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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

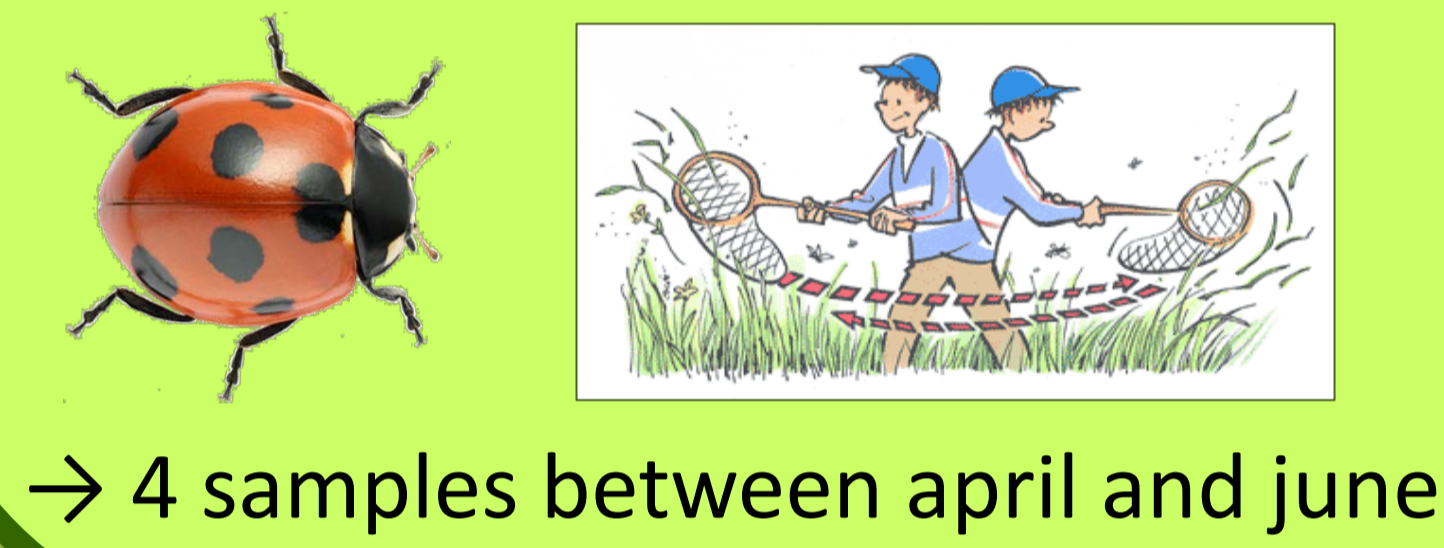
**The present study aims at measuring the impact of farming practices types and diversity on ladybirds and aphids in winter wheat, at different spatial scales.**

