



# Are ladybirds affected by farming practices at different spatial scales?

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# Are ladybirds affected by farming practices at different spatial scales?



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- Rationale**
- organic farming is a promising solution to ensure crop protection thanks to natural enemies
  - the functioning of biological control is not well understood

- What is known**
- overall, there is a positive effect of organic farming but some results are contradictory
  - the dichotomy between organic and conventional farming do not take into account the diversity of practices
  - the effect of farming practices at landscape scales is very little known

**The present study aims at measuring the impact of farming practices types and diversity on ladybirds and aphids in winter wheat, at different spatial scales.**

## 1. Selection of study sites



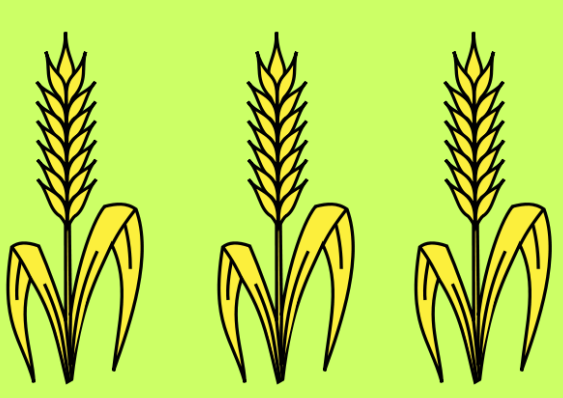
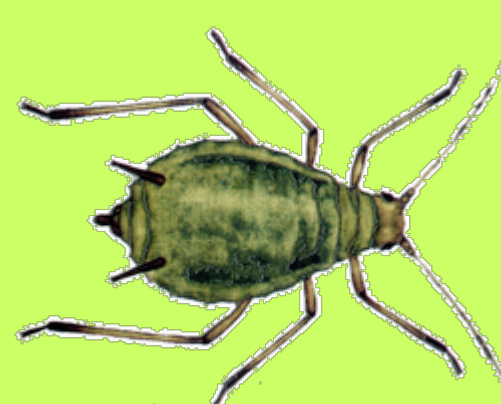
## 2. Insects sampling

### Sweep-netting



→ 4 samples between april and june

### Counts on plants



→ 3 samples between april and july

## 3. Survey of farming practices (interviews)

→ management sequence  
→ crop rotation  
→ previous crop  
→ winter cover  
→ seeding

