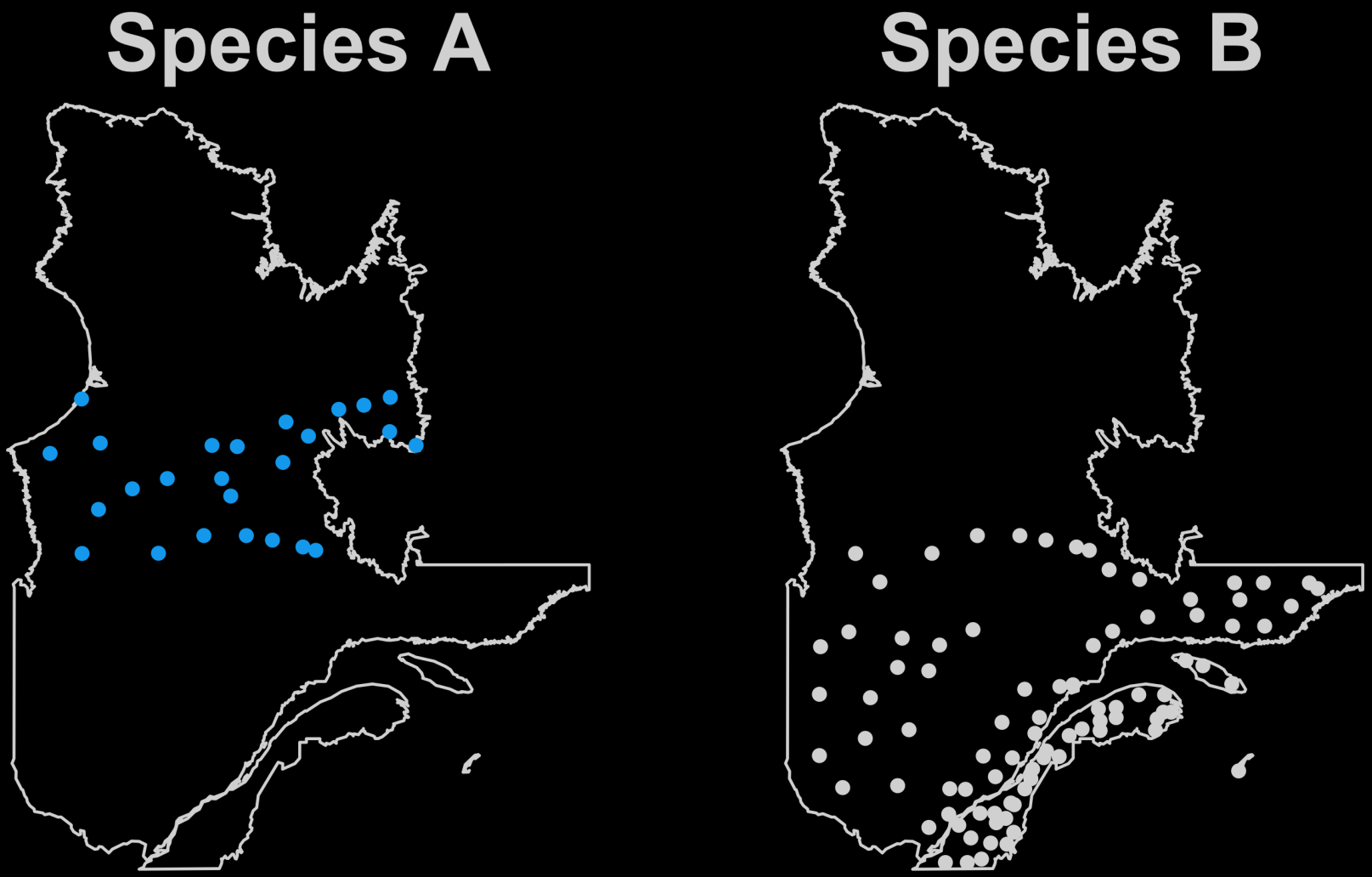
Do interacting species co-occur differently from not-interacting species?

