



MINISTÈRE
DE LA TRANSITION
ÉCOLOGIQUE
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DES TERRITOIRES

*Liberté
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Séminaire du
plan national d'actions
en faveur du Puffin des Baléares

24 au 26 juin 2024



Monitoring the exit of Balearic Shearwaters from the Mediterranean through the strait of Gibraltar: implications for the species' population dynamics.

Gonzalo M. Arroyo, Laura Rollán & Andrés de la Cruz.

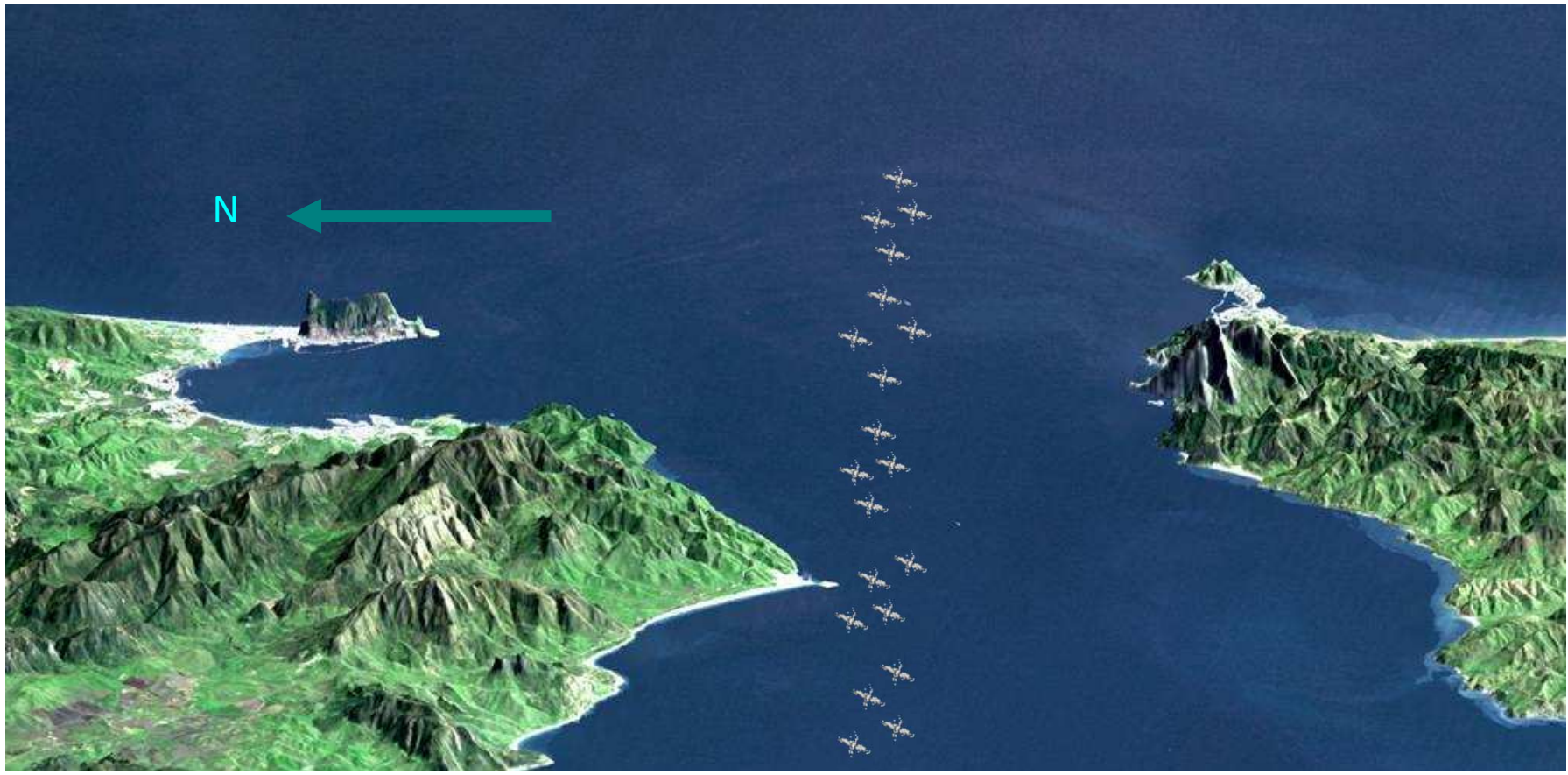
Marine Research Institute (INMAR), University of Cádiz, Spain.

