

# Workshop #5 | IVM & Bird Protection

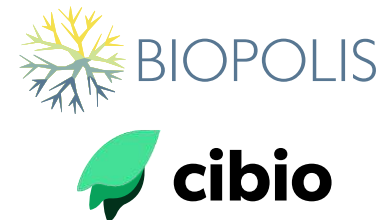
## *Stork nesting and wire markers*

Ricardo Martins & Joana Bernardino

BIOPOLIS | CIBIO

Research Center in Biodiversity  
and Genetic Resources

**REN–BIOPOLIS**  
PARTNERSHIP IN  
BIODIVERSITY



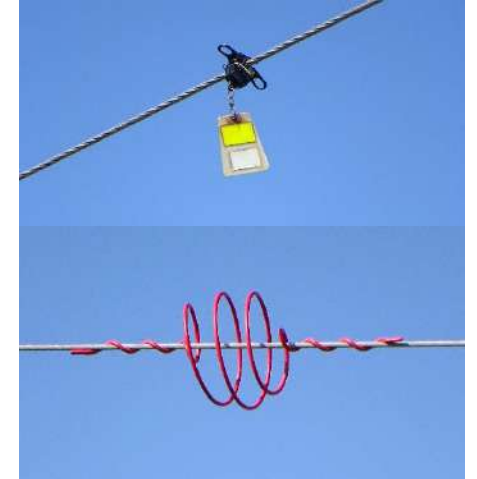
## REN – BIOPOLIS PARTNERSHIP

Collaboration since 2015, with 2 main aims:

- ✓ Conduct **Applied Research** on the interactions between Transmission PL and Biodiversity (strong focus on birds)
- ✓ Promote **Knowledge Transfer** to REN and other stakeholders

### Main **research** areas:

- Mortality by collision and impacts on bird populations
- ➡ • Effectiveness of mitigation measures (wire-marking)
- Monitoring methods to assess different types of impacts
- ➡ • Birds nesting on pylons: opportunities and risks



A large, stylized logo consisting of the letters 'B' and 'R' in a bold, rounded font. The 'B' is on the left and the 'R' is on the right, both in a dark teal color. The 'R' has a thick vertical stem and a rounded top. The background is a solid teal color.

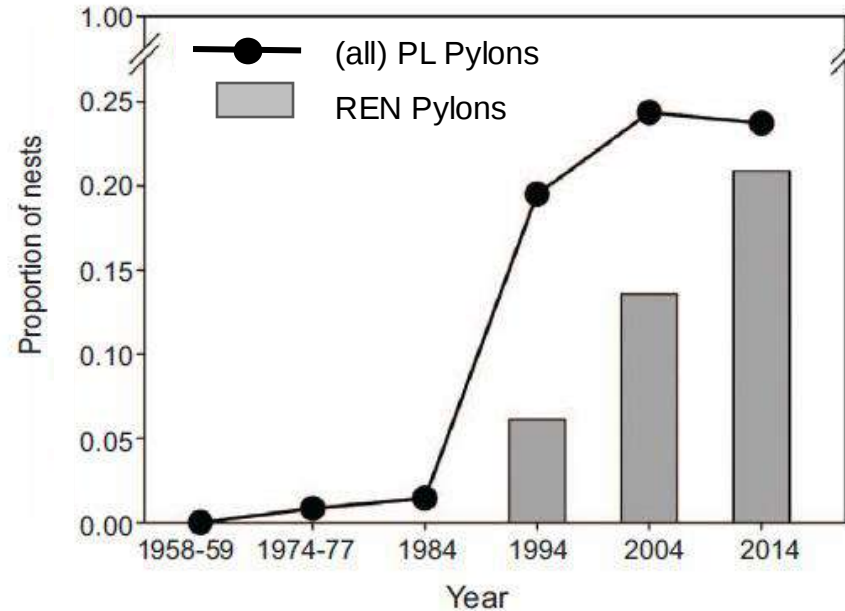
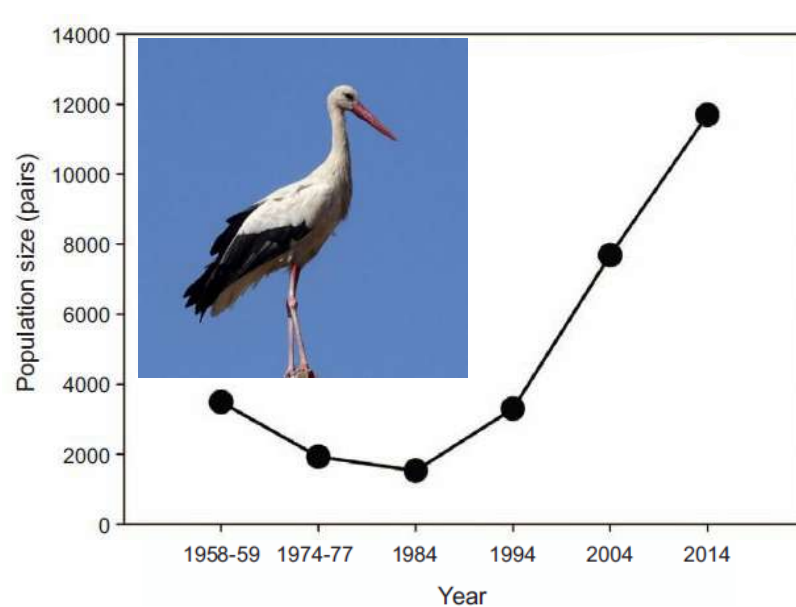
# WHITE STORK NESTING ON REN PYLONS

