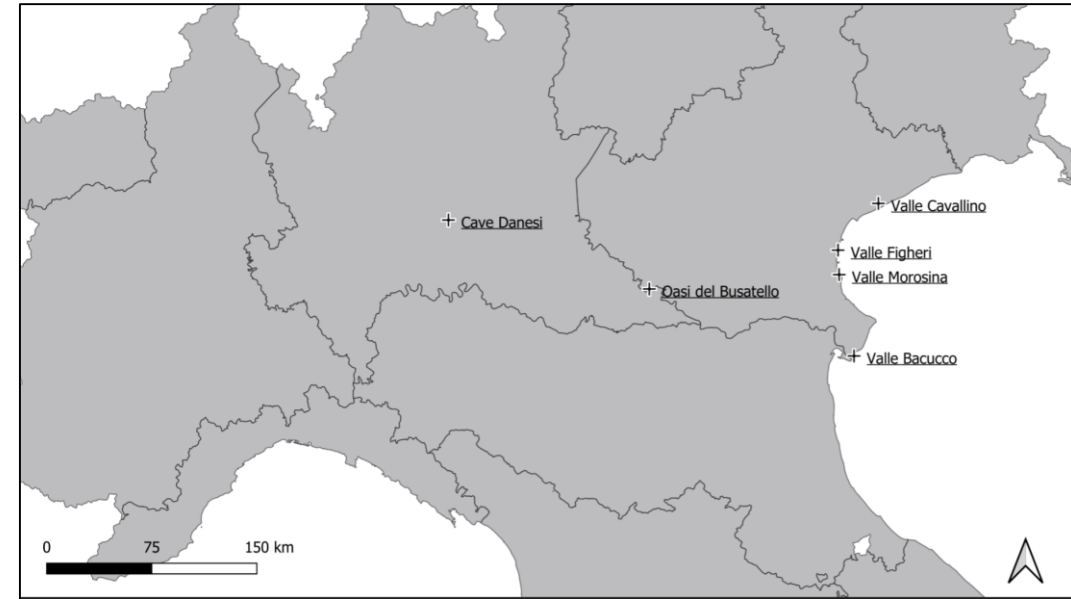
Tordo bottaccio Lombardia



Tordo bottaccio LIGURIA + SARDEGNA



# Supporto alla sorveglianza sanitaria e agli studi epidemiologici



# Grazie

[www.isprambiente.gov.it/it](http://www.isprambiente.gov.it/it)