

A trait-based approach to unravel the effects of habitat connectivity and habitat amount on weeds



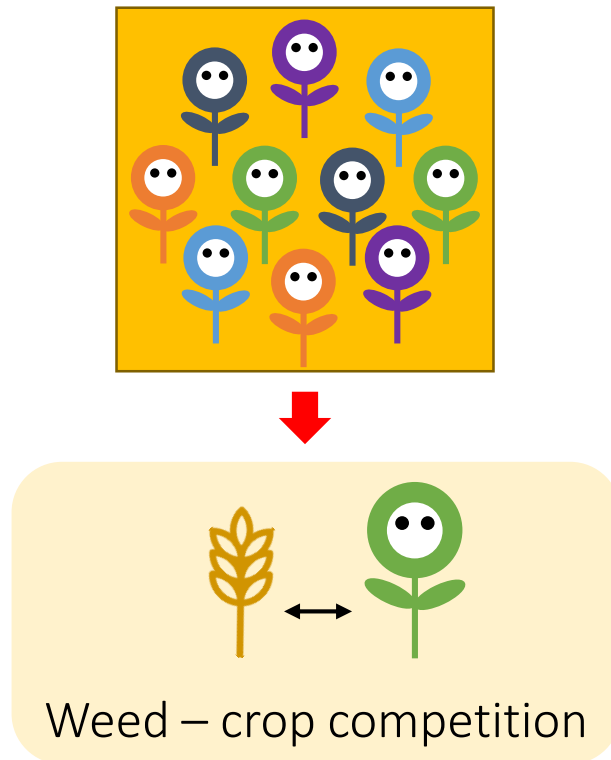
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¹UMR CNRS 6553 Ecobio – Université de Rennes

²UMR 0980 Bagap – INRA Rennes

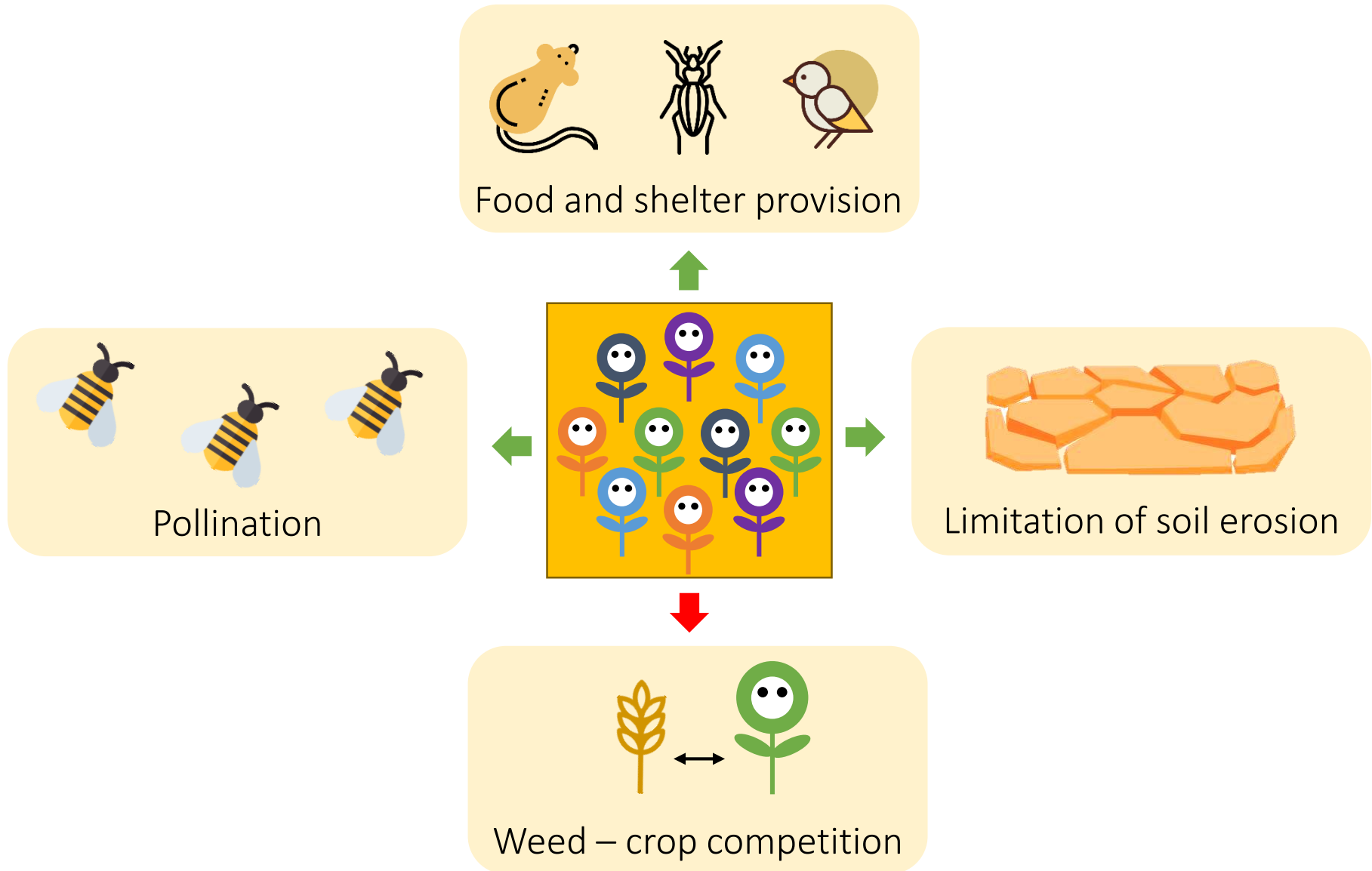
Introduction

- The maintenance of weed diversity and abundance: **a challenging issue**



Introduction

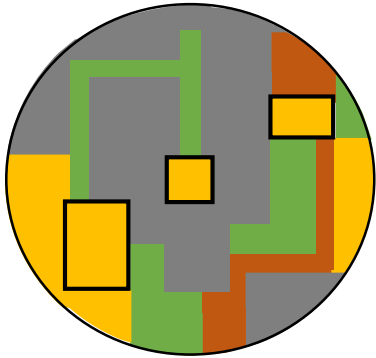
- The maintenance of weed diversity and abundance: **a challenging issue**