## 1. Selection of study sites

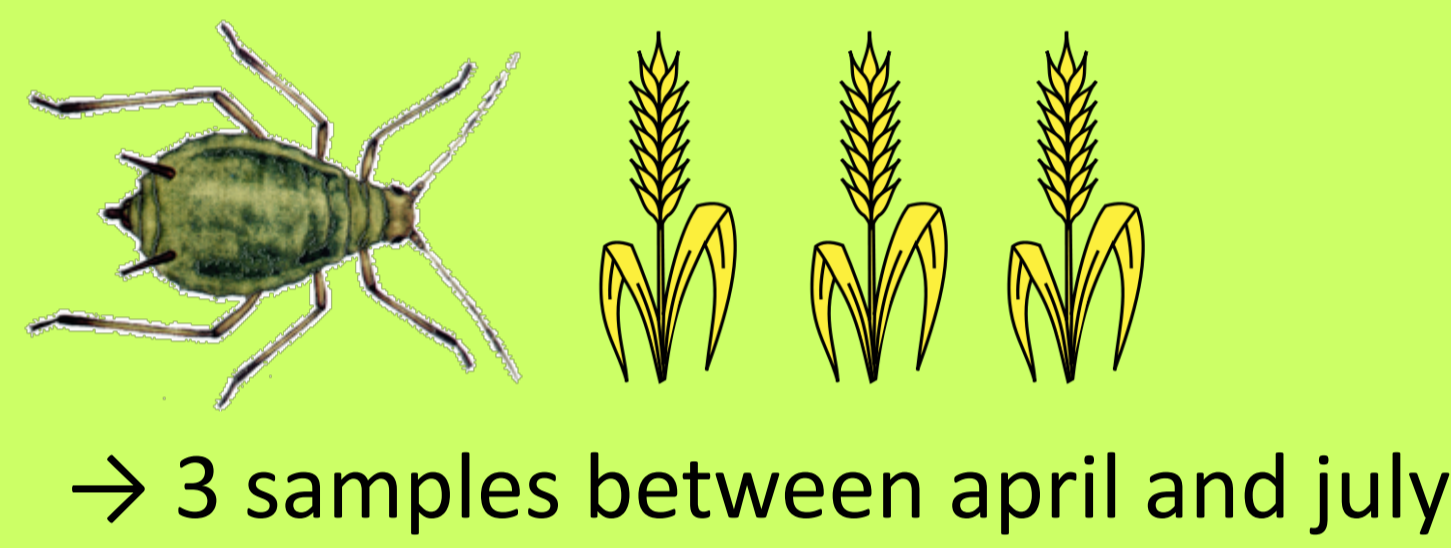


## 2. Insects sampling

### Sweep-netting



### Counts on plants



## 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

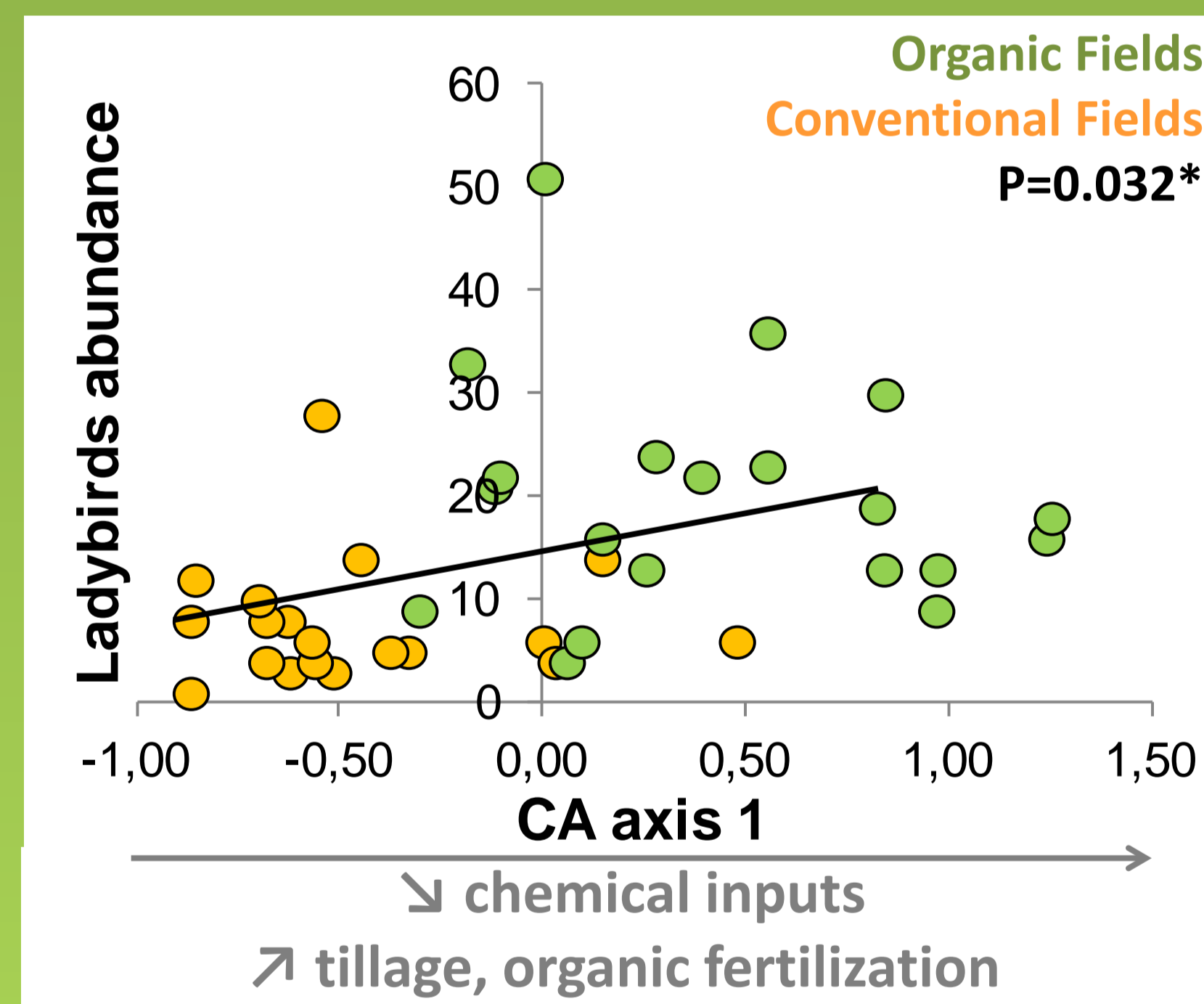
1. Correspondence Analysis
2. Extraction of the fields coordinates along the first 3 axis