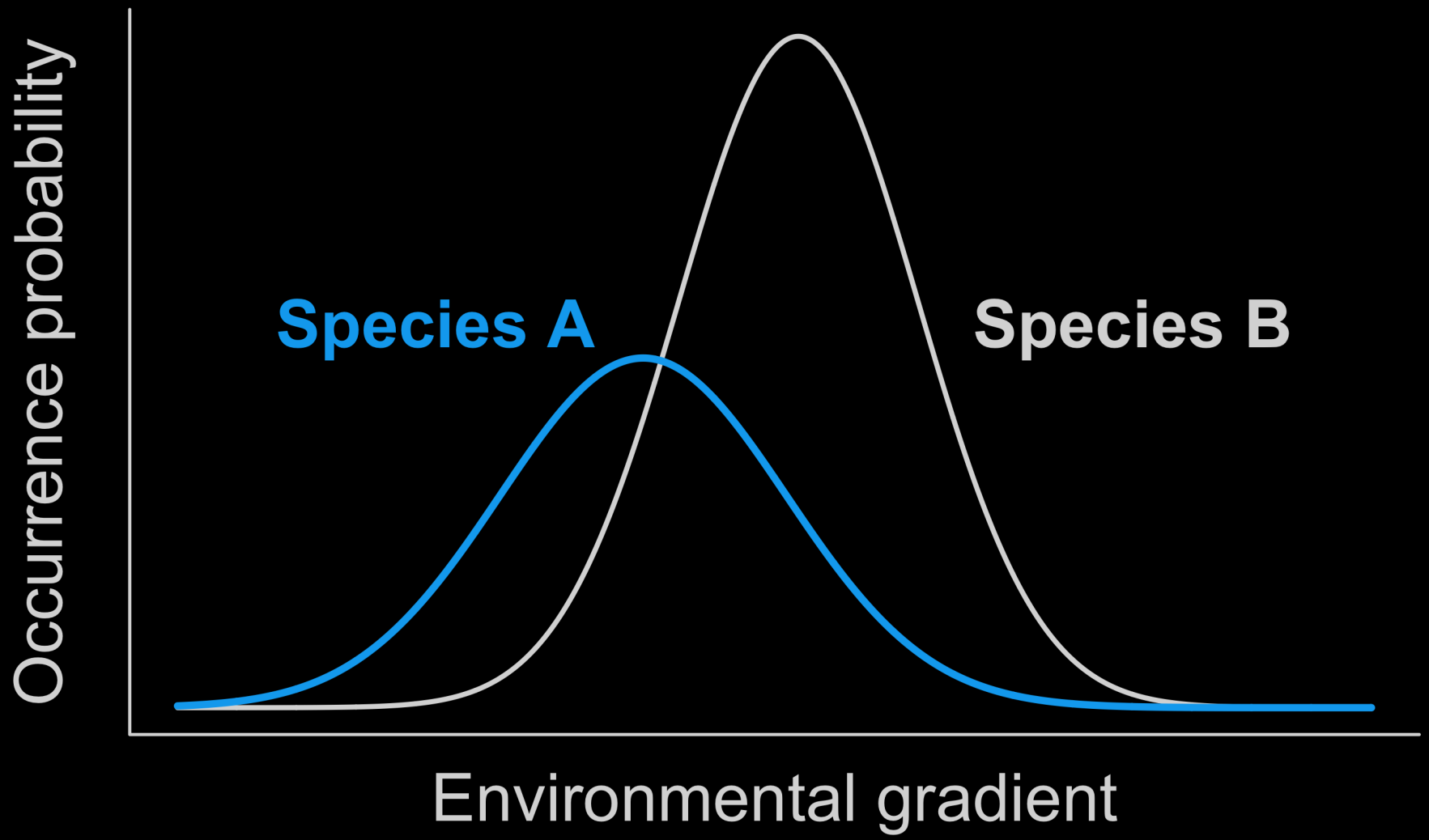
Kévin Cazelles and Dominique Gravel

University of Évora, March 1st 2016

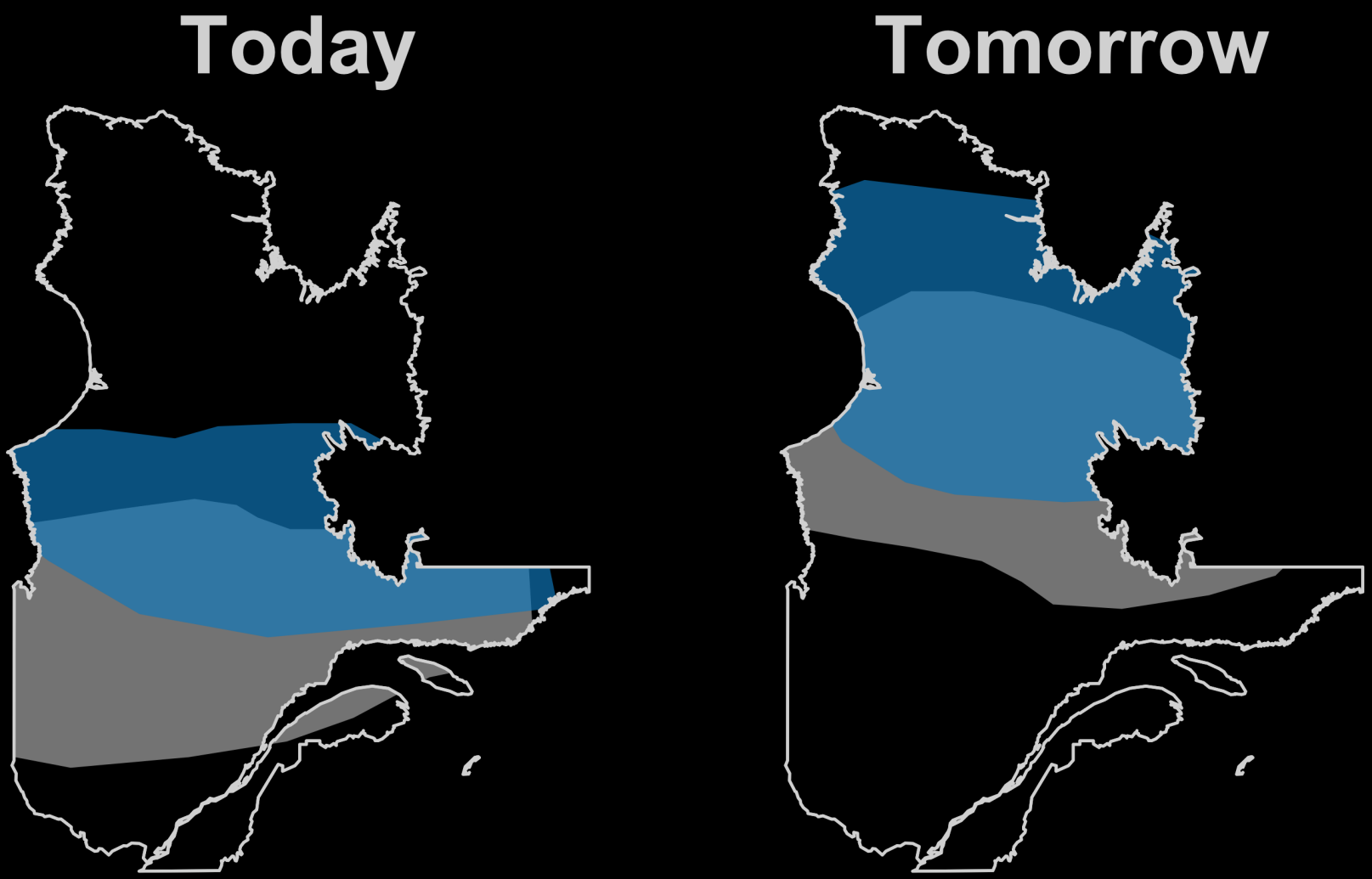
Species distributions



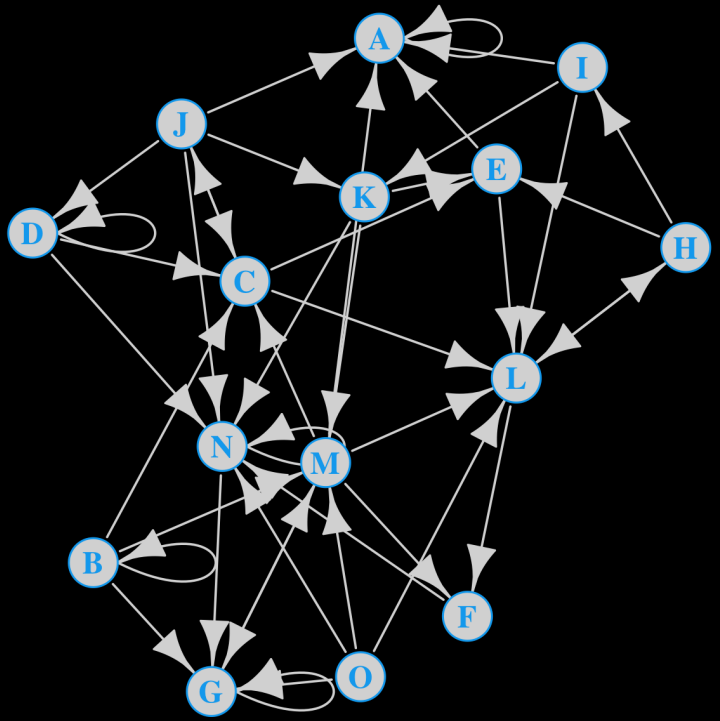
Ecological niche



Species distributions forecasts



Ecological interactions



Tomorrow

What have we done ?