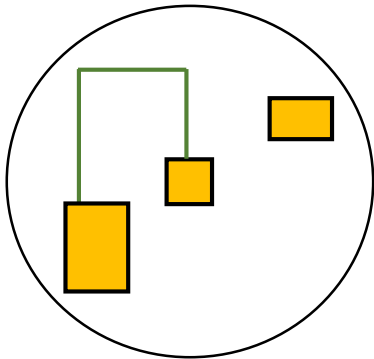
Introduction

Hypothesis 1

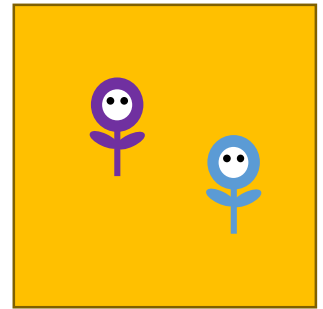
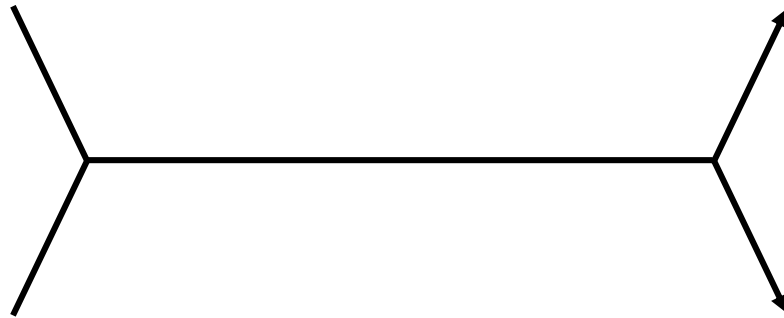
Low habitat connectivity and habitat amount decrease weed diversity and abundance



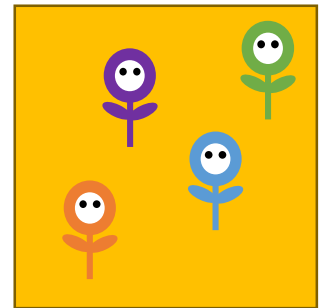
Low habitat amount



Low habitat connectivity



Low weed diversity



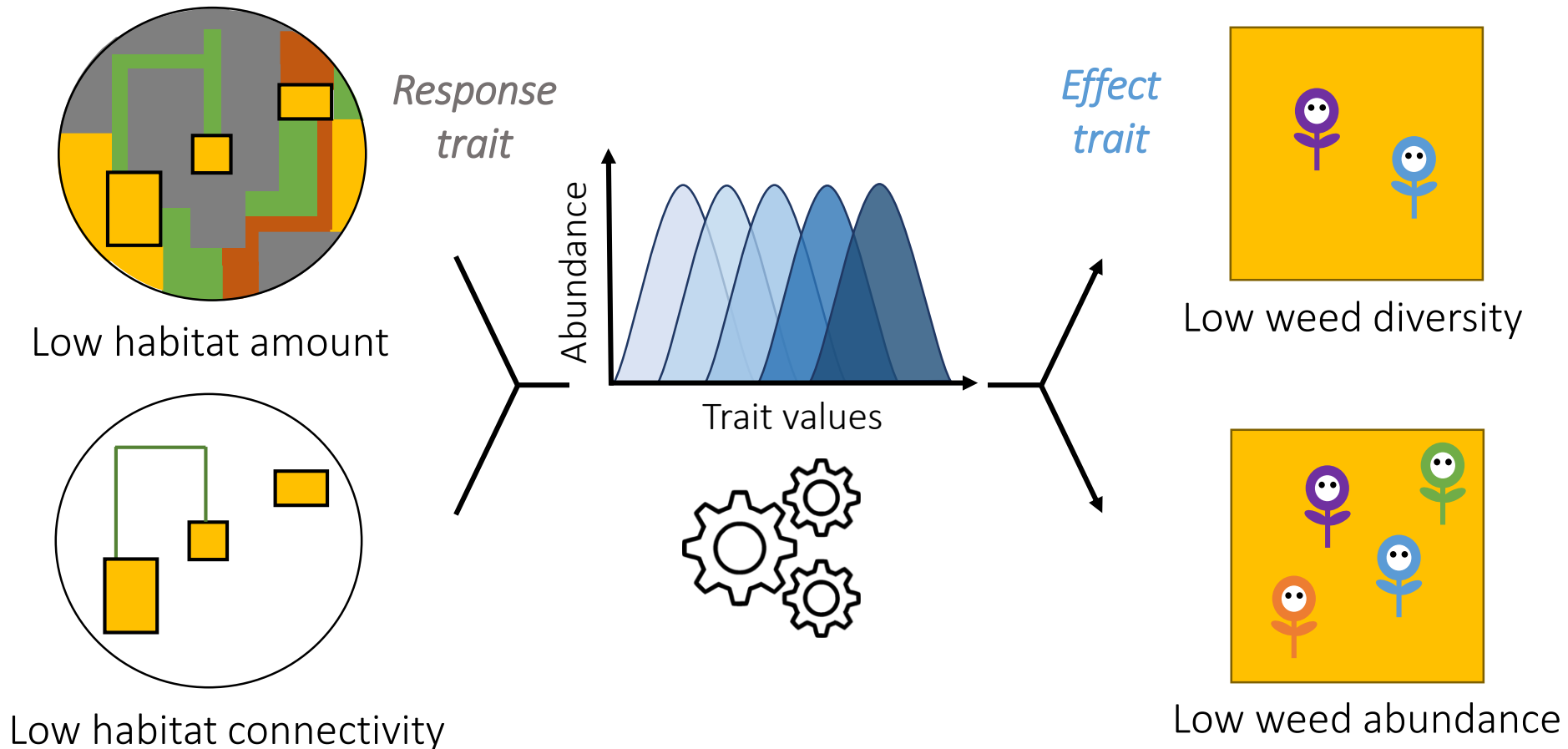
Low weed abundance



Element = not source / not suitable to dispersal

Introduction

- The **response-effect trait framework**: new insights on the relationships between **habitat amount** and **habitat connectivity** and **weed assemblages**