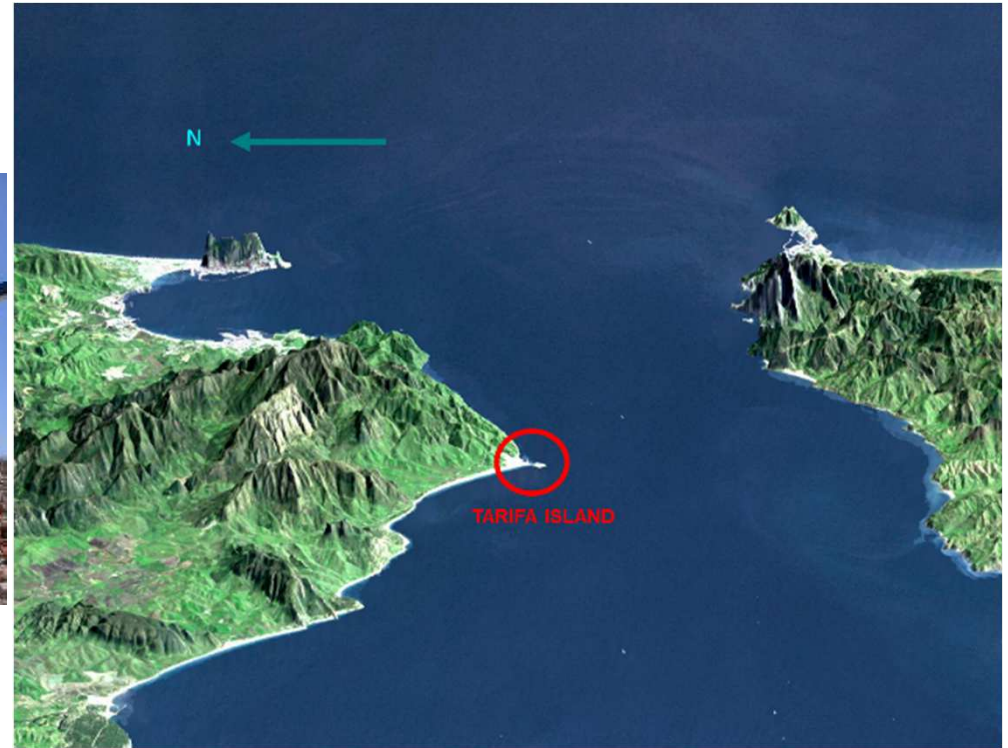
Séminaire du
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The Strait of Gibraltar

- **Narrow marine corridor (14.7 Km.) connecting two seas and two continents.**
- **Mandatory migratory passage for all marine organisms migrating between the Mediterranean Sea and the Atlantic Ocean.**







New population estimates of a critically endangered species, the Balearic Shearwater *Puffinus mauretanicus*, based on coastal migration counts

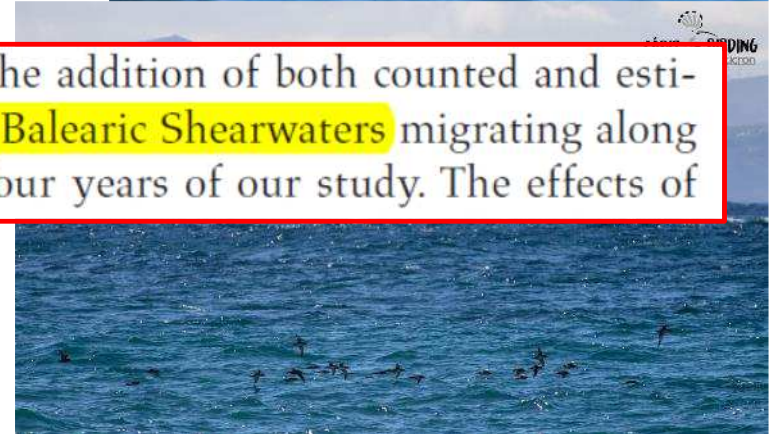
GONZALO M. ARROYO, MARÍA MATEOS-RODRÍGUEZ,
ANTONIO R. MUÑOZ, ANDRÉS DE LA CRUZ, DAVID CUENCA and
ALEJANDRO ONRUBIA

