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# Can carabid beetles be potential predators of the olive fruit fly *Bactrocera oleae*? A lesson from olive orchards and woody semi-natural habitats in Tuscany, Italy.

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## Abstract

Attention towards semi-natural habitats (SNHs) as tools to potentiate conservation biological control is rapidly increasing. However, most studies have focused on annual agroecosystems, and the role of non-crop habitats surrounding perennials remains largely unexplored. We addressed these knowledge gaps presenting the potential contribution of adult carabids (Coleoptera: Carabidae) as natural predators of third instar larvae and pupae of *Bactrocera oleae* (Diptera: Tephritidae). This fly is the most damaging pest of olive orchard, widespread in almost every country where olive trees have been cultivated for commercial purposes. We sampled both olive orchards and adjacent woody SNHs in Tuscany, Italy, from June 2014 to June 2015. We adopted a species-traits approach to offer a wider perspective to our analysis.

We found two main carabid assemblages: the assemblage of olive orchards and the one of woody SNHs, each one defined by a set of features and species-traits. It is the assemblage of olive orchards that has peculiarities that can be exploited for *B. oleae* conservation biological control. In addition, phenological analyses revealed that there is a temporal overlapping between the pest cycle and the activity of predators, as some carabid species are active during the months in which pest pupae are abundant in the top soil.

This may open new scenarios on the role played by carabids in *B. oleae* predation and, more importantly, on possible perspective in conservation biological control in olive orchard agroecosystem.

**Keywords:** Conservation biological control, Carabidae, *Bactrocera oleae*, olive orchard, woody semi natural habitat

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