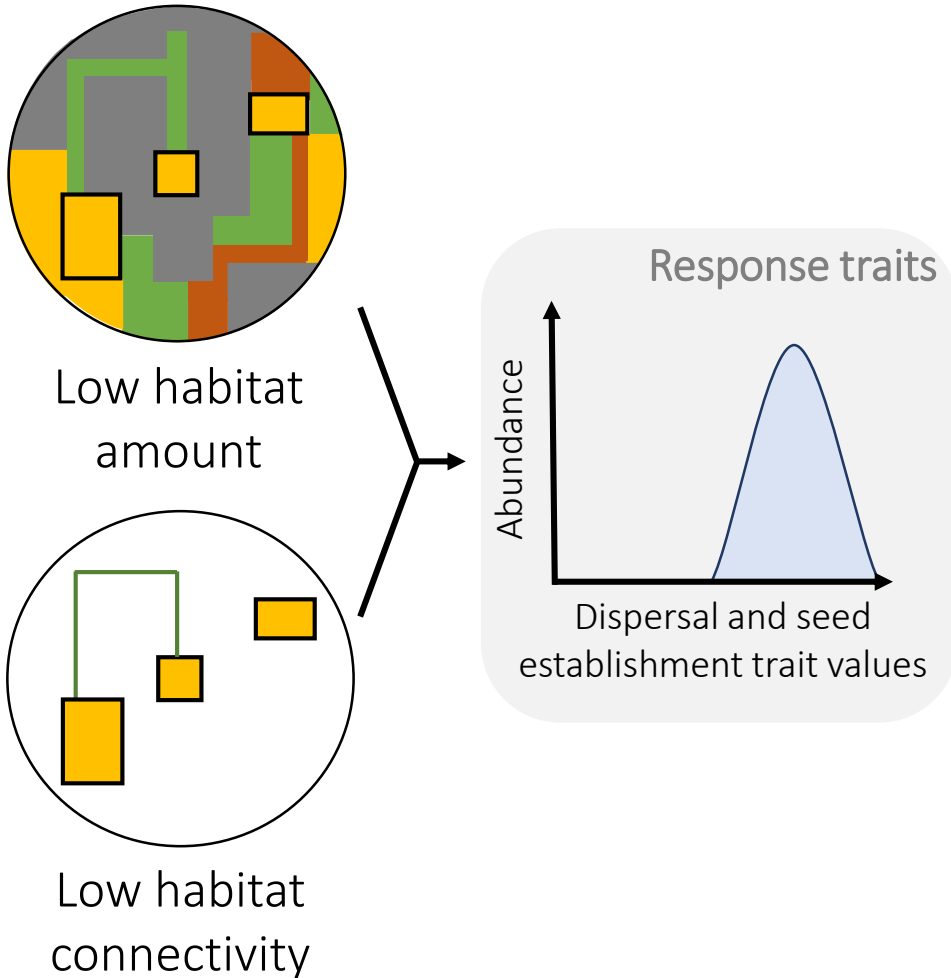


Element = not source / not suitable to dispersal

Introduction

Hypothesis 2

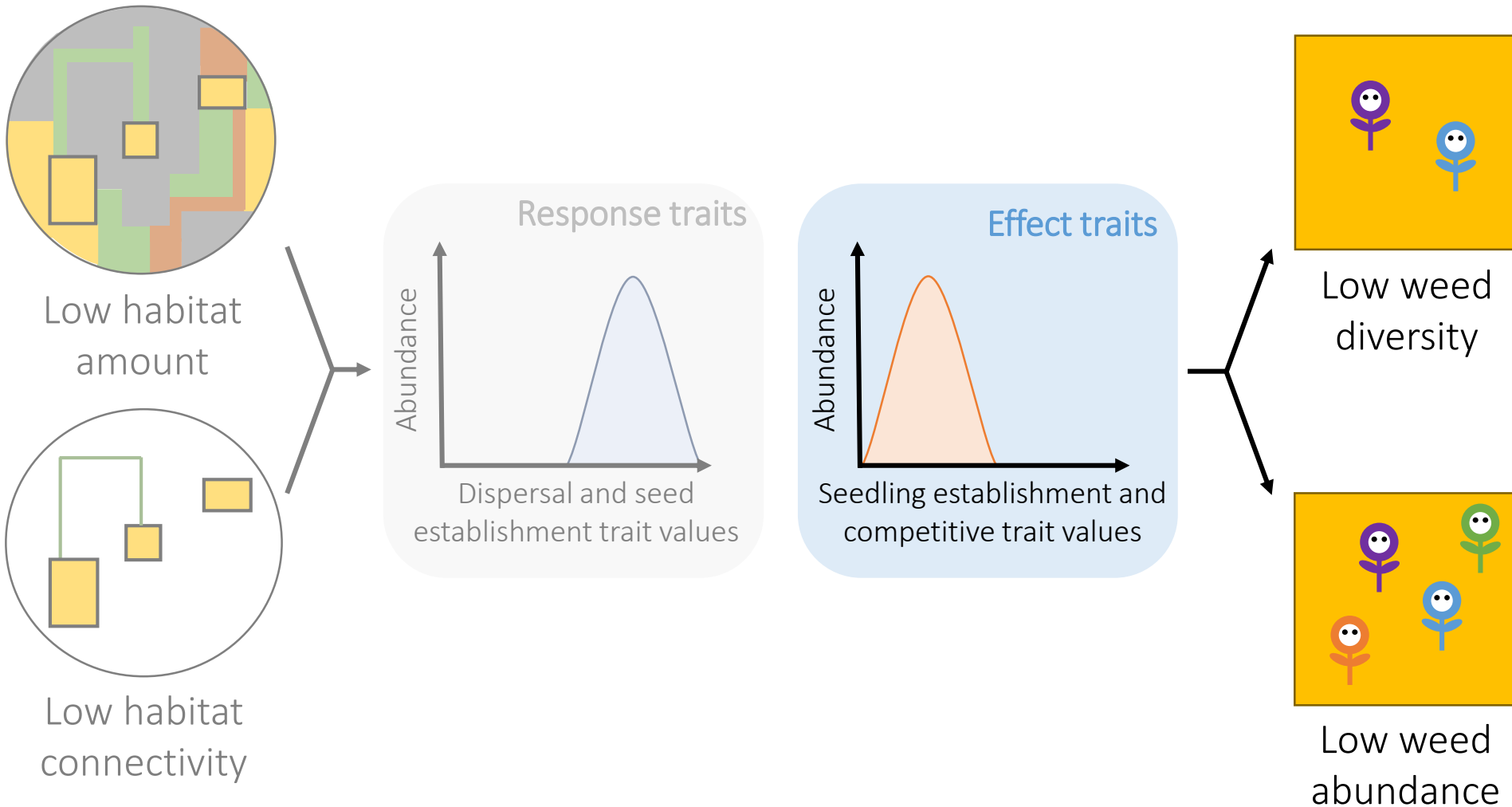
Low habitat connectivity and habitat amount select for high dispersal and seed establishment trait values in weed assemblages