# WHITE-STORK NESTING ON REN PYLONS

## LETTER

### Wired: impacts of increasing power line use by a growing bird population

Francisco Moreira<sup>1,2,8</sup>, Vitor Encarnação<sup>3</sup>, Gonçalo Rosa<sup>4</sup>, Nathalie Gilbert<sup>5</sup>, Samuel Infante<sup>6</sup>, Julieta Costa<sup>7</sup>, Marcello D'Amico<sup>1,2</sup>, Ricardo C Martins<sup>1,2</sup> and Inês Catry<sup>1,2,5</sup>



# WHITE-STORK NESTING ON REN PYLONS

Received: 21 December 2017 | Accepted: 1 March 2018  
 DOI: 10.1111/1365-2664.13149

RESEARCH ARTICLE

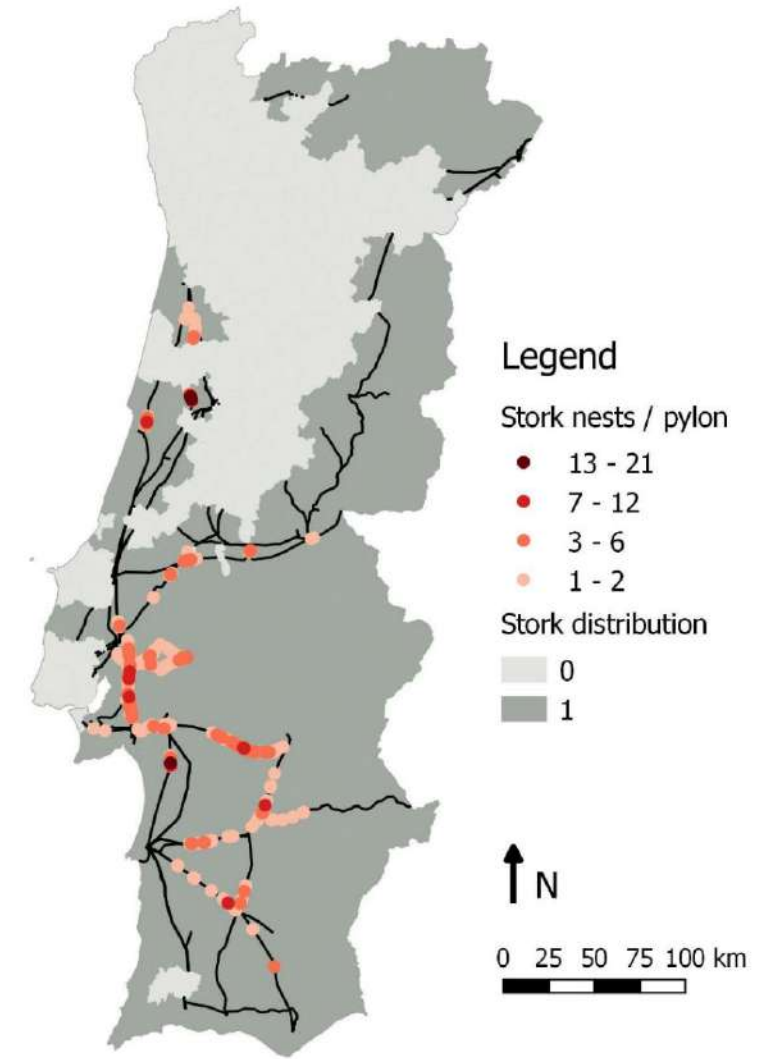
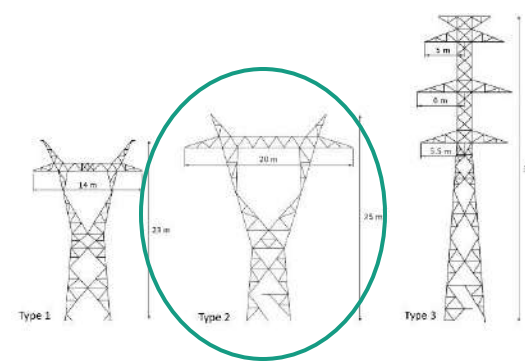
Journal of Applied Ecology 