Probabilistic model

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- $\frac{P_{i,j}}{P_i P_j}$ vs Network properties

Probabilistic model

- Niche Model to build realistic networks

  (Williams and Martinez, 2000)

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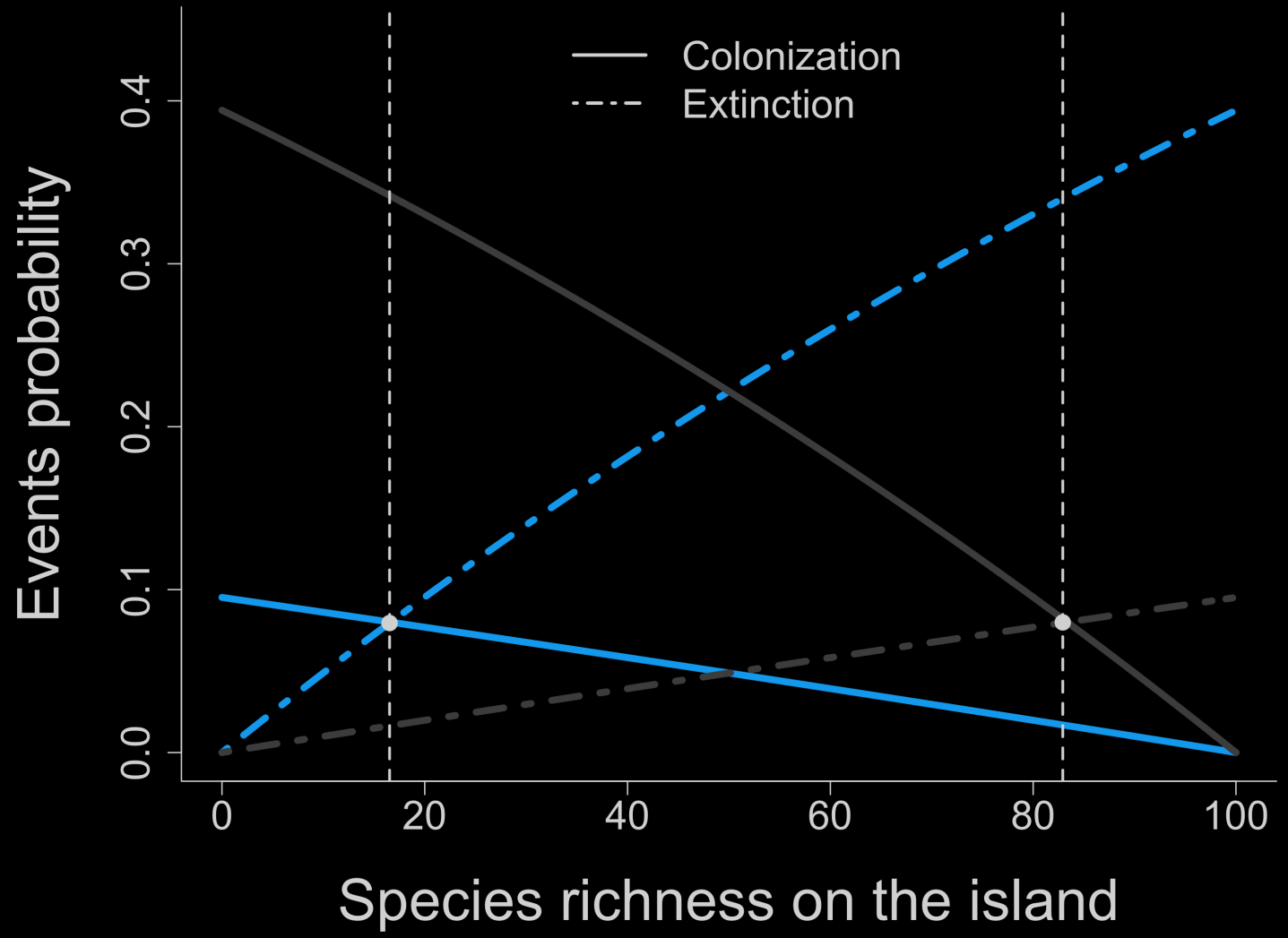
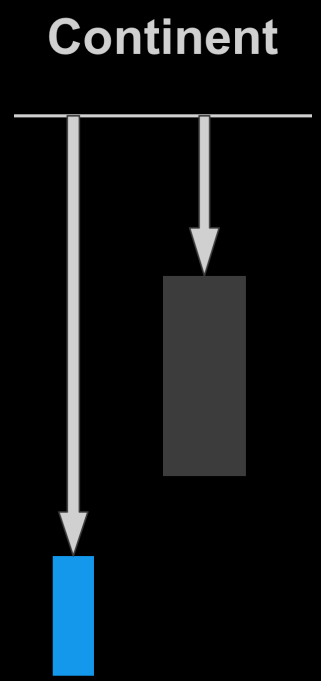
- Trophic Theory of Island Biogeography as a theoretical distribution

  (Gravel *et al.*, 2011)

Theory of Island Biogeography





Trophic Theory of Island Biogeography

Two additionnal rules:

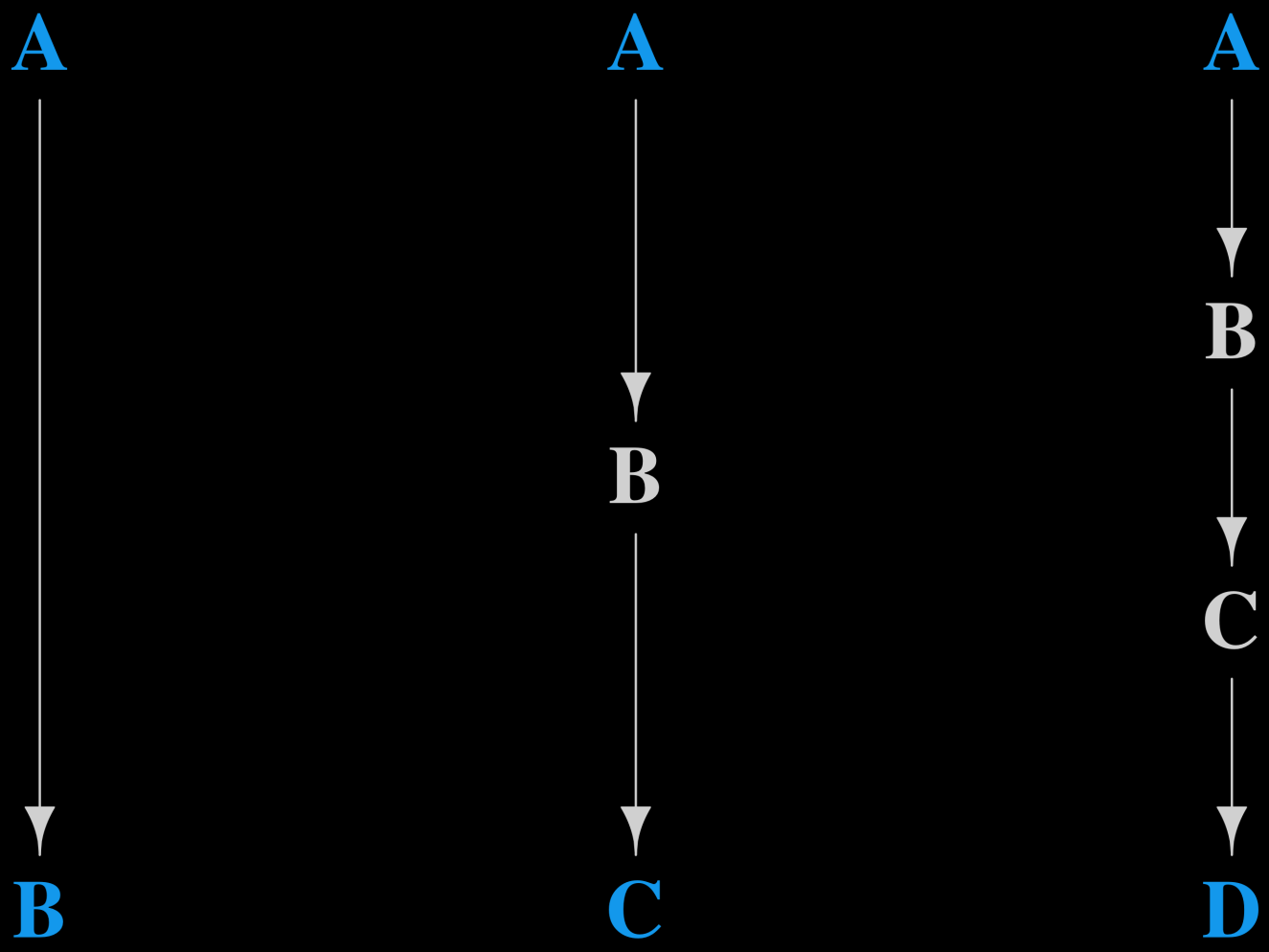
1. Island without preys, predator cannot colonize