tillage  
organic fertilization  
mineral fertilization  
pesticides



## Diversity of agricultural practices

1. Correspondence Analysis
2. Extraction of the fields coordinates along the first 3 axis

→ Existence of a diversity within conventional and organic farming

## Local scale: the field

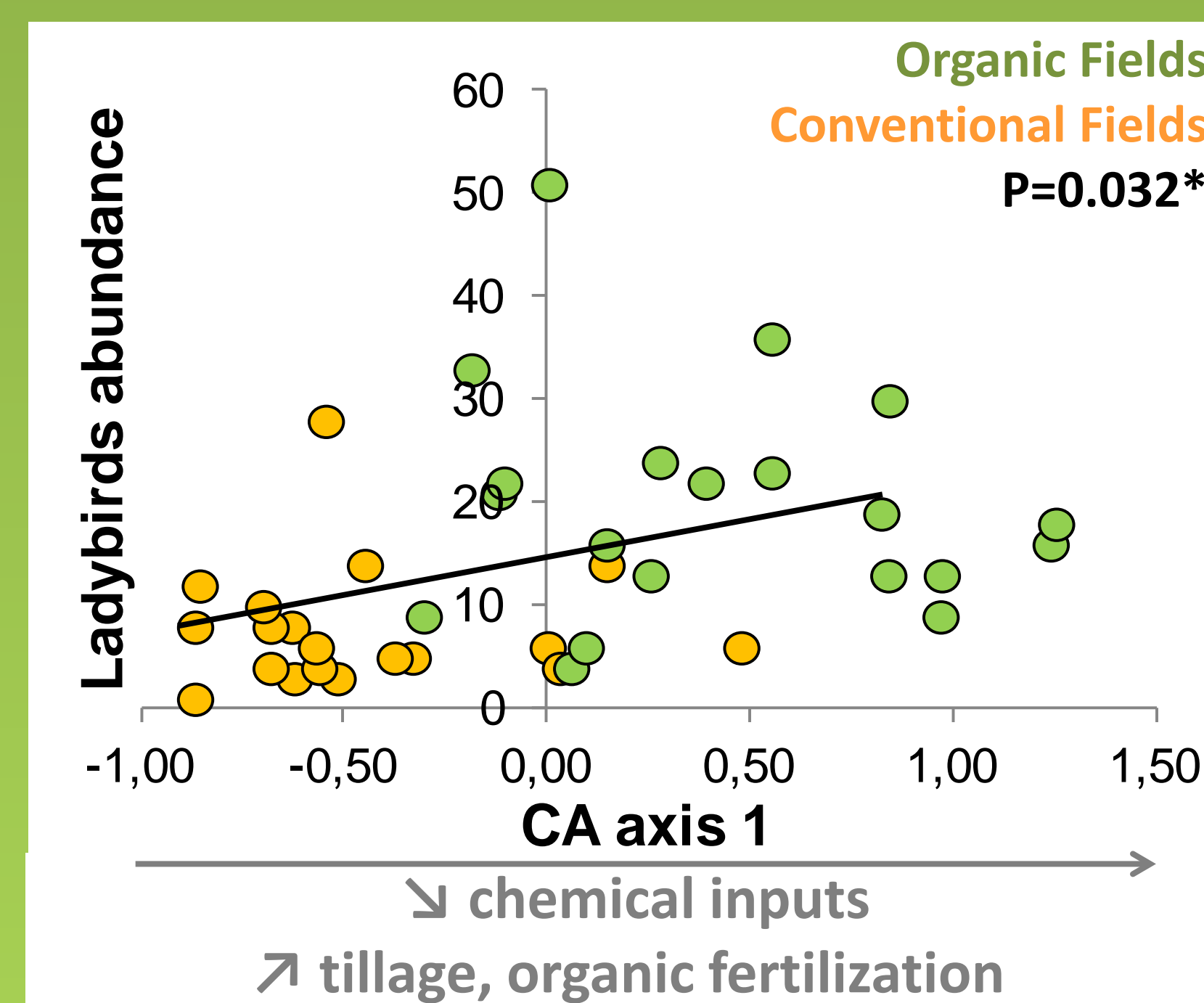
Use of CA coordinates  
Linear modelling

CA axis 1 **P\***  
Correlated with weeds cover

CA axis 2 **NS**

CA axis 3 **NS**

Aphid abundance **NS**



## → Positive effect of practices similar to organic farming

- direct or indirect lethal effect due to chemical inputs
- organic fertilization → improvement of soil structure → favorable microclimate
- weeds → favorable microclimate → feeding source