Introduction

Hypothesis 3

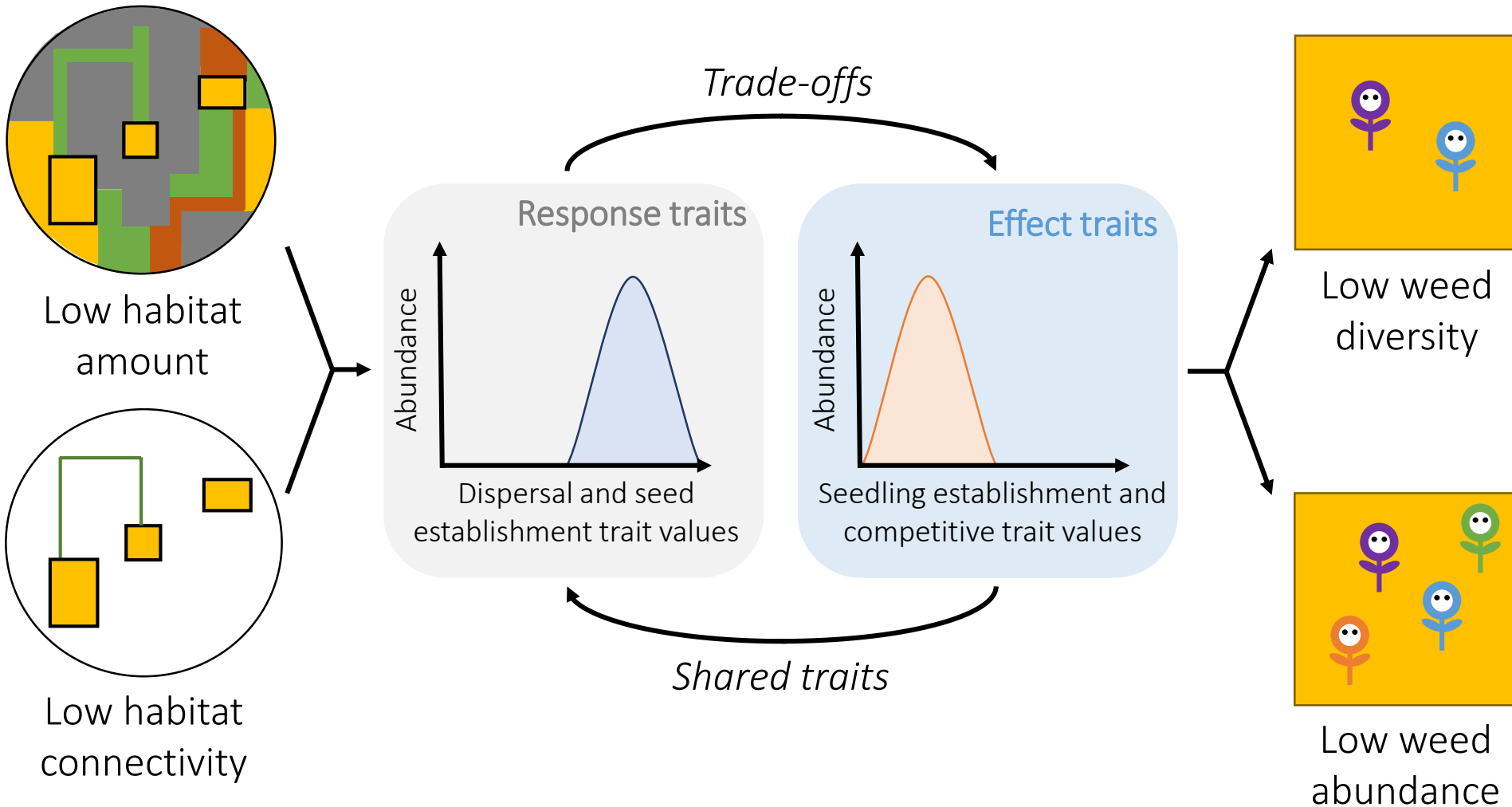
Low seedling establishment and competitive trait values decrease weed diversity and abundance in crops



Introduction

Hypothesis 4

The shifts in the functional structure of weed assemblages induced by landscape factors drive weed diversity and abundance