Summary

The Balearic Shearwater *Puffinus mauretanicus* is considered one of the most threatened seabirds in the world, with the breeding population thought to be in the range of 2,000–3,200 breeding pairs, from which global population has been inferred as 10,000 to 15,000 birds. To test whether the actual population of Balearic Shearwaters is larger than presently thought, we analysed the

not undertaken (count gaps), and their associated error. The addition of both counted and estimated birds reveals figures of between 23,780 and 26,535 Balearic Shearwaters migrating along the north coast of the Strait of Gibraltar in each of the four years of our study. The effects of

not undertaken (count gaps), and their associated error. The addition of both counted and estimated birds reveals figures of between 23,780 and 26,535 Balearic Shearwaters migrating along the north coast of the Strait of Gibraltar in each of the four years of our study. The effects of several sources of bias suggest a slight potential underestimation in our results. These figures reveal the urgent need to reformulate the population viability analysis for the species, and then if necessary reconsider its conservation status.





Demography of the critically endangered Balearic shearwater: the impact of fisheries and time to extinction

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4. Adult survival was much lower than expected (0.809, SE: 0.013) and largely influenced by bycatch, which accounted for a minimum of 0.455 (SE: 0.230) of total mortality. Breeding success was positively correlated with discard availability. Recruitment started at low rates in 3-year-old birds (0.030, SE: 0.0455), increasing in following age classes and was almost complete at 6 years. Under the present scenario, we predict a time to extinction of 61 years (95% CI: 55–69).

Discrepancies between estimates in breeding areas and migratory bird areas

How can they be explained?


- **H1.** Estimates of breeding population are severely underestimated >>> the number of pairs at the known colonies should be higher.
- **H2** The existence of new undetected breeding colonies.
- **H3** The proportion of non-breeding individuals might be unusually large in this species and consequently the numbers of non-breeding Balearic shearwaters would be underestimated



SEANIMALMOVE Project (2024-2025)

**Intensive migration counts of Balearic Shearwaters
in the Strait of Gibraltar (May 15 - July 15).**

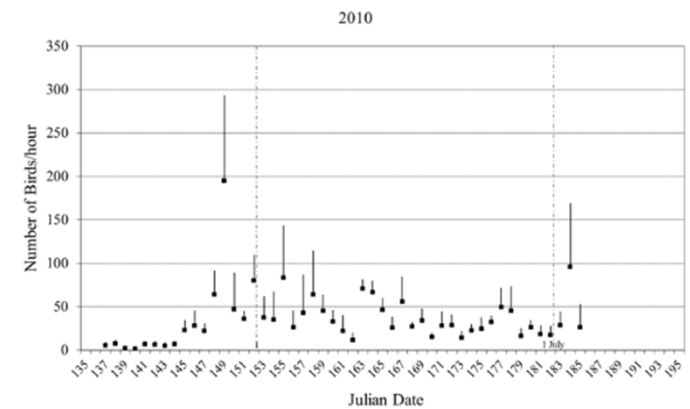
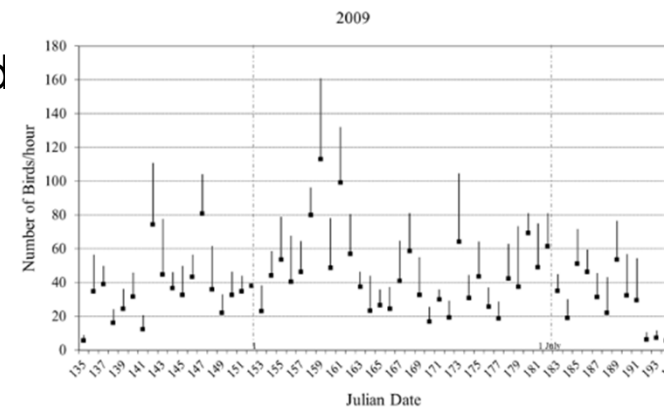
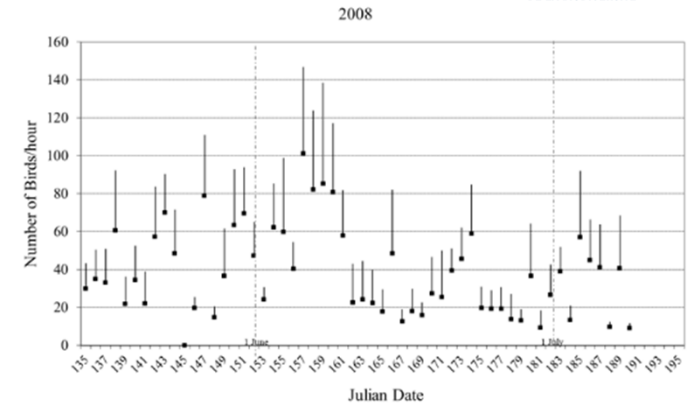
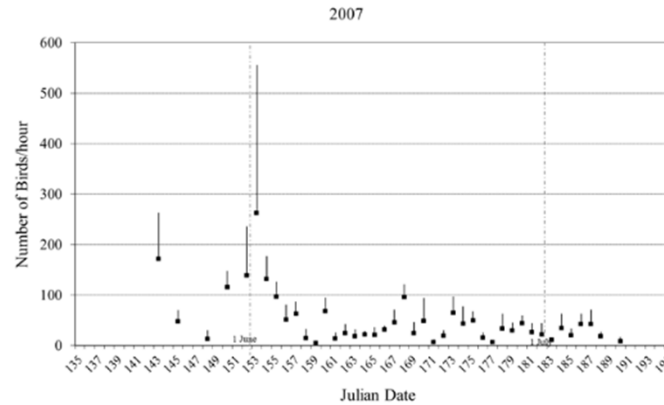
- Changes in migratory populations (trends).
- Changes in migratory phenology .
- Information on moult and age patterns.

