Differential spatial and temporal crop richness impact on biological control and spillover of natural enemies: a case study on *Harmonia axyridis*

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High plant biodiversity and landscape food provision stability is known to have a positive impact on biocontrol services naturally provided by natural enemies. However, few studies have assessed how differential spatial and temporal crop richness actually impact biocontrol services, and notably how natural enemies may spill-over among crops. Within this framework, using a four-cage maze system under laboratory conditions, we evaluated the effect of a highly diversified crop system and low diversified crop systems, on the predator *Harmonia axyridis* (Pallas) population and predation capacity on aphids.

Assessment of the effect of multi-crop system vs mono-crop system differing in space and time on the predator *Harmonia axyridis* (Pallas) population growth, predation rate and spill-over of the predator.

- The predator laid more eggs (Fig. 2) and had a higher survival rate on the squash low diversified crop system. It showed a similar biocontrol activity on aphids in the tomato and squash low diversity crop systems as well as in the highly diversified one (Fig. 3).
- The spillover of the ladybird was strongest in the squash low diversified crop system and lowest in the cotton one, other systems showing intermediate spillover values (Fig. 4). In the highly diversified crop system, the ladybird presence was always closely related to plant presence.

**Low diversified crop systems (tomato and squash)** as well as highly diversified systems proved to be suitable for the predator development and its biocontrol activity. This suggests that highly diversified systems can counterbalance the impact the low-quality crops (soybean and cotton) on predator population. In addition, the predator was also found in cages lacking plant in highly diversified crop system, as opposed to the low diversified crop systems; hinting the potential impact of the highly diversified crop system on the ladybird dispersal and foraging activity.

**References:**  


**Acknowledgement:** The authors are grateful to P. Bearez and C. Metay for technical support. All the authors were supported by the project EUCLID (H2020-SFS-2014, grant number: 633999).