Trophic Theory of Island Biogeography

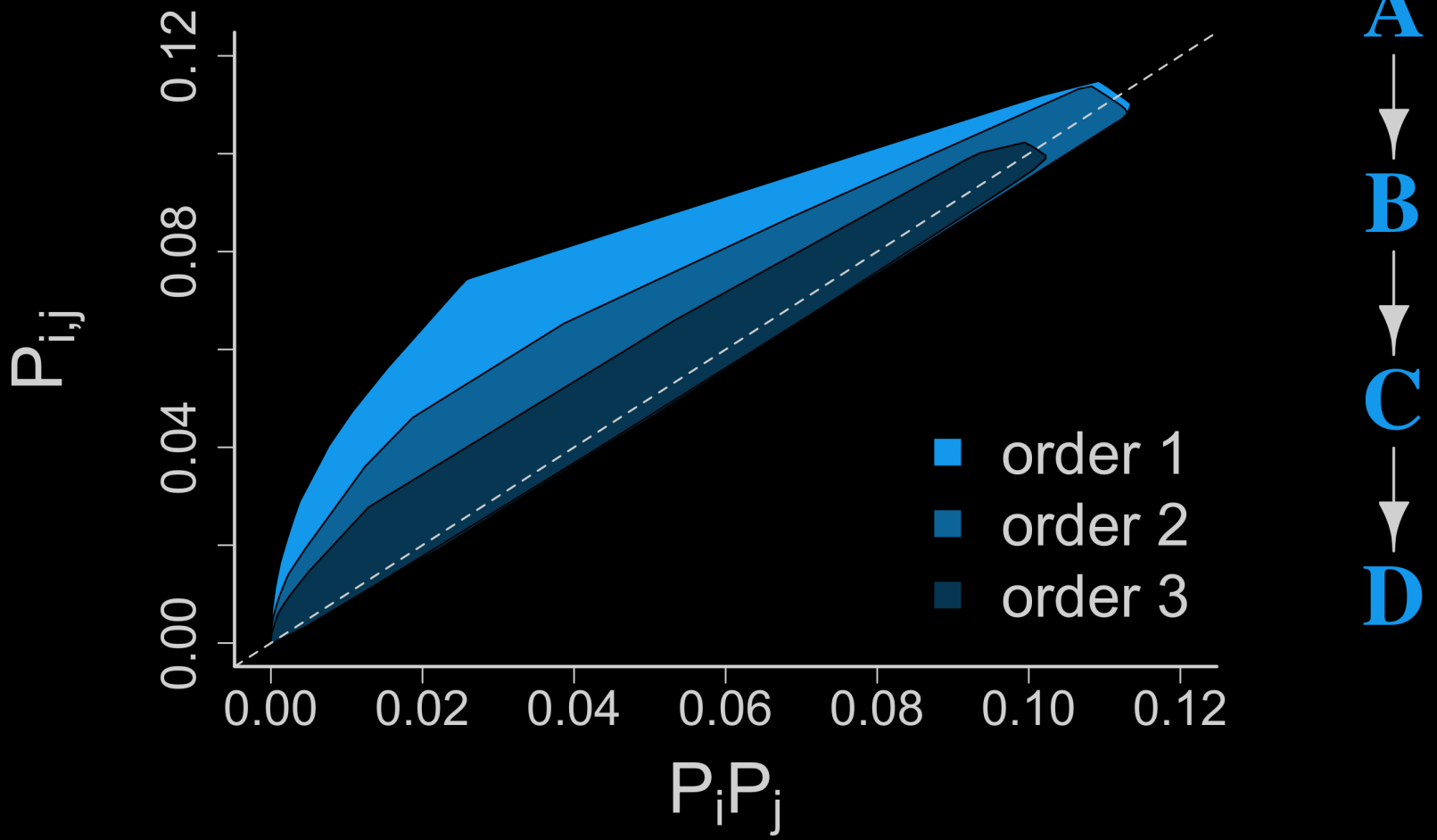
Two additionnal rules:

