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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

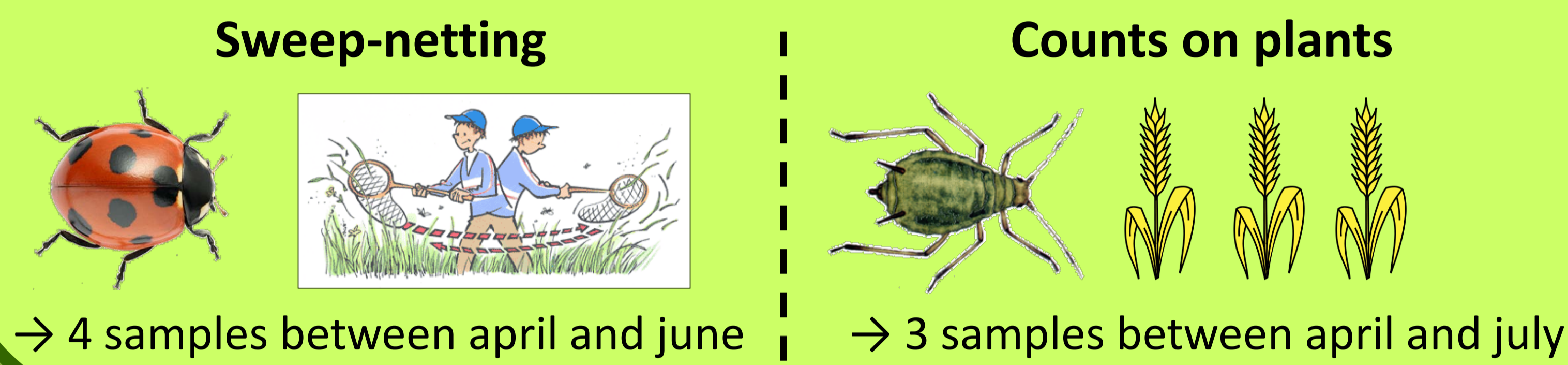
What is known • overall, there is a positive effect of organic farming but some results are contradictory
 • the dichotomy between organic and conventional farming do not take into account the diversity of practices
 • the effect of farming practices at landscape scales is very little known

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



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

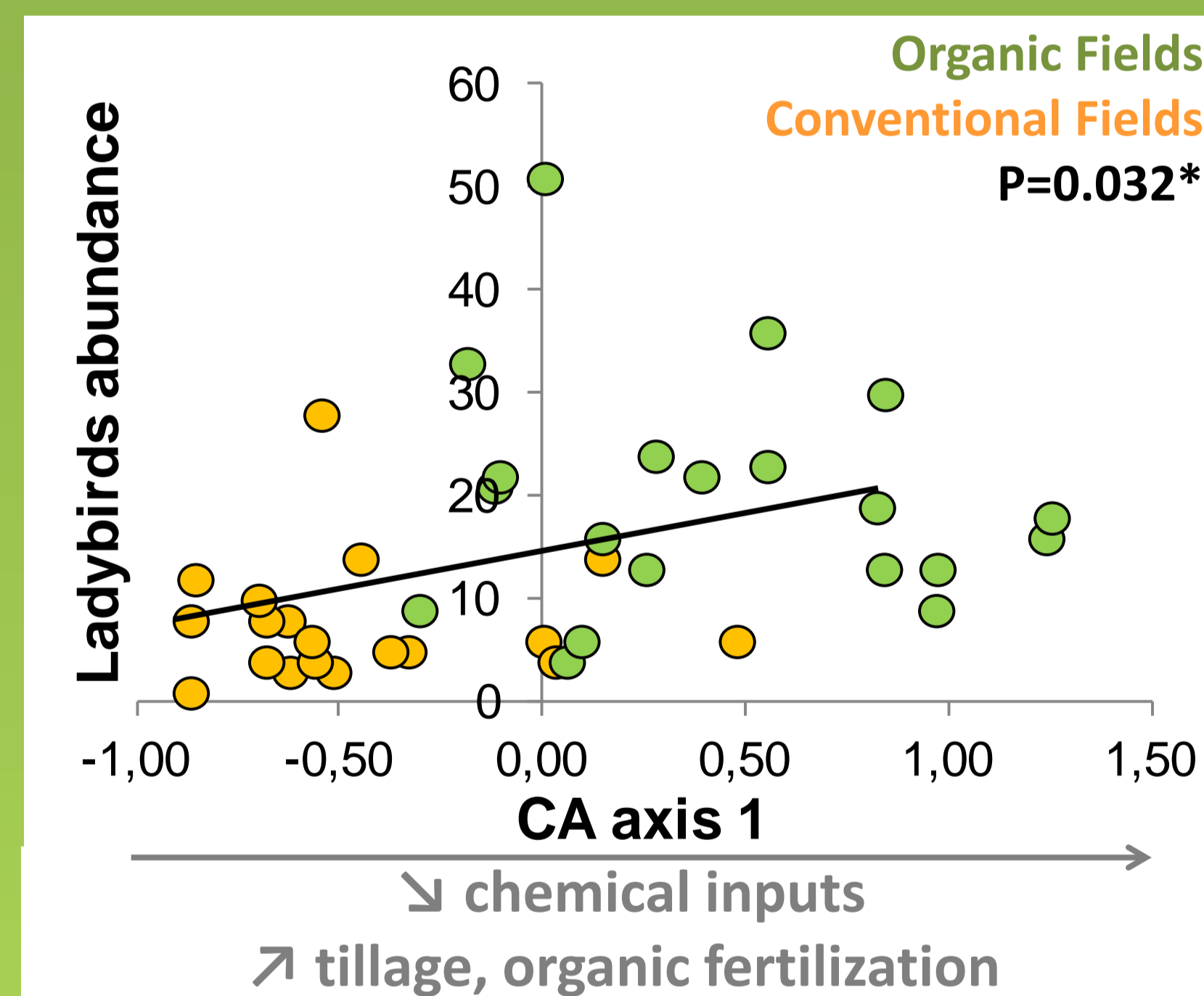
1. Correspondence Analysis
2. Extraction of the fields coordinates along the first 3 axis