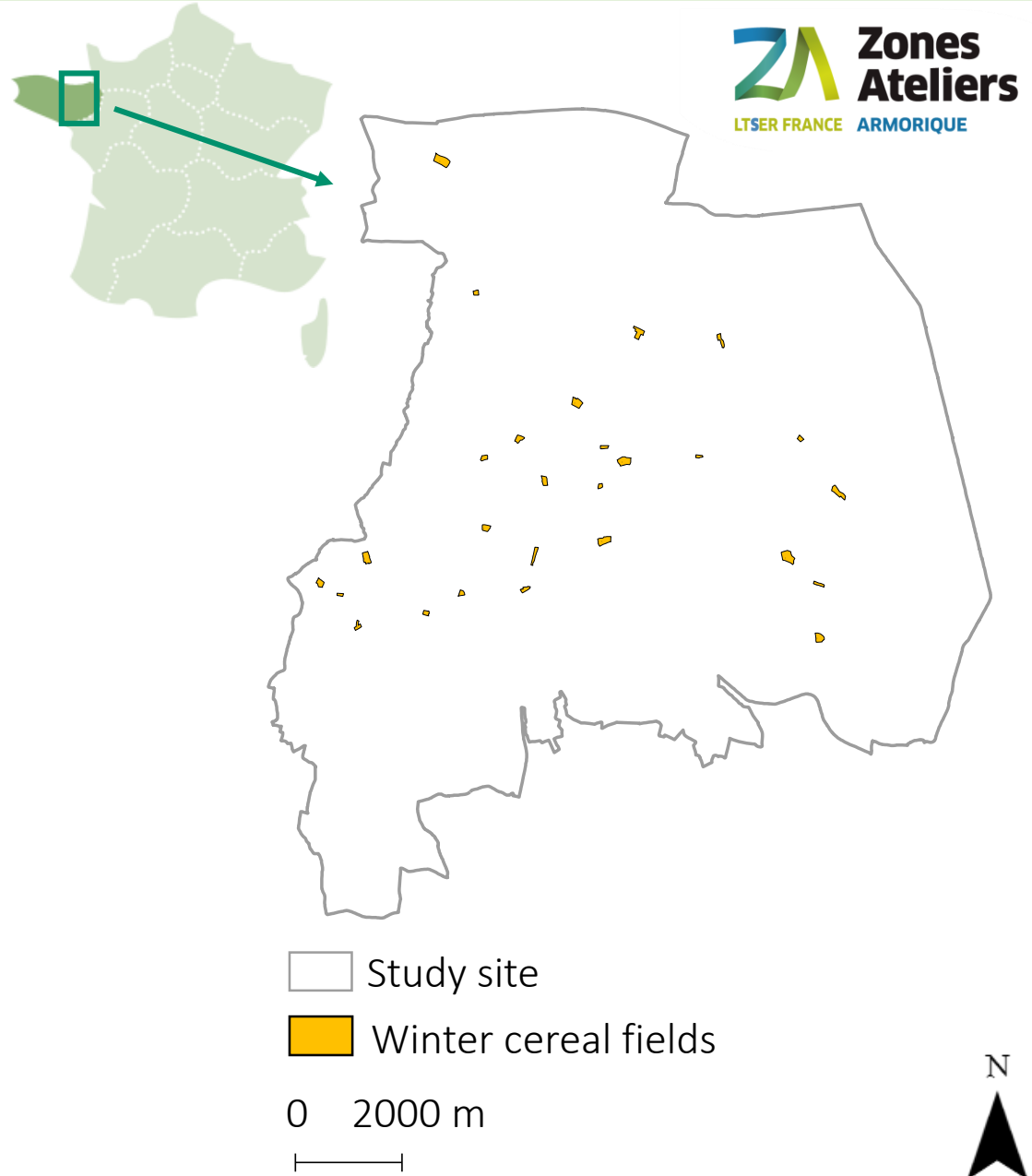


Methods

- Study area and field sampling

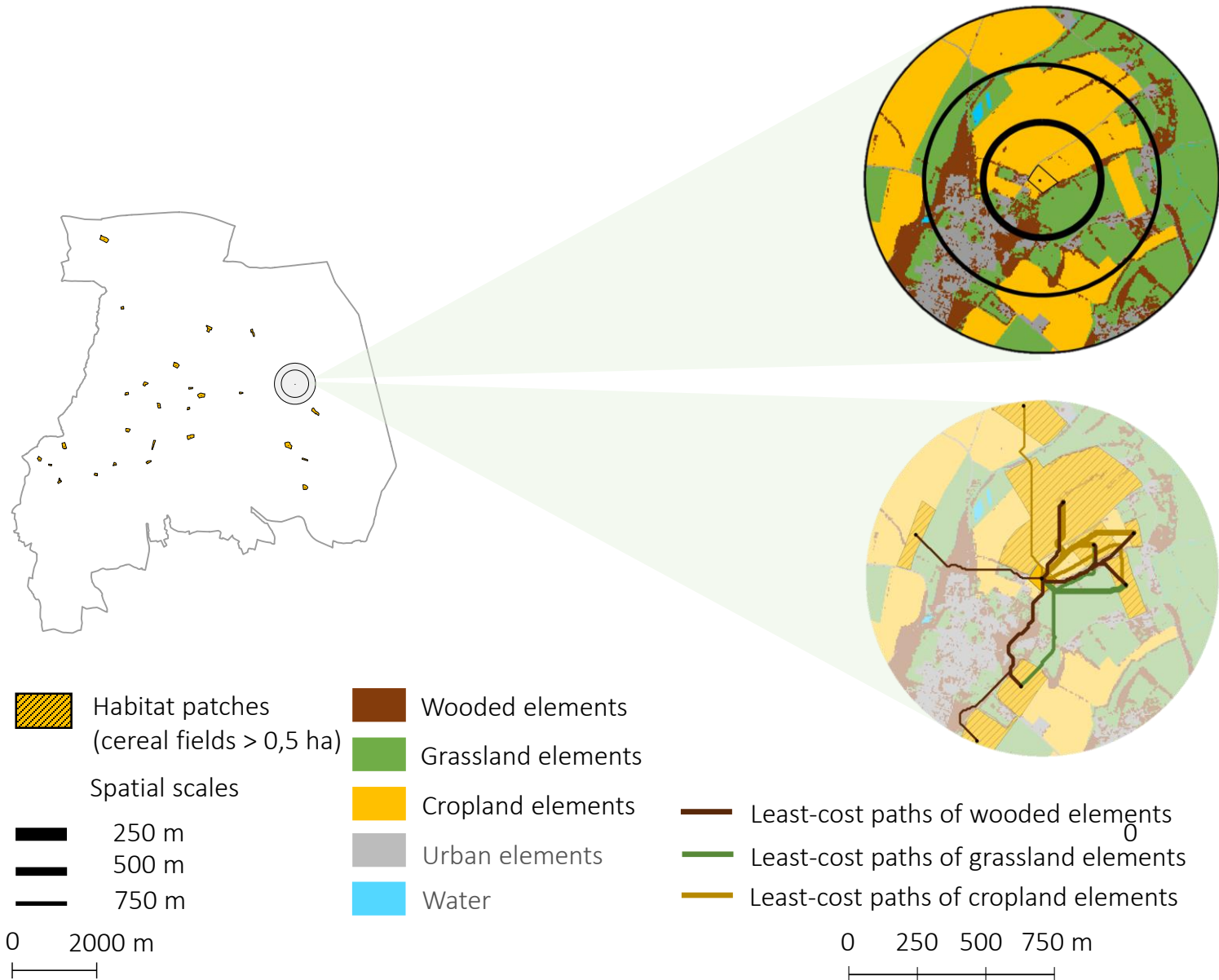
Zone Atelier Armorique, Brittany

27 winter cereal fields



Methods

■ Assessment of habitat amount and habitat connectivity

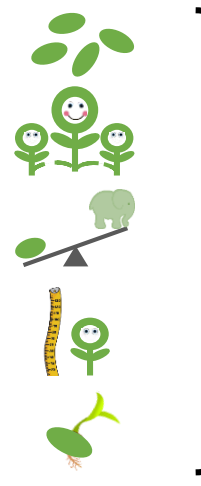


Methods

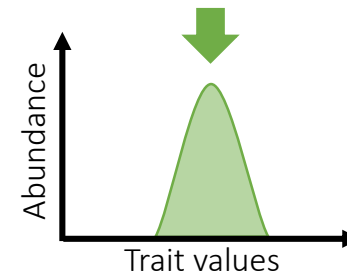
■ Assessment of the structure of weed assemblages

Functional structure

5 functional traits linked to ● dispersal, ● establishment and ● competition

- Seed number per plant
 - ● ● Allocation to vegetative reproduction
 - ● Seed dry mass
 - ● Plant height
 - Seed germination rate
- 

Community-weighted mean value

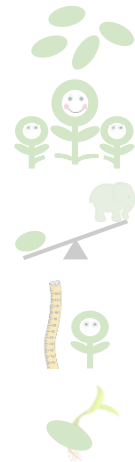


Methods

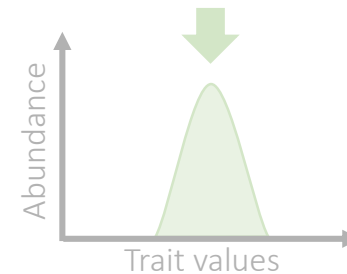
■ Assessment of the structure of weed assemblages