**Drivers of power line use by white storks: A case study of birds nesting on anthropogenic structures**

Francisco Moreira<sup>1,2</sup>  | Ricardo C. Martins<sup>1,2</sup> | Inês Catry<sup>1,2,3</sup> | Marcello D'Amico<sup>1,2</sup>

## Main Results:

- Distance to feeding grounds and surrounding land use
- Pylon age and structure

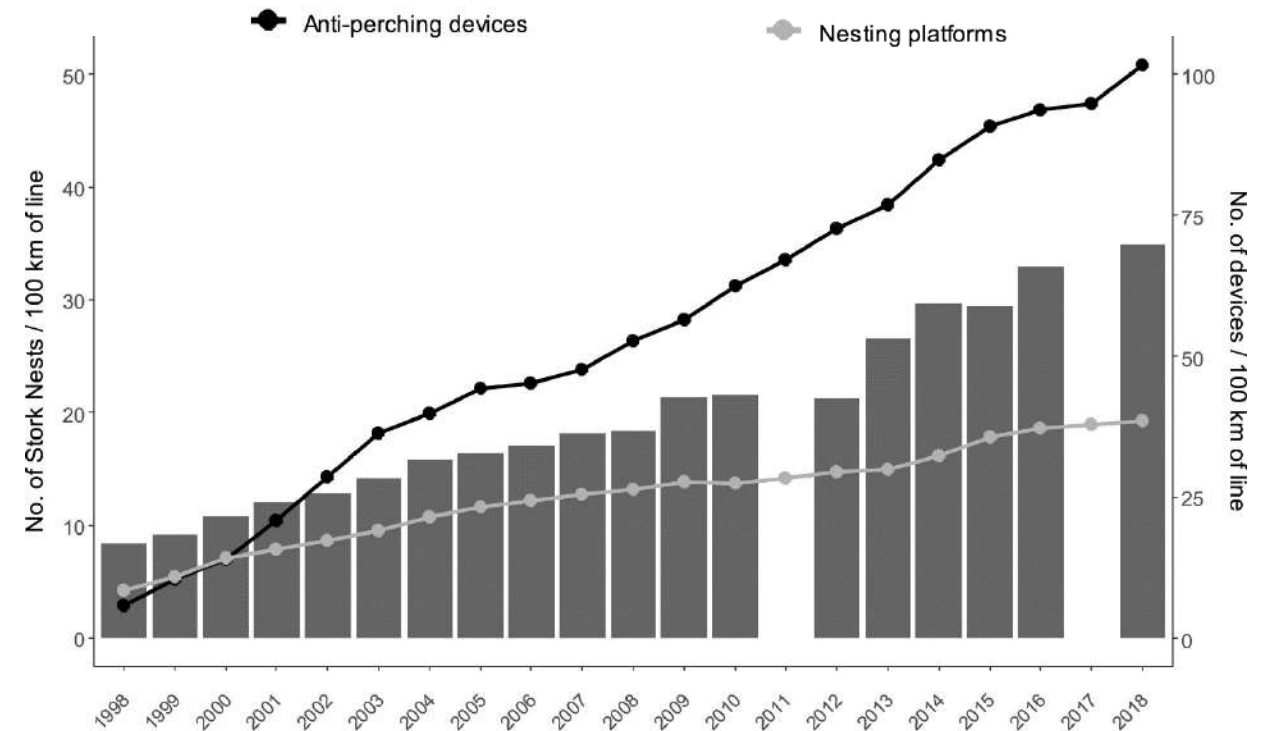
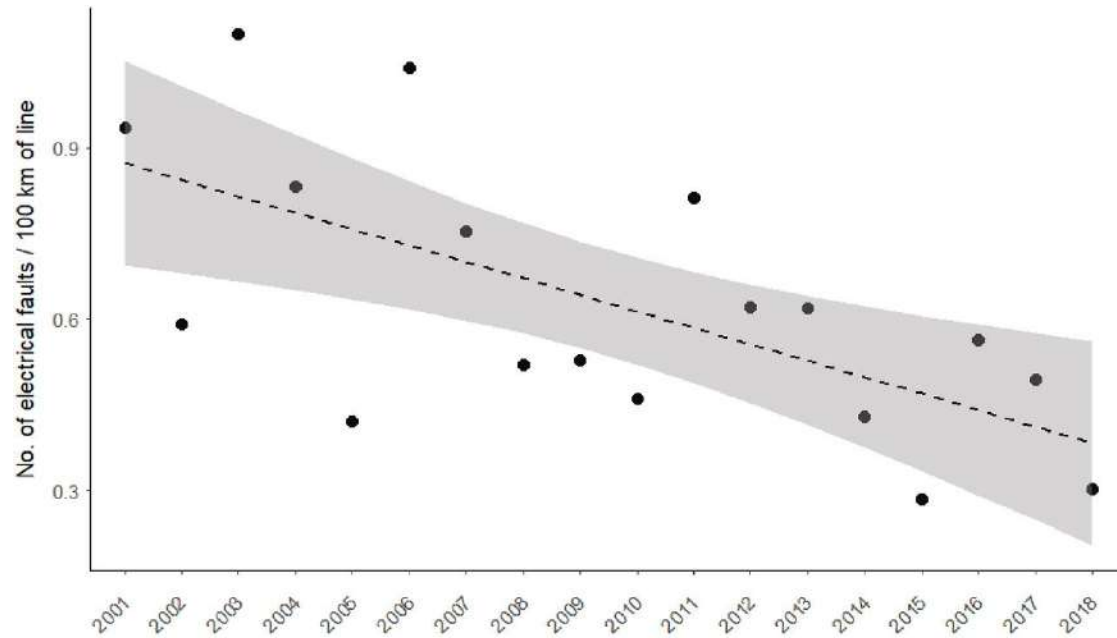