→ 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

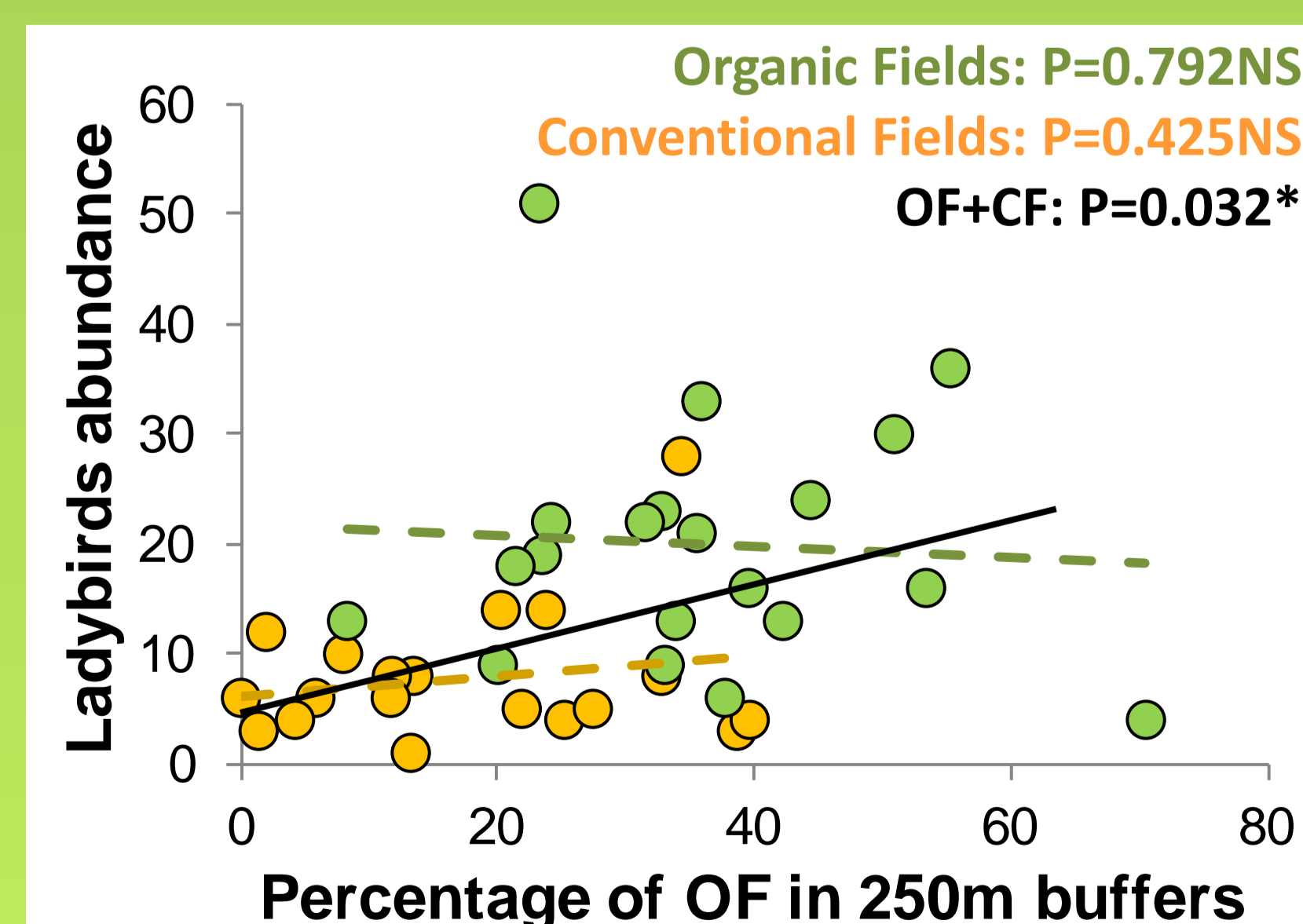
→ No effect of preys abundance

- 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)

