



# Study of trophic networks in agroecosystems: Effects of crop management (organic vs conventional) at the field and landscape scale on trophic interactions and biological control

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## Social-economic context

Agriculture is facing new challenges: to keep or even increase the level of production while minimizing environmental impacts and ensuring a long term sustainability of agriculture.

The optimization of ecosystem services arise as a major action lever for change of current agricultural systems towards highly productive and more environmentally friendly agricultural systems.

These services are directly and / or indirectly related to biological processes involved in the functioning of ecosystems, such as the decomposition of organic matter, pollination or trophic interactions that contribute to biological regulation of pests.

## Scientific context

It is now demonstrated that the farming practices at field scale and the complexity of the landscape strongly influence population dynamics, community assembly and trophic interactions. Furthermore it is known that organic farming promotes abundance and species richness in many taxa at field scale. However, there is no knowledge about the effects of the spatial organization of organic and conventional farming systems at the landscape scale on the functional diversity of natural enemies communities and biological control.

## Objectives

The aim of my research project is to study the effects of spatial and temporal organization of cropping systems (i.e organic and conventional farming) and their proportions in the landscape on:

- Assemblages of natural enemies
- The structure of food webs
- Biological control of pests

## Results

- Our results show that both species richness and density of spiders were significantly higher in AB (organic farming) compared to the AC (conventional farming) which translates into a clear effect of the cultivation system (Fig.1)
- Our study show that the overall abundance of carabid beetles increase in conventional farming with the increase of the percentage of organically managed areas within 500 meters surrounding the conventional plots. This relationship suggests that organic farming play a role of « source » for carabid beetles at the landscape scale. (Fig.2)

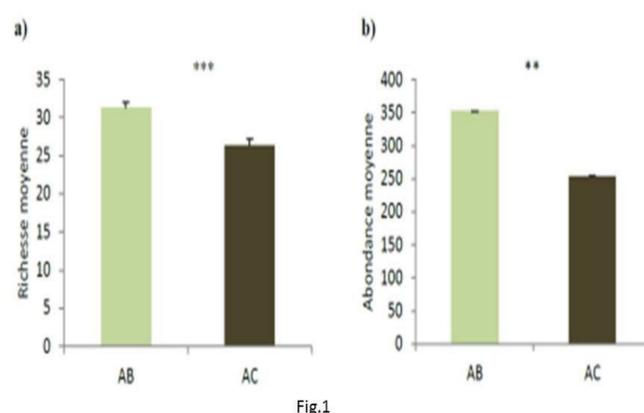


Fig.1

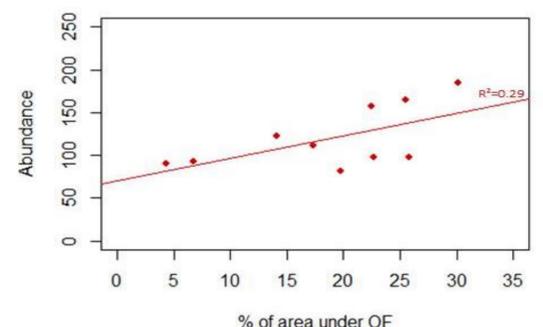


Fig.2

## Perspectives

My research project aims at assessing the best strategies for diversification of cropping systems (organic and conventional farming) across the landscape by optimizing natural pest control services, and this by evaluating:

- (i) the effects of diversification of landscapes on the structure of ancillary communities
- (ii) the relationship between the structure of food webs and biological control level

A dual approach (functional approach and a molecular approach) will be implemented in order to achieve a detailed understanding of the processes determining the natural regulation services.

