**Major conclusions from the article**

Dependent variable: APG

* High aphid density at first (max 1105), then decrease. Initially positive APG, then negative or zero over the whole season.
* APG 4 times higher in the absence of all natural enemies than in their presence, on average. Maintained across sampling dates
* The exclusion of birds did not impact APG.
* The combined effects of GD and P were stronger than in isolation.
* APG increased from simple to more complex landscape. But the degree of aphid suppression by natural enemies also increased with landscape complexity.
* In complex landscapes, P reduced APG 2 times more than GD.

Dependent variable: parasitism rate and syrphid fraction

* Parasitism and syrphid were higher in treatments accessible to flying insect. More significant in parasitism rate as only low numbers of syrphid larvae were collected.
* Rates of parasitism and syrphid fraction increased with LC mainly in treatments accessible to flying insects.

APG and syrphid fraction/parasitism rate

* APG growth was strongly negatively correlated with parasitism rate and syrphid fraction, confirming the impact of enemies for reduction of aphid population.
* APG/aphid density did not have a significant effect on yield, but syrphid fraction did.

Management effects:

* APG was not truly affected by the crop type, nor their maturity
* APG affected by management type: higher in plots surrounded by conventional plots at Date 1. No differences subsequently.

Discussion.

* In the absence of NE, APG was higher in complex than in simple. However, aphids were strongly reduced by natural enemies, and this reduction increased with LC.
* Higher APG in complex landscapes was compensated by stronger pest control.

**Explanation**: higher availability of alternative resources and overwintering habitats in seminatural areas 🡪 benefits colonization and reproduction in fields.

Fine mesh cages when enemies were excluded: highest aphid pop growth rate. Could also be due to differences in nitrogen + cages were permeable to colonization.

Other studies find increasing pest control with increasing natural or seminatural habitat (2-5 more control in complex versus simple landscape)

**Enemy contribution**

* Flying insects had stronger impact than ground dwellers, effect increased in complex landscape where overwintering, nesting, food resources are more common than in simple landscape.
* The importance of LC for flying insect effectiveness is confirmed by increased parasitism and syrphid fraction.
* Control by GD increased less with increasing LC, flying insects increased more.

**Explanation**: consistent with the idea that GD (generalist predators) have lower impacts than specialists when prey density is high.

* Birds show no clear contribution to reduce aphids.
* Flying insects were the most effective control in complex landscapes = confirmed by high parasitism and syrphid larvae. However, only syrphid had a positive impact on crop biomass.
* For farmers, it is better when enemies are predators, instead of parasitoids.

**Complementarity effect**

* Complementary effect between flying insects and ground dwellers

**Explanation**: due to density-dependent predation by each guilt, but also to escaping behavior of aphids. Behavior not reported here, but several species of ground dwellers are known to forage by climbing directly onto the plants.

* Lower enemy rates in treatments accessible to birds

**Explanation**: predation by birds of parasitized aphids and syrphids. No clear effects of birds.

Further investigation between the different communities is needed.

**Management effect**

* higher N in plots surrounded by conventional fields => likely to be responsible for higher initial aphid population build up.
* Time lag in the arrival of natural enemies between conventional and organic: more insects needed in conventional. then no differences at subsequent dates.

**Explanation**: Could be caused by the emission of enemy-recruiting volatiles by the plants under attack.

Conclusion:

Complex interactions between enemy guilds and landscape complexity, pest control was always stronger when many different enemies were present, especially in more complex landscapes.

Pest control of GD and flying insects was complementary, but flying insects provided the strongest contribution to aphid pest control.

* Need to identify underlying interaction mechanisms of pest control in larger areas.