→ 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

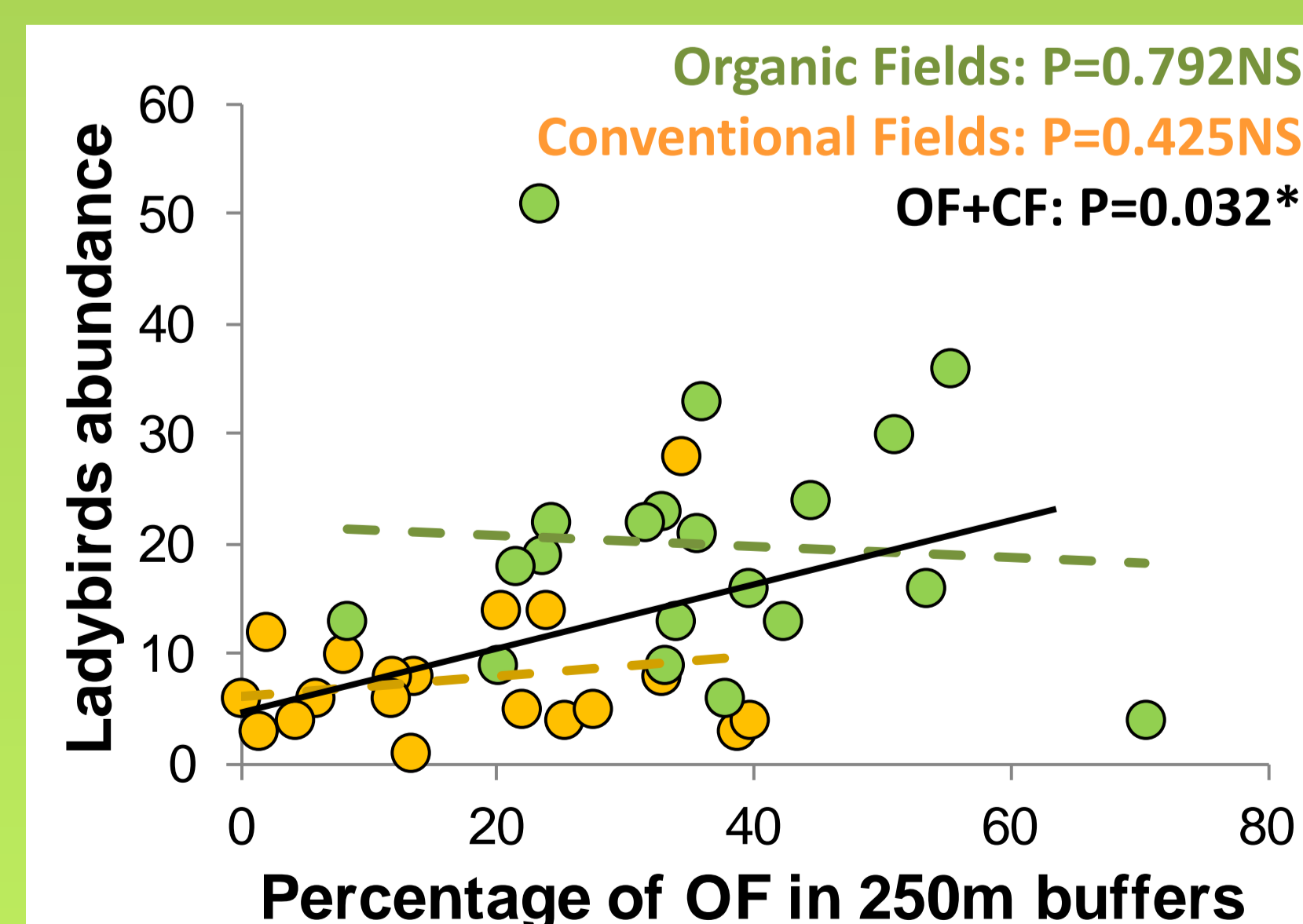
→ No effect of preys abundance

- 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)