1. Island without preys, predator cannot colonize
2. Last preys goes extinct, predator goes extinct too

Shortest path



Shortest path and association strength



Cazelles *et al.*, 2015, *Theoretical Ecology*

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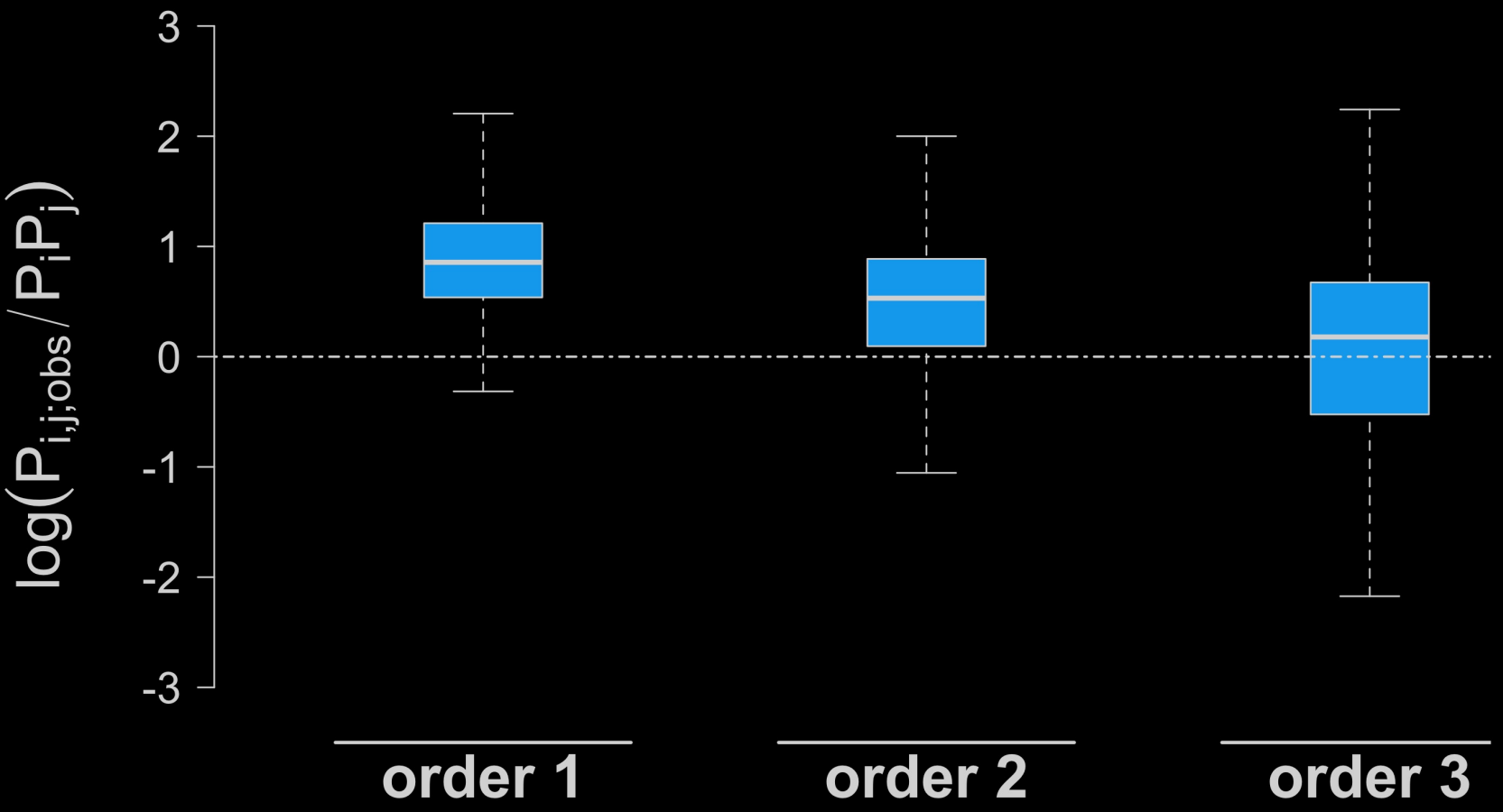
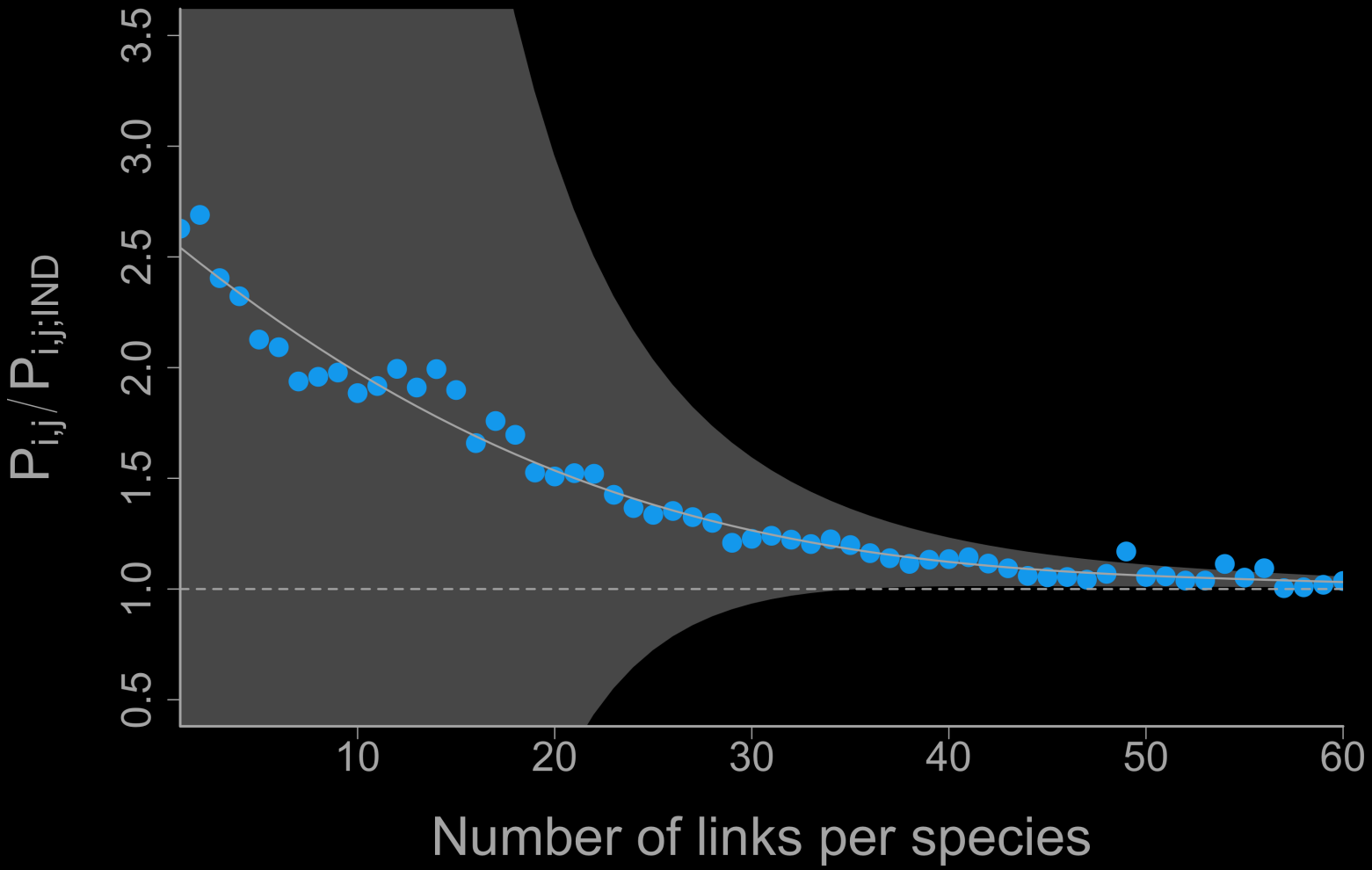