# WHITE-STORK NESTING ON REN PYLONS



Long-term management practices successfully reduce bird-related electrical faults in a transmission grid increasingly used by white storks for nesting

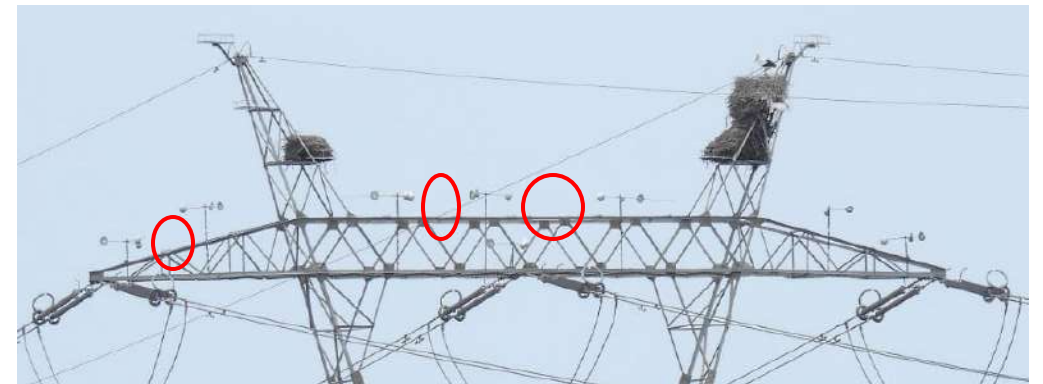
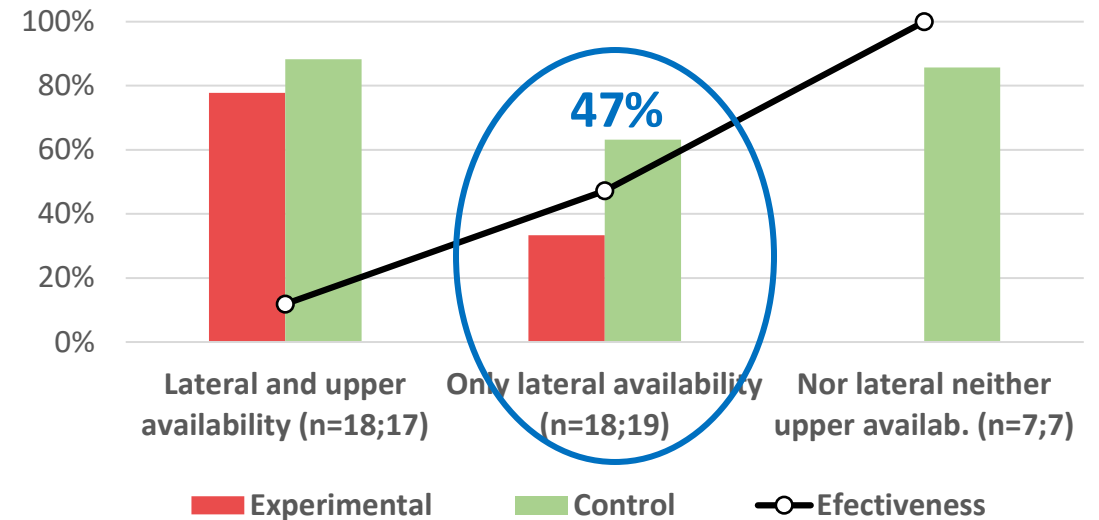
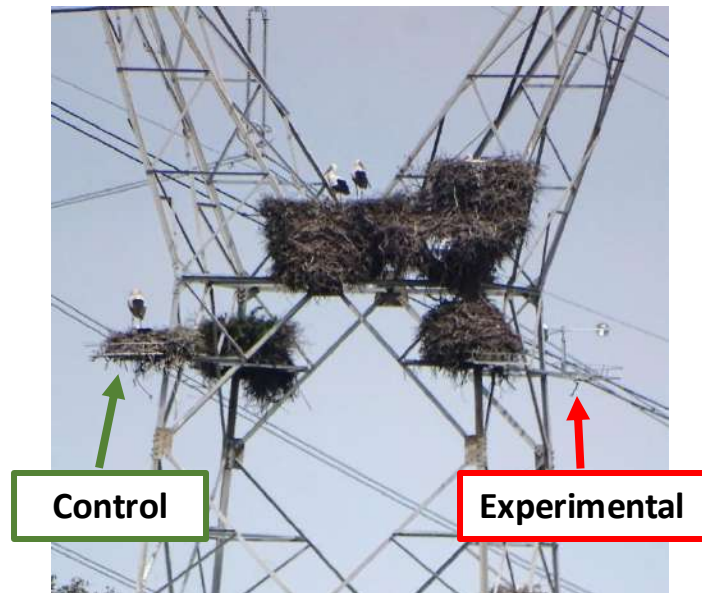
Francisco Moreira<sup>a,b,c,\*</sup>, Ricardo C. Martins<sup>a,b,c</sup>, Francisco F. Aguilár<sup>a,b</sup>, António Canhoto<sup>d</sup>, Jorge Martins<sup>d</sup>, José Moreira<sup>d</sup>, Joana Bernardino<sup>a,b,c</sup>