- In collaboration with  **SEO** BirdLife



RESULTS.

- 50% of the annual passage occurred between June 4th and June 9th (in 2007 and 2009, respectively).



RESULTS.

2024 (15 May – 15 July)

- 230 hours of counts.
- 15,794 Balearic Shearwaters counted (net flux).

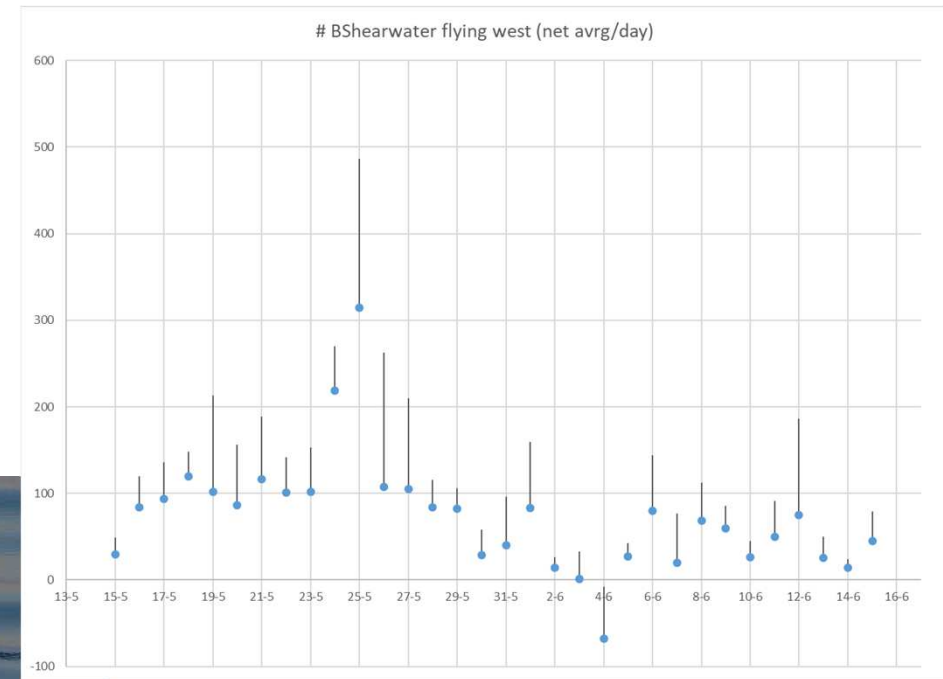


Hours	# counts	# Bshearwaters
08:00-09:00	33	4194
09:00-10:00	33	2294
10:00-11:00	33	1597
11:00-12:00	33	1711
12:00-13:00	33	2072
13:00-14:00	6	394
14:00-15:00	6	422
15:00-16:00	13	774
16:00-17:00	13	699
17:00-18:00	13	898
18:00-19:00	7	353
19:00-20:00	7	386
Total	230	15794

RESULTS.

