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Influence of agroecological management and flower availability on predators and parasitoids in horticultural farms

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Abstract

The demand for sustainable food production practices in peri-urban areas has driven alternative approaches to conventional agriculture. Agroecology aims to restore biodiversity in agroecosystems and increase ecosystem services, such as pest control provided by predators and parasitoids. On the other hand, maintaining diverse plant communities in the field margins of farms can support these beneficial arthropods by providing additional resources like pollen and nectar. Here, we analysed the effects of management (conventional/agroecological), crop diversity, and field margin vegetation on the richness and abundance of parasitoid and predator arthropods in horticultural farms from Córdoba, Argentina. In five conventional and five agroecological farms, we sampled parasitoids within crops and predators in field margin vegetation with yellow pan traps, and estimated vegetation cover and flower abundance. 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 and long-legged flies as the most abundant. Agroecological farms supported a higher parasitoid richness and abundance than conventional farms, especially at the edges of the crop field. In conventional farms, parasitoids decreased as crop diversity and cover increased. In contrast, predator richness at the field margins was unaffected by management type and vegetation structure. Predator abundance, instead, was positively linked to the abundance of flowers with an open corolla. 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. The combination of 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.

Keywords: Agroecology, Argentina, biological pest control, ecosystem services, insects

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