

Influence of agroecological management and flower availability

on predators and parasitoids in horticultural farms

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1. Introduction

- The demand for sustainable food production practices in peri-urban areas has driven alternative approaches to conventional agriculture
- Agroecology aims to restore biodiversity and increase ecosystem services, such as pest control provided by predators and parasitoids
- In addition, plant communities in the field margins of farms can support beneficial arthropods by providing additional resources like pollen and nectar

2. Objective

- To evaluate the effects of management (conventional/agroecological), crop and weed cover, and field margin vegetation on the richness and abundance of parasitoid and predator arthropods in horticultural farms from Córdoba, Argentina

3. Methods

- In five conventional and five agroecological farms, we sampled parasitoids within crops (at the edge and interior of the field) and predators in the field margin vegetation with yellow pan traps
- In both crops and field margins, we quantified vegetation cover and flower abundance
- The responses of species richness and abundance were analyzed using Generalized Linear Mixed Models

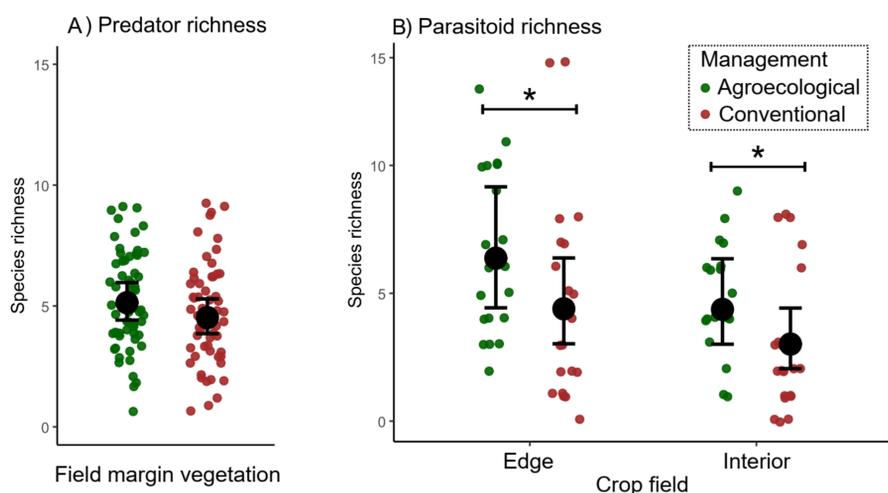


Figure 1 - Effects of management type on (A) Predator richness on field margin vegetation and (B) parasitoid richness at the edge and interior of cultivated fields in horticultural farms in Córdoba, Argentina. Asterisks indicate significant differences between agroecological (green) and conventional (red) managements.

4. Results

- We collected 142 species of parasitoids, dominated by hymenopteran wasps, and 104 species of predators, with crabronid wasps, ladybirds, and jumping spiders as the most diverse groups
- Predator richness at the field margins was unaffected by management type (Fig. 1). In contrast, agroecological farms supported a higher parasitoid richness and abundance than conventional farms, especially at the edges of the crop field.
- Predator abundance was positively linked to the abundance of flowers (Fig. 2A). Parasitoids decreased as crop diversity and cover increased in conventional farms but remained stable in agroecological farms (Fig. 2B).

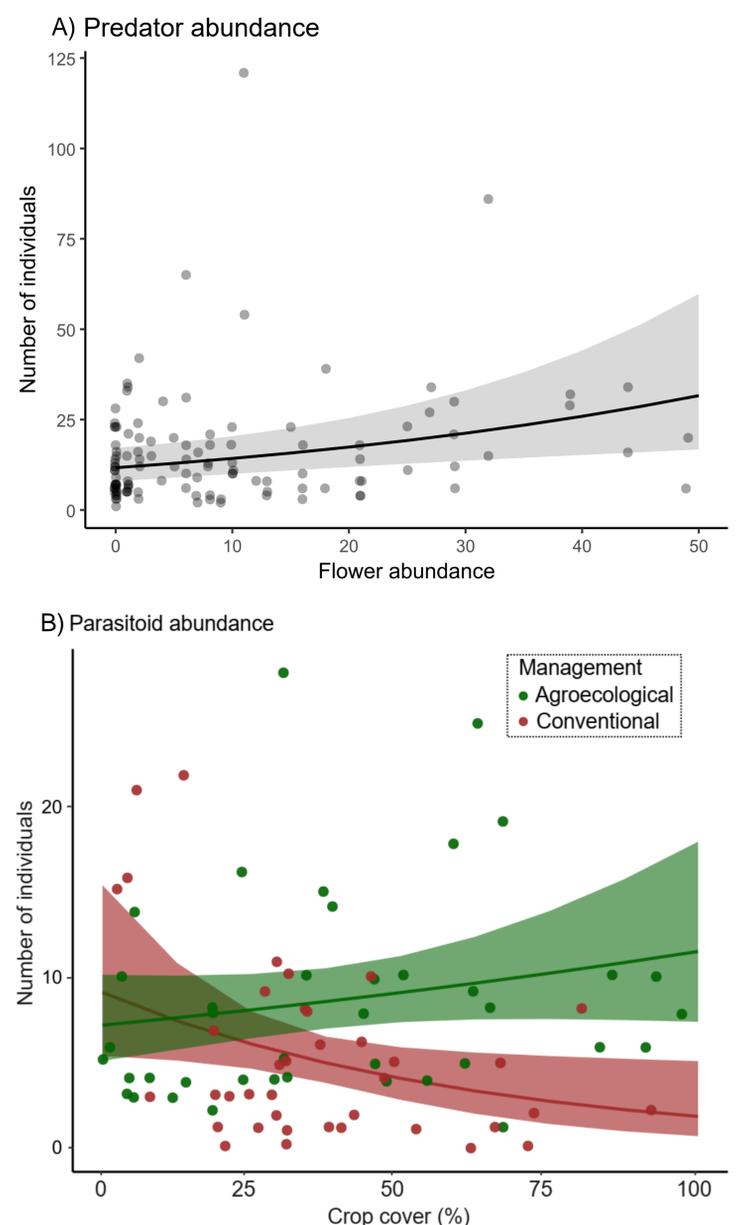


Figure 2 - Effects of flower abundance on predator abundance (A), and of crop cover and management type on parasitoid abundance (B). Lines and colored bands represent model estimates and 95% confidence intervals.

5. Conclusions

- These findings suggest that conventional management, which uses herbicides and insecticides regularly, has deleterious effects on insects within crops, whereas field margins can act as refuges for predators.
- Combining agroecology and active management to provide high flower availability in field margins could support both parasitoids and predators, promoting sustainability and ecosystem services such as biological pest control.