Number of links and association strength



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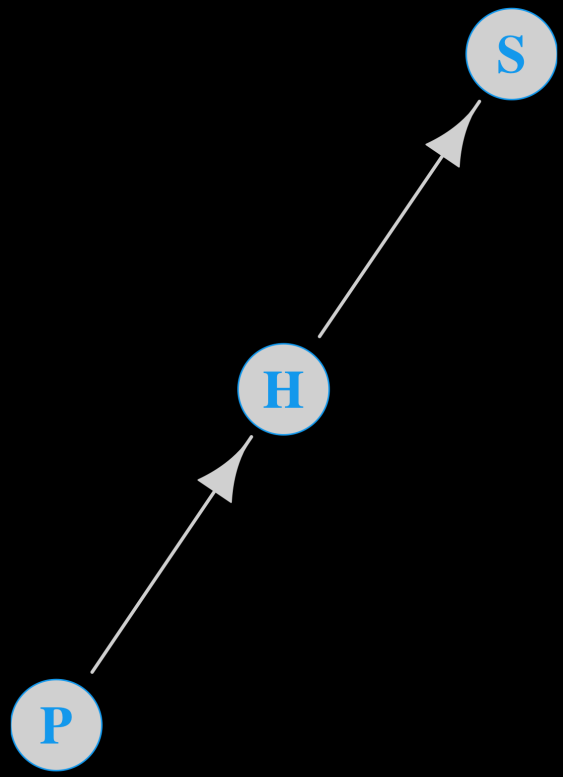
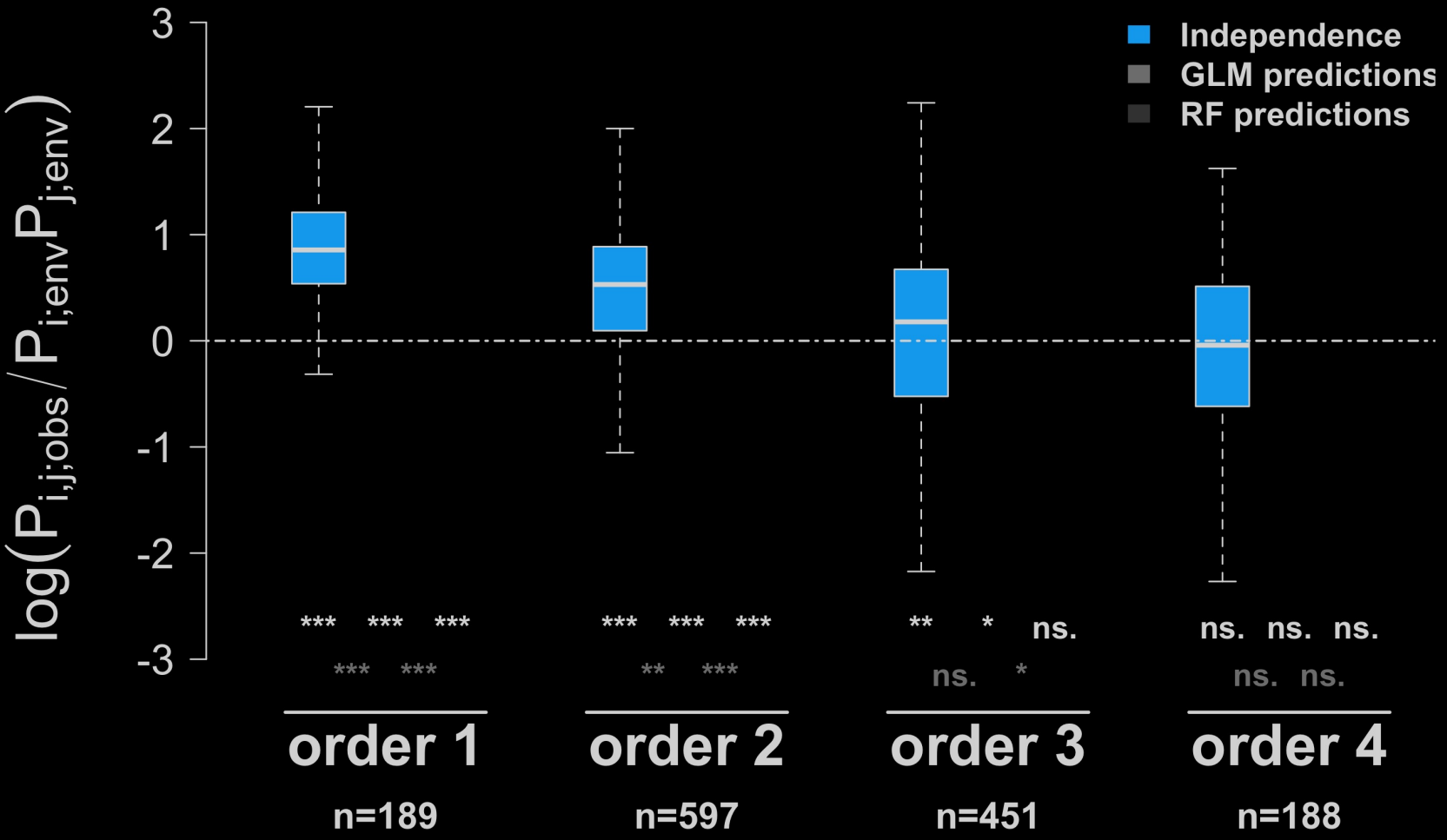
- Empirical data?

Empirical datasets



S: Salix H: Herbivore P: Parasitoid

Empirical results



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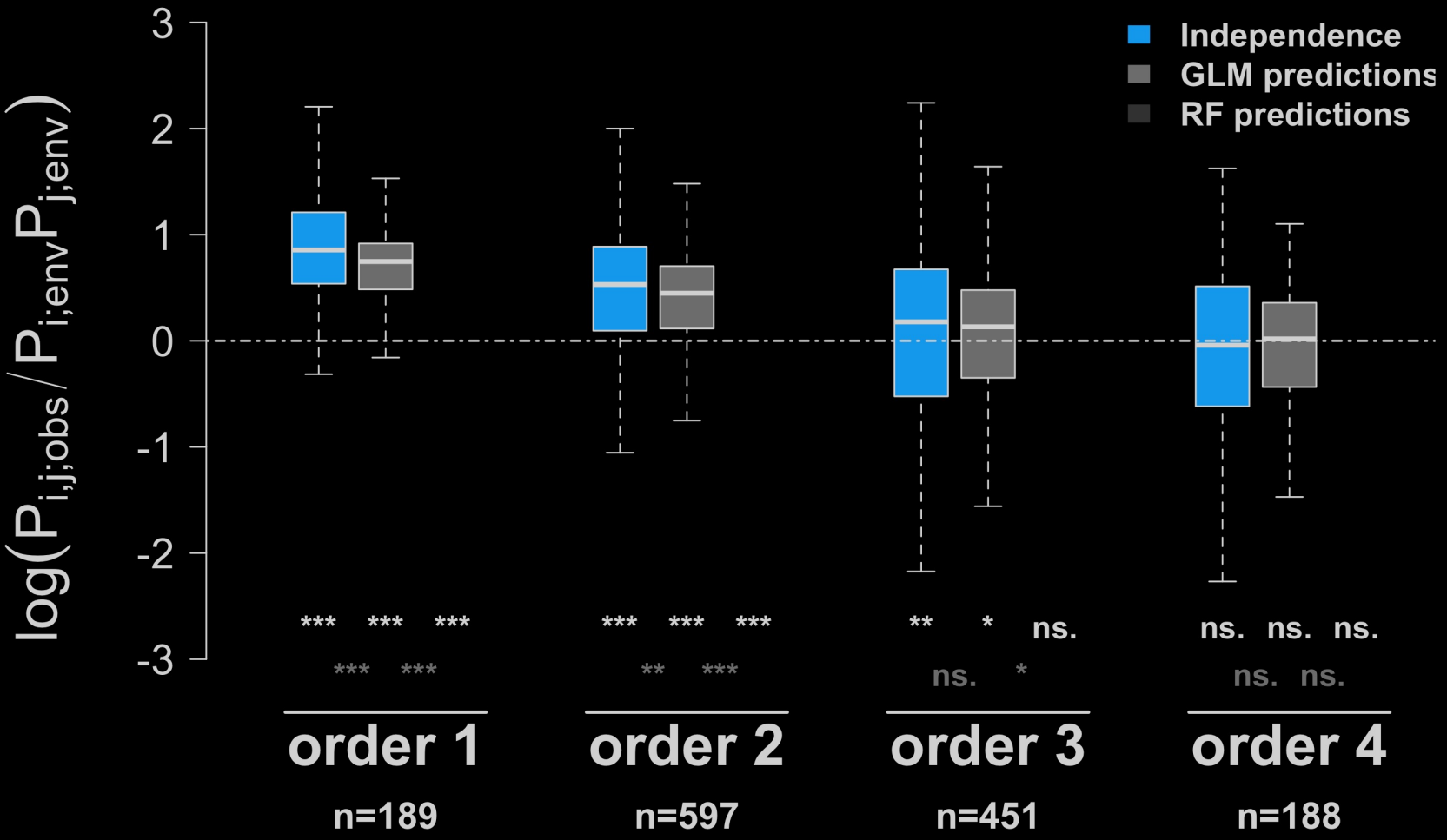