2024 (15 May – 15 July)

- Peak: 25th May (314±172 birds/hour)
- Bimodal distribution.



RESULTS.

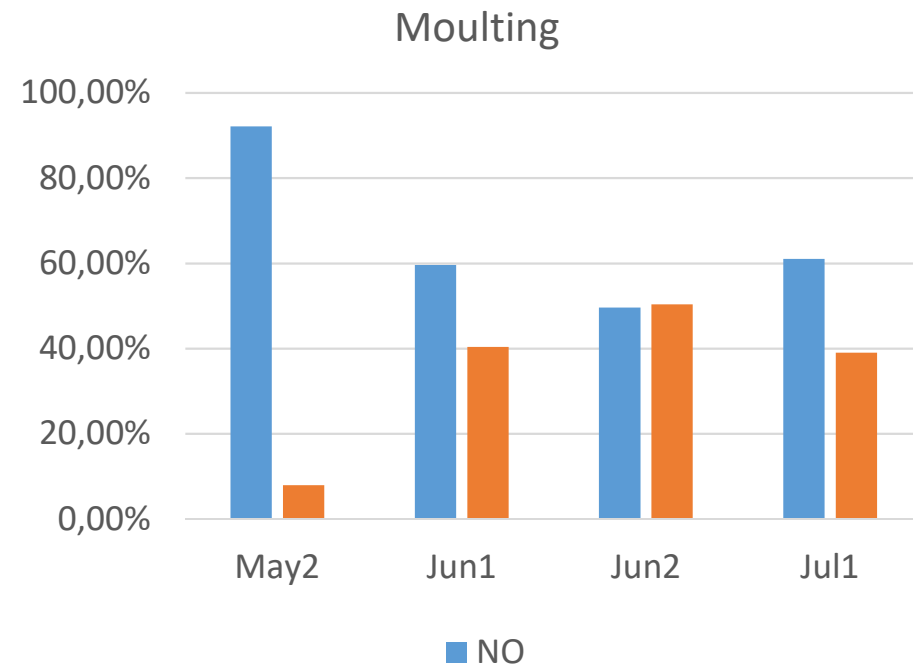
Moult (2009-10; 2749 birds; 8%)



RESULTS.

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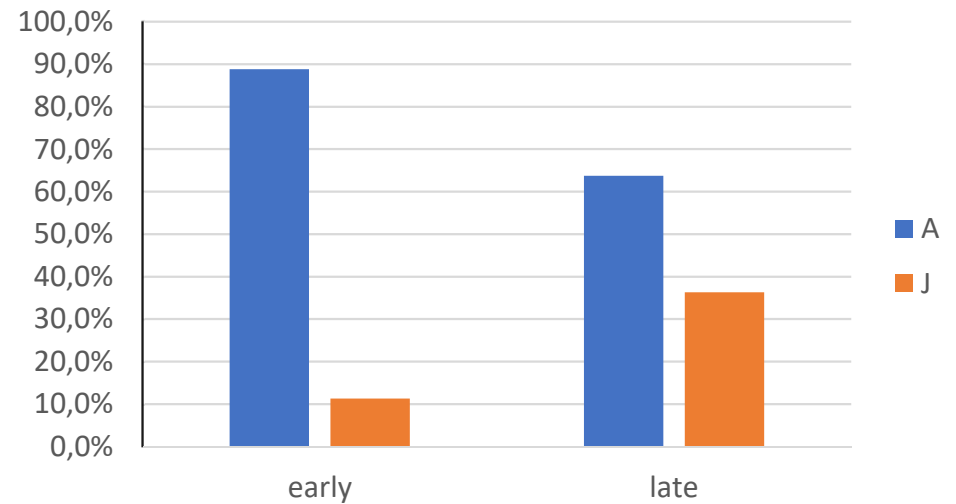
- 40% actively molting.
- Less frequent in early migrants.



RESULTS.

Moult (2009-10; 2749 birds; 8%)

The percentage of individuals with juvenile plumage increased from 7% to 51% between May and July, respectively.



DISCUSION.