## → No effect of preys abundance

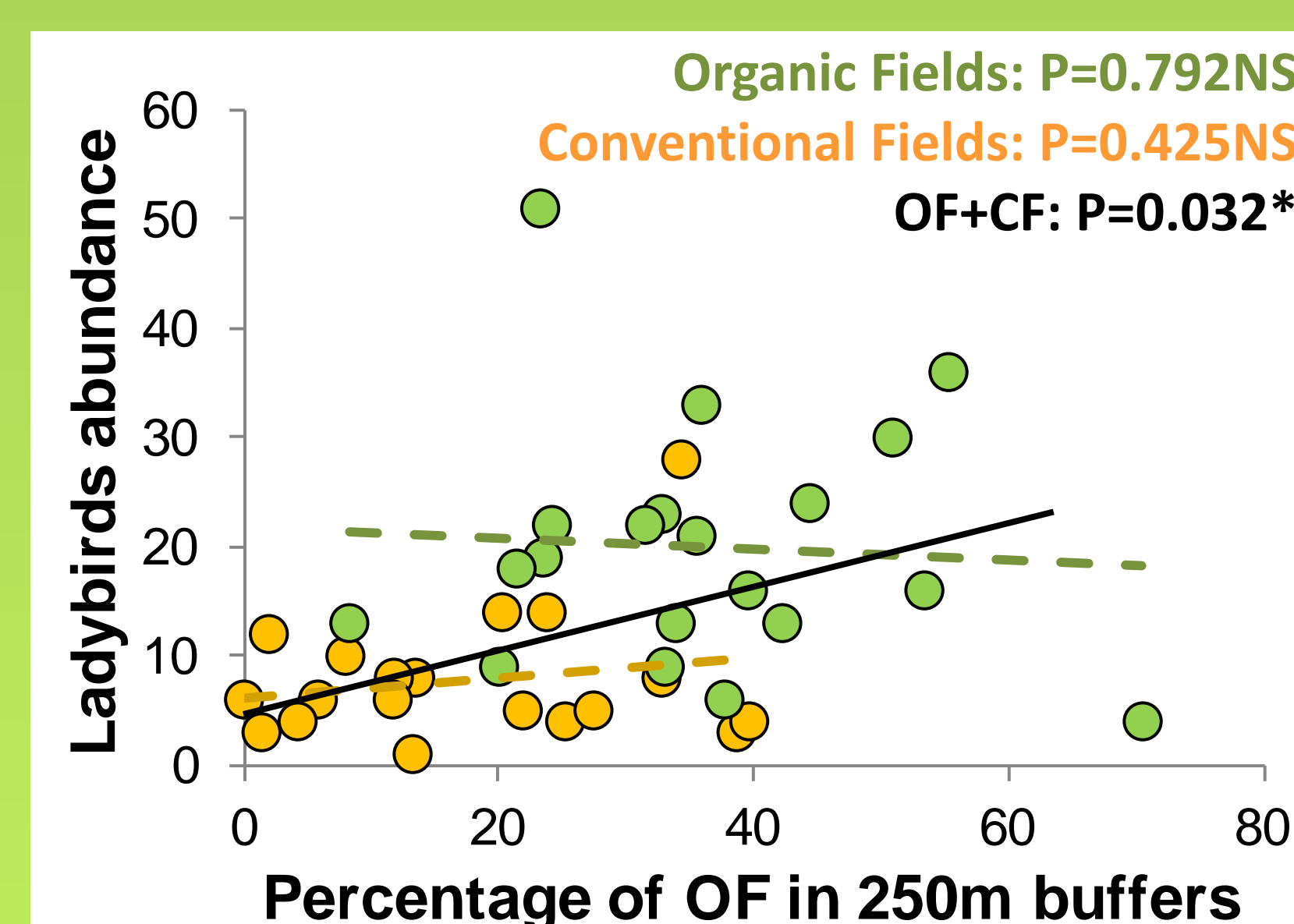
- too few aphids in 2012?

## Landscape scale: 250m and 500m buffers

Linear modelling

% OF areas in 250m buffers **P\***  
Correlated with hedges amount

% OF areas in 500m buffers **NS**  
Correlated with hedges amount



## → Overall positive effect of farming practices at 250m

- drift of pesticides in the environment
- movement of ladybirds in the landscape
- hedges → wintering place, feeding source

## → No effect in organic and conventional fields when considered separately

## → No effect of farming practices at 500m

- ladybirds no more impacted at this scale?
- too few variability in the amount of organic farming?

**Finally, what kind of situations are likely to enhance ladybirds abundance and efficiency?**

- in addition to organic practices, the presence of organic fields in the surrounding landscape seems to be important

**And then?**

- analysis of the diversity of farming practices at the landscape scale
- comparison with other groups of natural enemies (carabid beetles, parasitoids)