# WHITE-STORK NESTING ON REN PYLONS

Effectiveness of “anemometers” in reducing nest reconstruction

- Experimental test - paired sample approach



A large, stylized, light teal 'RE' is positioned on the left side of the slide, serving as a background element. The letters are thick and rounded, with the 'R' having a prominent vertical stem and a curved shoulder.

— (MANY) OTHER SPECIES NESTING ON REN PYLONS

## OTHER SPECIES NESTING ON REN PYLONS

First national survey (2021-2023)



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## OTHER SPECIES NESTING ON REN PYLONS

Total of 13 species (beyond the white stork)

- 3 sp of Corvids (1 threatened)



Raven  
*Corvus corax*



Carrion crow  
*Corvus corone*



Jackdaw (EN)  
*Corvus monedula*

## OTHER SPECIES NESTING ON REN PYLONS

- 5 sp. of other Passeriformes (small-medium size)



House sparrow  
*Passer domesticus*



Tree sparrow (NT)  
*Passer montanus*

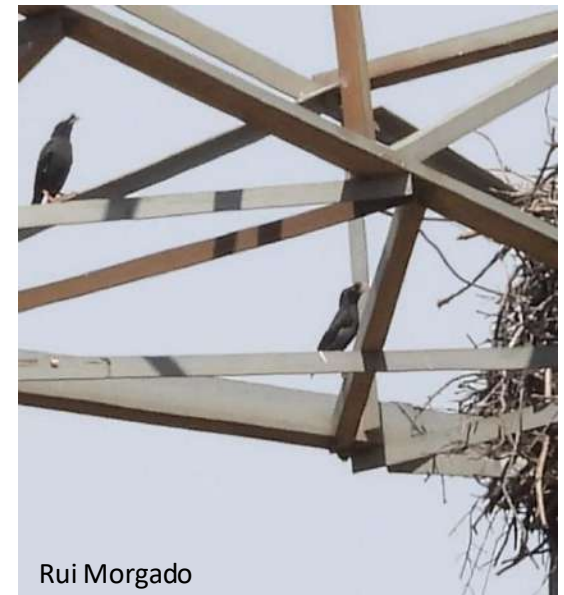


Spanish sparrow  
*Passer hispaniolensis*



Rui Morgado

Spotless starling  
*Sturnus unicolor*



Rui Morgado

Crested myna (exotic)  
*Acridotheres cristatellus*

## OTHER SPECIES NESTING ON REN PYLONS

- 5 sp. of raptors (3 threatened)