The passage of the Balearic Shearwater through the Strait occurs earlier than previously described (median June 4 – 9).

Phenology

Regularly visits colonies from late Sept, virtually immediately after returning to Mediterranean, until January (57), followed by short pre-laying exodus of 5–22 days (in females, even briefer in males) (57), laying in February–April, apparently rather synchronously within colonies (57), and fledging mostly in June (4).

Kirwan et al. 2021

Guilford et al. 2012.

The timing of the Atlantic migration, its duration, and the timing of return to the Mediterranean were rather variable. **Median date of passage into the Atlantic was 27/06/2010 (range 31/05/2010-11-07/2010).** We were able to relate migration to the previous (2010)



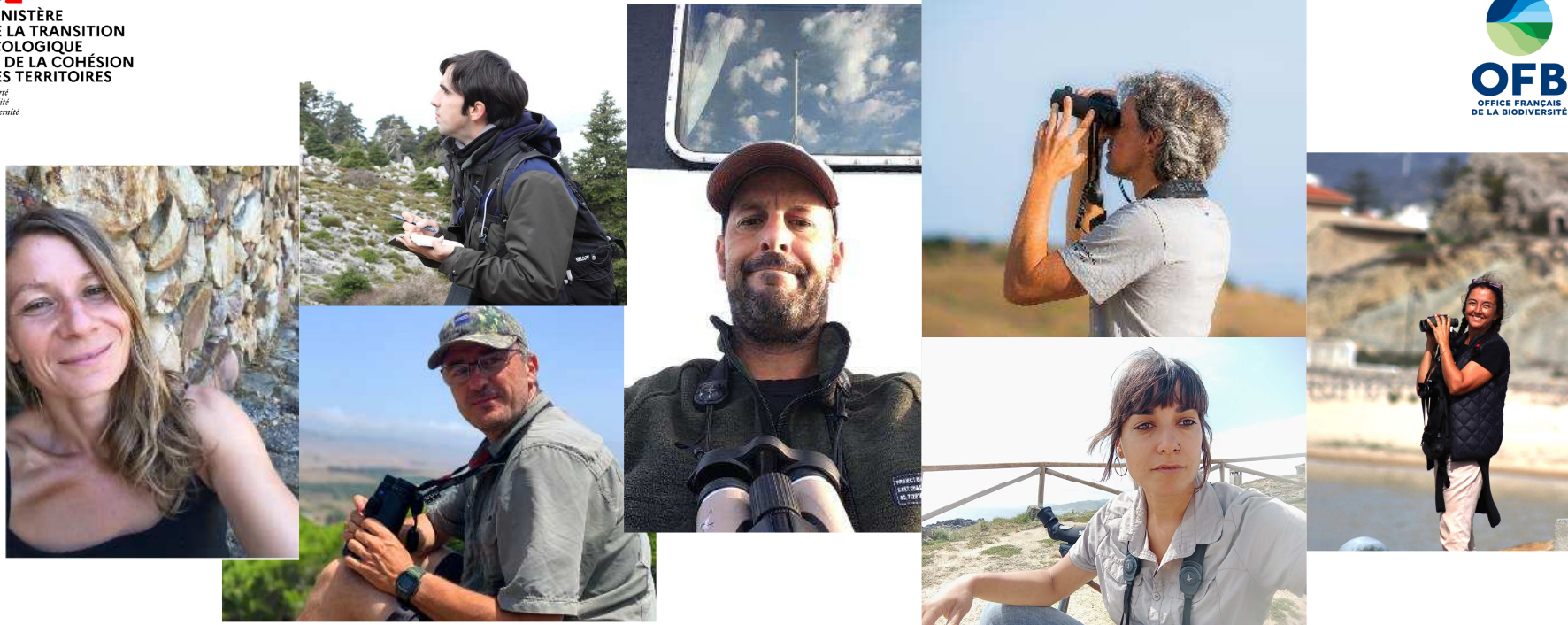
DISCUSION.

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EARLY MIGRANTS?

1. A high proportion breed at the beginning of the breeding season.
2. An early passage of breeders that have failed in reproduction.
3. A particularly high proportion of individuals that do not breed in the season.





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To the SEANIMALMOVE team, the volunteers, and especially to Andrés de la Cruz and Javier Elorriaga, for the wonderful photos.