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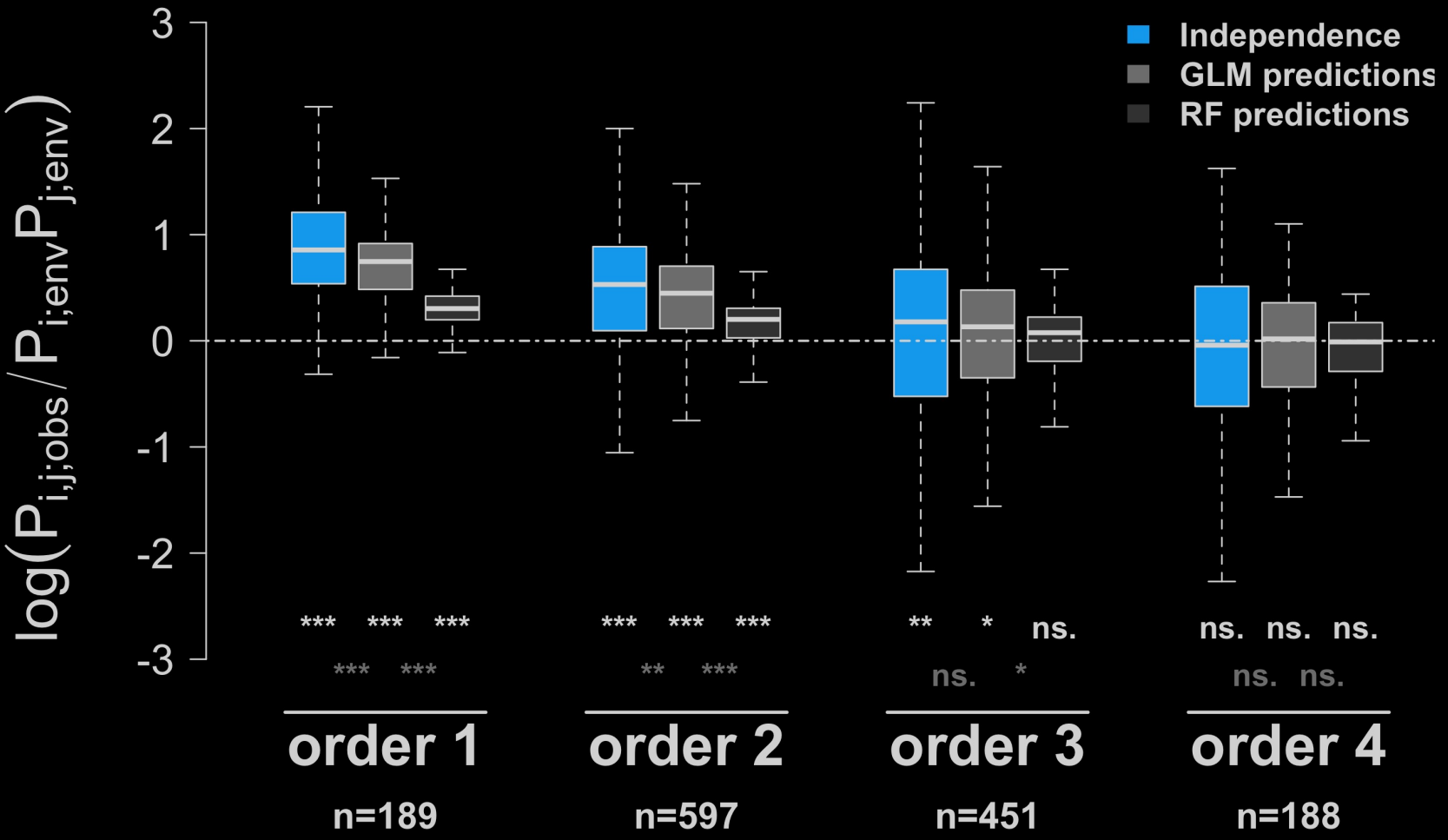