Functional structure

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- 

Community-weighted mean value



Taxonomic structure

Diversity

- Species richness
- Piélou's evenness

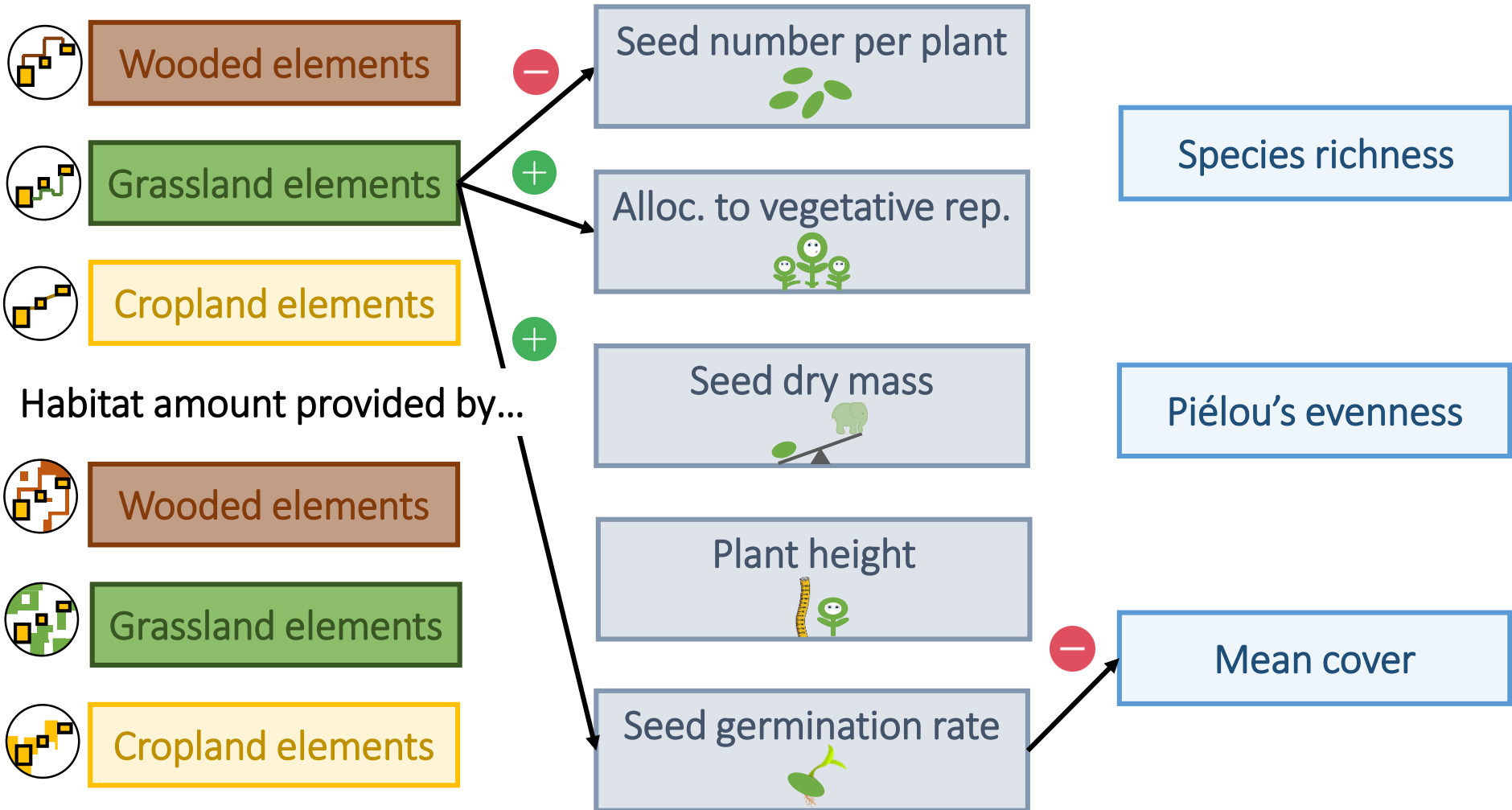
Abundance

- Weed mean cover

Results

■ 750 m

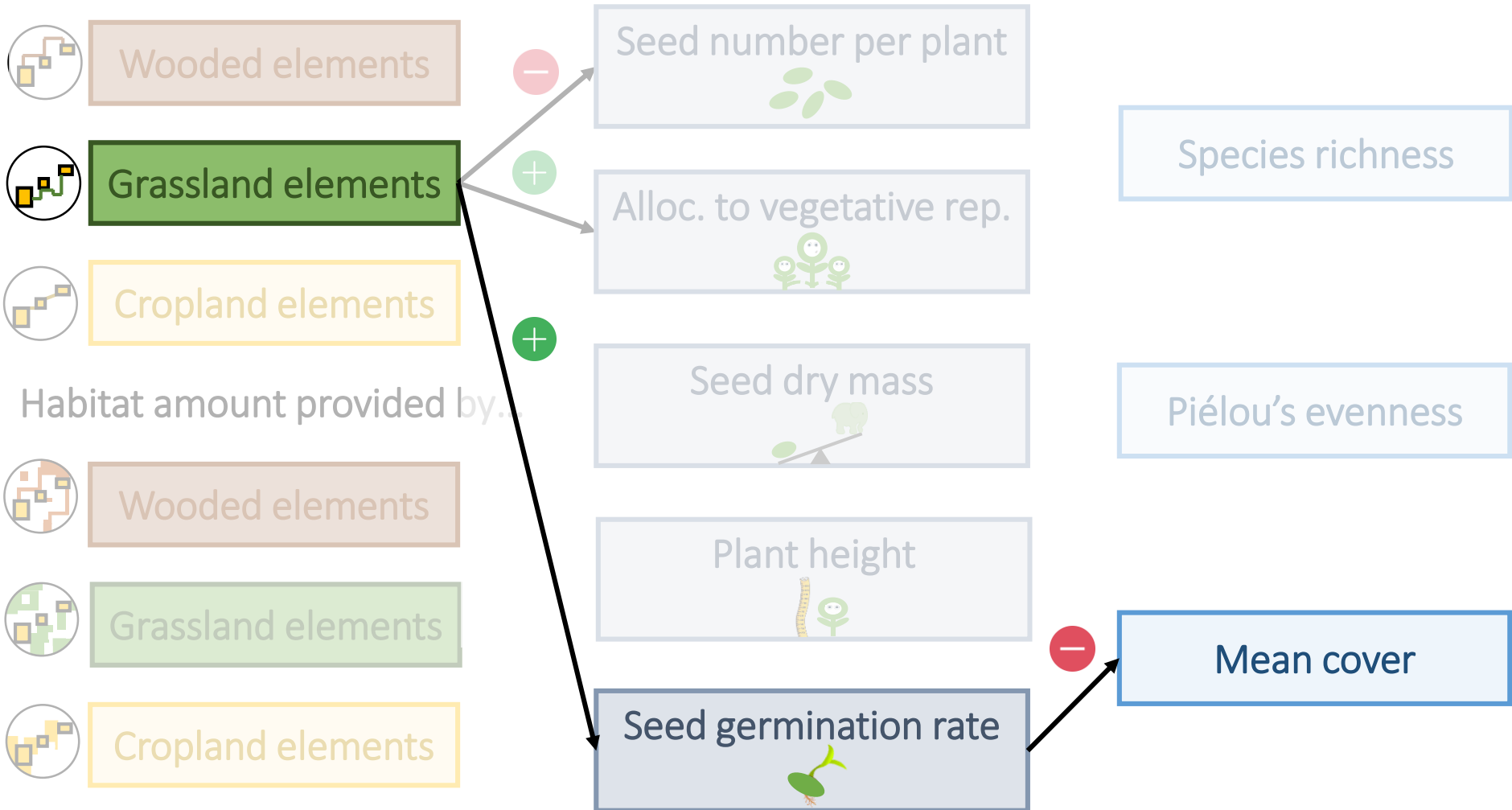
Habitat connectivity provided by...



Results

■ 750 m

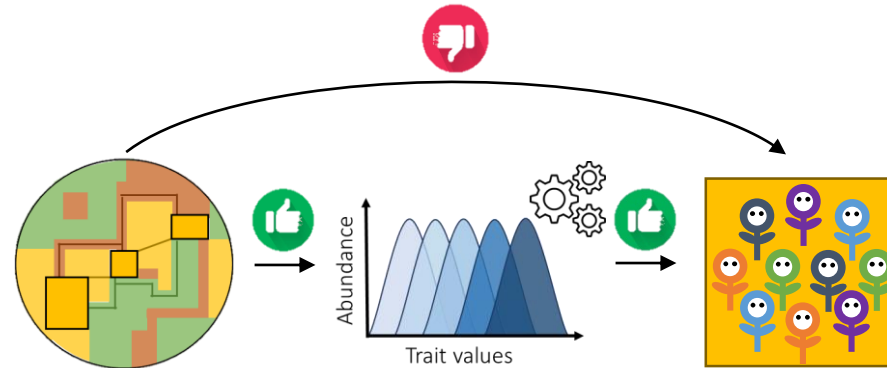
Habitat connectivity provided by...