Rui Morgado

Common kestrel (VU)  
*Falco tinnunculus*



Jorge Safara

Lesser kestrel (EN)  
*Falco naumanni*



Black-winged kite  
*Elanus caeruleus*



Little owl  
*Athene noctua*



Bonelli's eagle (VU)  
*Aquila fasciata*

## OTHER SPECIES NESTING ON REN PYLONS

### From 13 species (apart from white stork)

- 9 (69%) with high dependence on cavities of white stork nests



REN pylons hold 4 threatened species



Risks associated with transmission lines

### 4 types of recommendations :

- Adapt the monitoring /management program
- Avoid / minimize disturbance near some pylons (Bonelli's eagle)
- Adopt or reinforce measures to reduce collision risk around pylons
- Active promotion of nesting behaviour on pylons (e.g. nest boxes)



A large, stylized letter 'B' in a dark teal color, positioned on the left side of the slide. It has a thick, rounded design with a horizontal bar in the middle.

# — WIRE-MARKING FOR BIRDS

## WIRE-MARKING FOR BIRDS

- Wire-markers (aka Bird Flight Diverters - BFDs)



The most used mitigation measure worldwide to reduce bird collisions with power lines



- Wide variety of devices available



Little/scattered information on wire-marking effectiveness



# WIRE-MARKING FOR BIRDS

- Global meta-analysis on wire-marking effectiveness

- Compilation of 35 studies conducted until 2019



66 separate trials



- Study/trial origin:

- Europe – 45 trials (68%)
- USA – 11 trials (17%)
- South Africa – 8 trials (12%)
- South America – 2 trials (3%)