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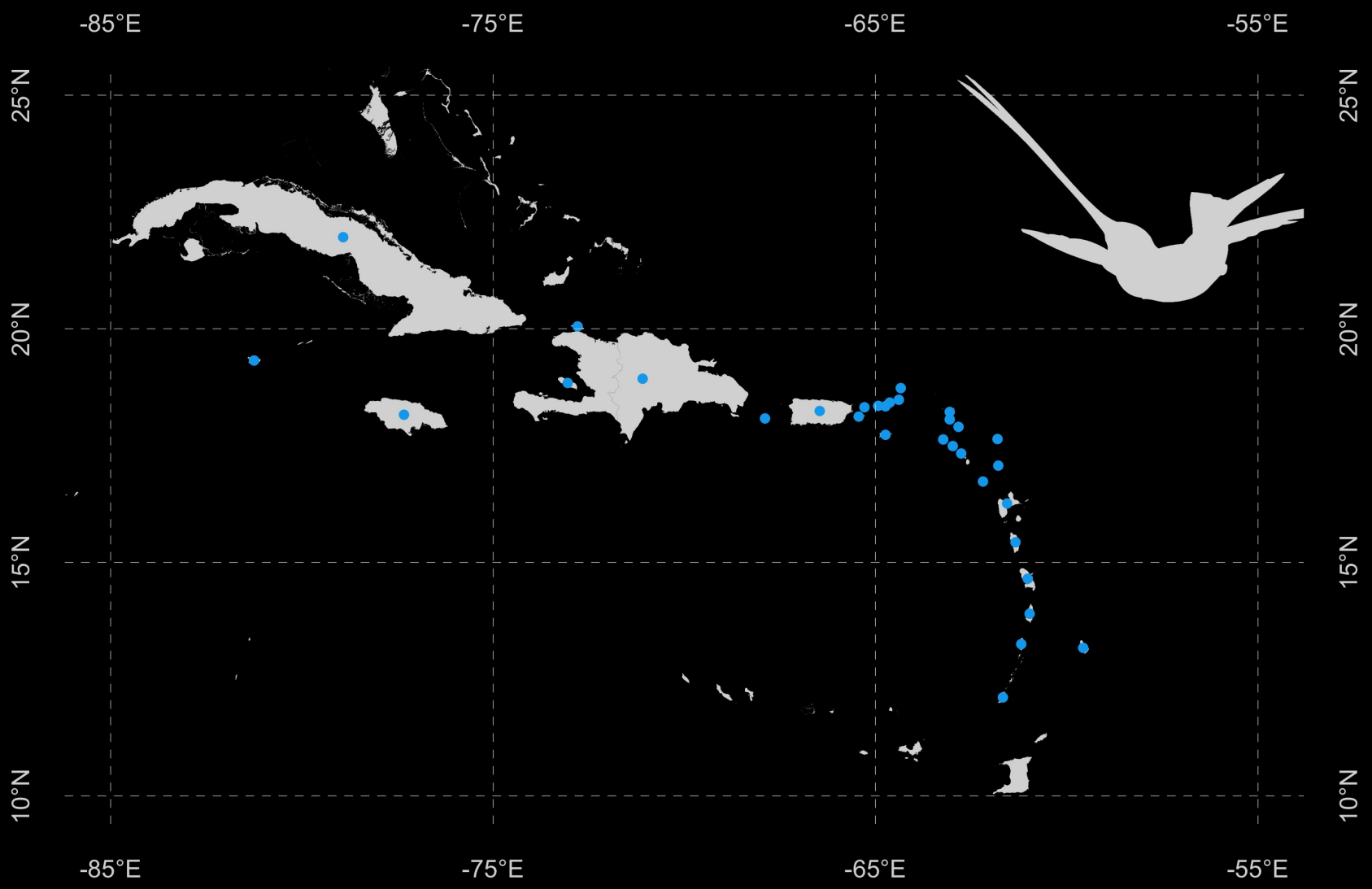

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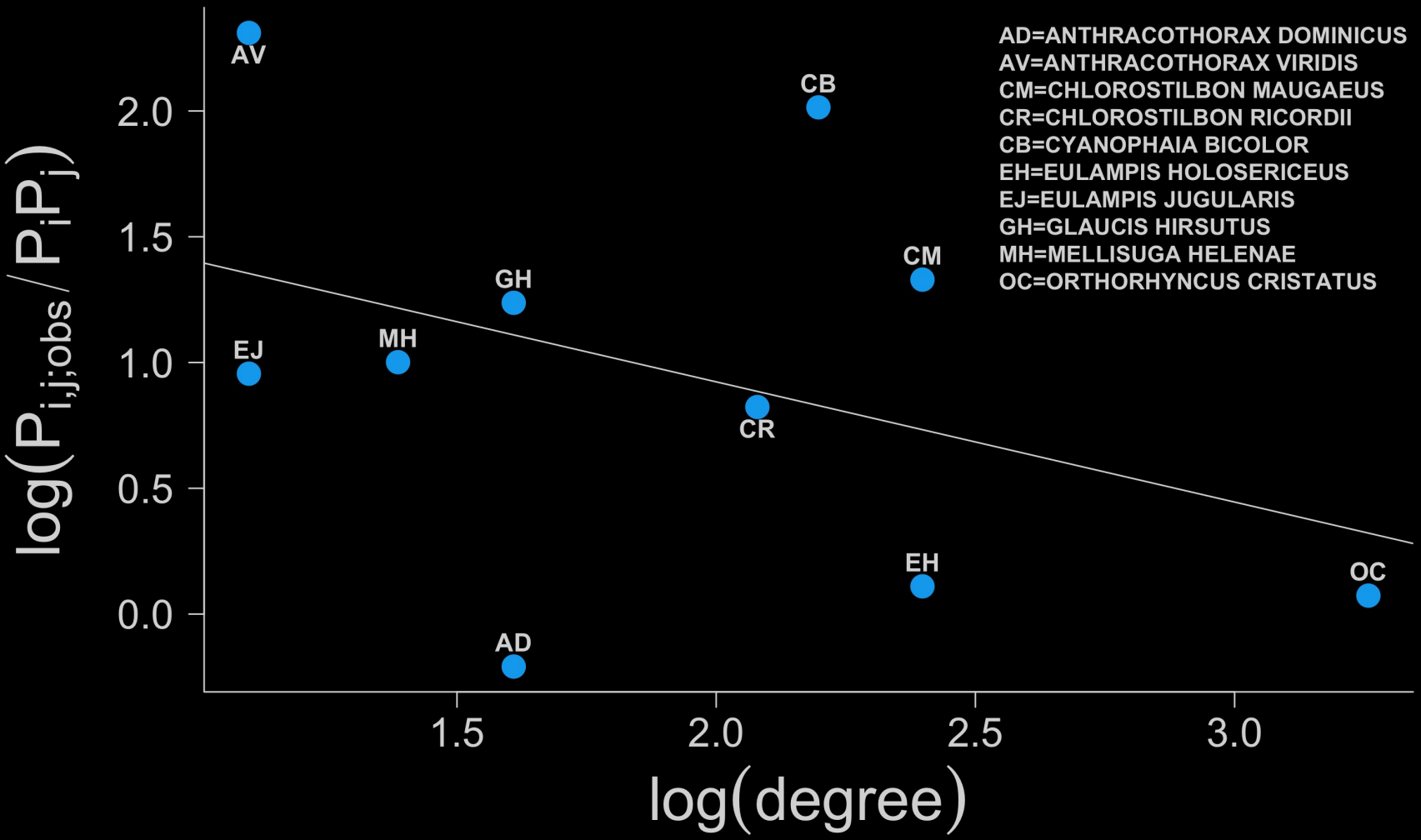

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3. The strength of an association decreases with the number of interactions a species is experiencing
4. Taking the abiotic environment into account makes the signal is weaker

Perspectives

- Mutualism and predation induce positive co-occurences
- What about competitiion?
- Can we really tease abiotic and biotic constraints apart?

Biogeography: integrated theory

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Functionnal traits may help to link theses fondamental variables

Modelling and Biodiversity management

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3. We should keep thinking about the relevant unit for biogeography
4. How can we develop suitable strategies for conservation at community/foodweb scale?

OBRIGADO