Discussion

1

The functional approach outweighed the taxonomic one in detecting the effects of landscape factors on weed assemblages



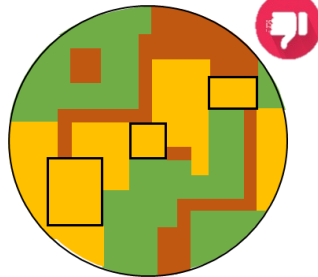
Discussion

1

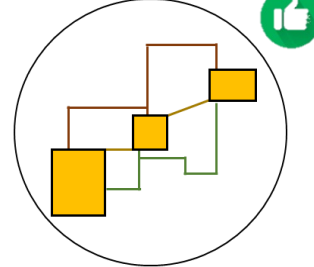
The functional approach outweighed the taxonomic one in detecting the effects of landscape factors on weed assemblages

2

Only habitat connectivity drives the functional structure of weed assemblages



Habitat amount



Habitat connectivity

Discussion

1

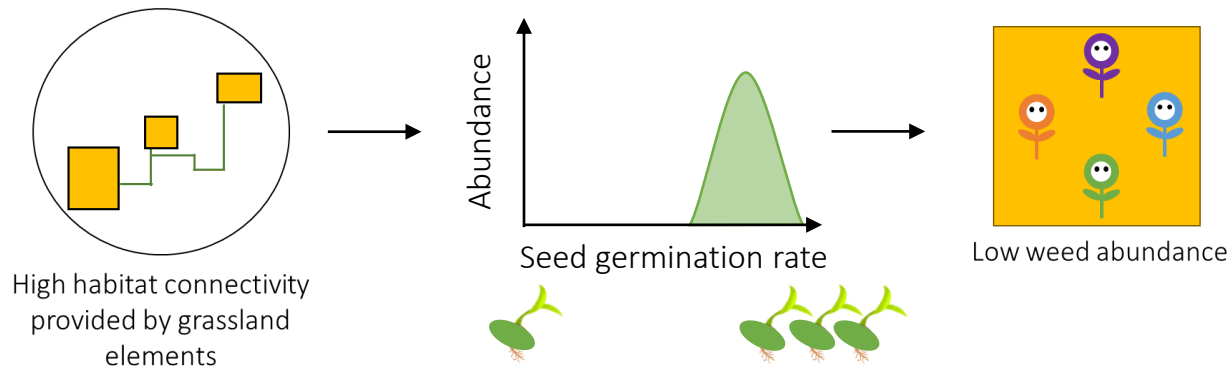
The functional approach outweighed the taxonomic one in detecting the effects of landscape factors on weed assemblages

2

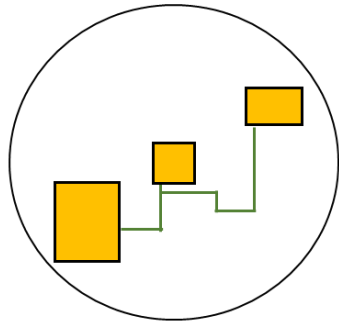
Only habitat connectivity drives the functional structure of weed assemblages

3

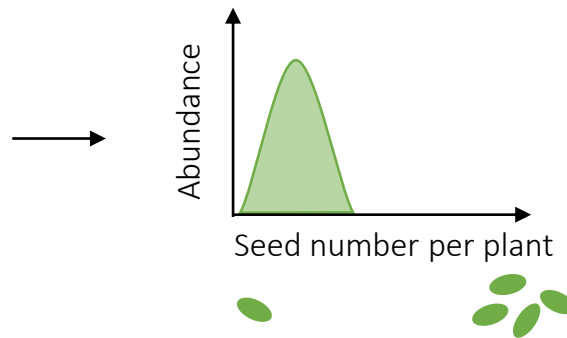
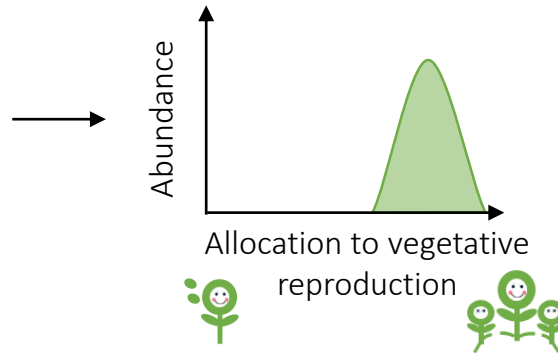
Habitat connectivity provided by grassland elements increased seed germination rate, which, in turn, reduced weed abundance



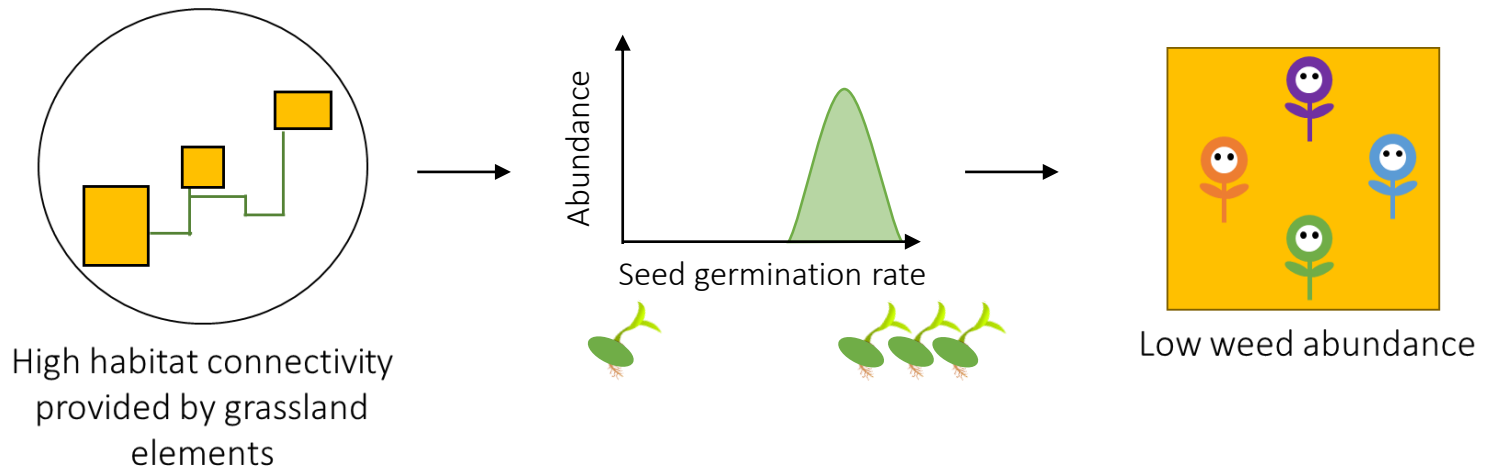
Conclusion



High habitat connectivity
provided by grassland
elements



Conclusion





THANK YOU FOR YOUR ATTENTION