# WIRE-MARKING FOR BIRDS

- Global meta-analysis on wire-marking effectiveness

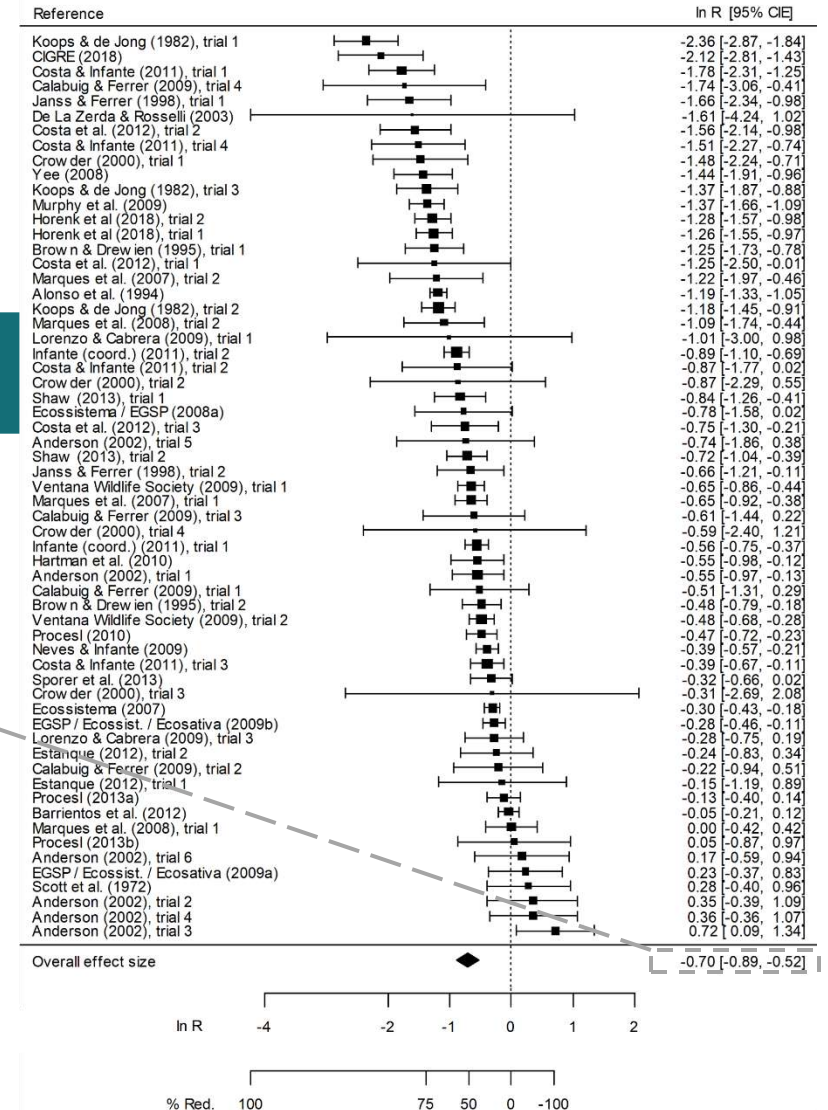
## OVERALL EFFECTIVENESS

$\ln(R) [95\% \text{ CI}] = -0.70 [-0.89, -0.52]$



~ 50.4 % reduction in mortality rates

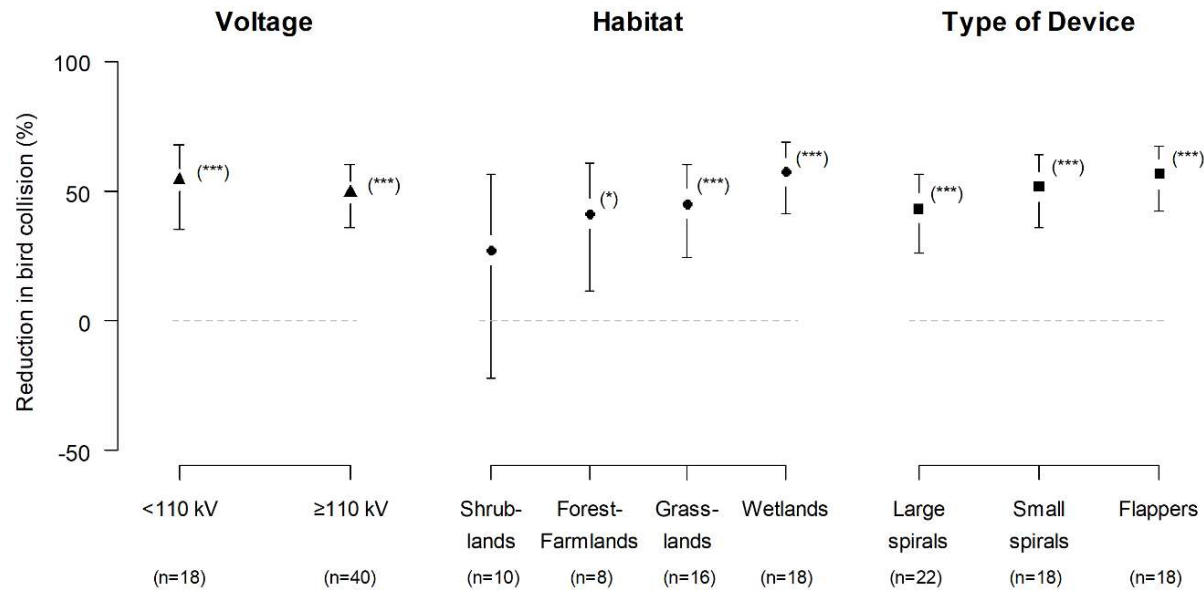
in wire-marked PLs, compared to controls



# WIRE-MARKING FOR BIRDS

- Global meta-analysis on wire-marking effectiveness

## MODERATING EFFECT OF...



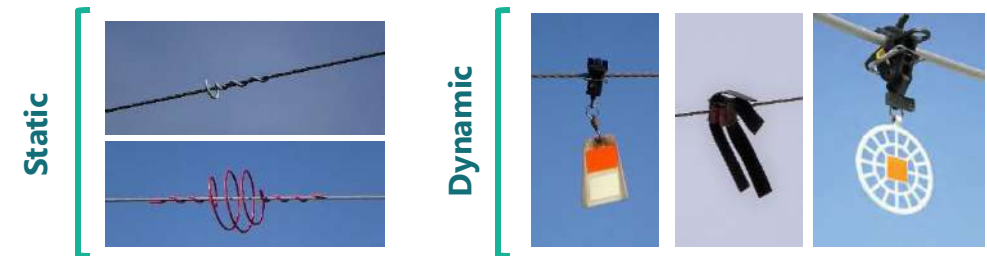
## Habitat:

- BFDs tend to be more effective in wetlands (e.g., cranes)



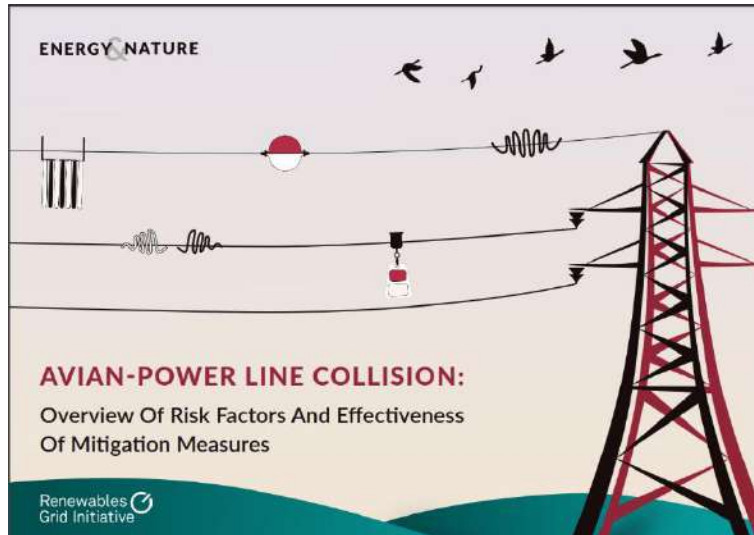
## Type of device:

- 'Flappers' tend to be more effective (in reducing bird collisions), than Static devices (large/small spirals)



# WIRE-MARKING FOR BIRDS

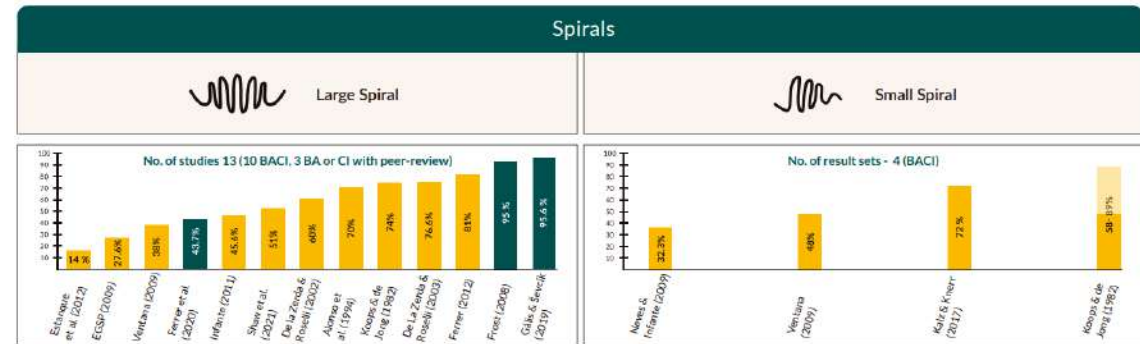
- RGI brochure (Oct. 2024)



## AN OVERVIEW OF PEER REVIEWED STUDIES

■ BACI Design ■ Peer-Reviewed BA or CI Design

Static



Effectiveness range: 32.3 – 89 % (small spirals) and 14 – 95.6% (large spirals)

Dynamic



Effectiveness range: 54 – 98.8%



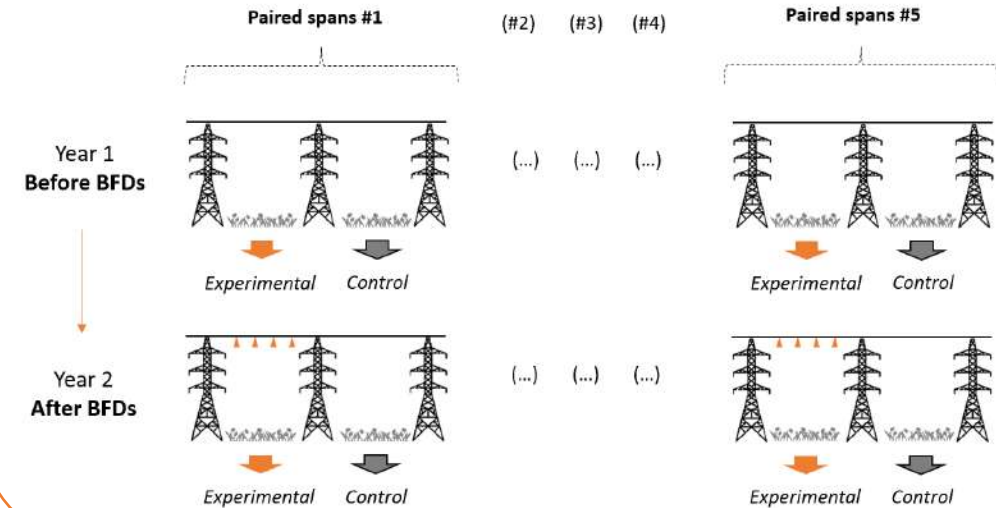
# WIRE-MARKING FOR BIRDS

- **Next steps**

- **Conduction of more “well-designed” effectiveness studies**

(e.g., BACI design, with several replicates)

## BEFORE-AFTER CONTROL-IMPACT (BACI) DESIGN



- **Assessment of wire-markers durability, particularly in studies using Flappers**



IVM Workshops – Portugal

20-22 November 2024

## IVM & Bird Protection Workshop #5

# ACKNOWLEDGEMENTS

Renewables  
Grid Initiative 

REN 

fct

Fundação  
para a Ciência  
e a Tecnologia

NORTE2020  
PROGRAMA OPERACIONAL REGIONAL DO NORTE

PORTUGAL  
2020



UNIÃO EUROPEIA

Fundo Social Europeu

Projeto: NORTE-01-0246-FEDER-000063



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