

NEWSLETTER

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Release

Dear Readers,

Plant species are associated with many beneficial insect species (e.g., pollinator) or species having a detrimental effect (e.g. pests). The insect-plant interactions and the mechanisms by which insects choose their host plants can help understanding the association patterns observed in nature, which could be “exploited” by organic farming methods. Sometime, the compounds produced by plants, that at a first look do not seem to be useful for the plant, play instead a central role in the insect-plant interactions or can interfere with the interactions of other plants. This is the subject of the research that has been carried out in DOMINO when assessing the effect of the different living mulch species on both beneficial insects and pests. Indeed, it is important to verify whether these plants do not negatively impact on parasitoids or predators.

The current issue of the newsletter is thus presenting some results about the effect of the living mulches on the composition and size of the populations of predatory mites commonly present in Polish apple orchards.

We wish you an interesting reading.

Eligio Malusá and Davide Neri

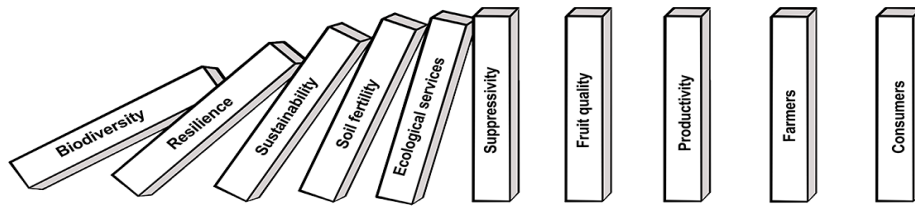
Living mulching species as a possible factor affecting the occurrence of predatory mites on organic apple orchards

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Spider mites and eriophyid mites are among the major pests in apple orchards. Feeding of these pests cause chlorosis of leaves, reduction in photosynthesis, abnormal tree growth and defoliation, thus resulting in decreased yield.

Predatory mites of the family Phytoseiidae (Photo 1) are the most common predators of phytophagous mites. Besides them, predators mites from the family Stigmaeidae (Photo 2) are also present in Polish apple orchards.

Living mulches, i.e. the cultivation of plants on the tree row, can be selected to provide several eco-services, including a support to orchard protection. We have tested within



DOMINO several species that could provide additional income to the farmer (e.g. wild strawberry), that have bioremediation activity (e.g. pumpkin against organic soil pollutants), that can have phytosanitary effect (e.g. marigold against soil pests) or that increase the orchard biodiversity (e.g. mint or Alchemilla toward pollinators). However, we have also evaluated the effect of these species on the abundance of predatory mites from both mentioned families on the leaves of organic apple trees.

The effect of the living mulch was visible for both 2019 and 2020, even though, overall, the number of beneficial mites was higher in the first season than in the second. However, the results were not always consistent. Indeed, mint resulted among the species that favored the presence of predatory mites in 2019, but in the following season this was no more observed. On the other hand, wild strawberry and Pulmonaria resulted to support the presence of the beneficial mites in both seasons.

The reasons for this result could be several. Surely, climatic conditions can affect the impact of the living mulches on the mites, but also the growth pattern of these plants could be another reason. For example, mint was growing more in 2020 than in 2019, so producing also a higher amount of essential oil (which release in air was felt in the orchard!). It is known that essential oils can have some effects on pests, but it is also possible that they could interfere with the beneficial fauna. On the other hand, it is worthy to note that wild strawberry, which was also successful in reducing the growth of weeds, was positively affecting the beneficial mites population.

The seasonal differences involved also the species present in the beneficial mites populations: four species were identified in 2019; (*Typhlodromus pyri*, *Amblyseius (Amblyseius) andersoni*, *Euseius finlandicus* and *Phytoseius echinus*), while only two species were observed in 2020: *Typhlodromus pyri* and *Amblyseius (Amblyseius) andersoni*.

It should also be mentioned that in both seasons, the number of phytophagous mites was very low, which could possible be derived from the activity of the predatory species as well as by a direct effect of the living mulches

The results point to a possible unexpected eco-service for some of the plants used in the trial useful to protect the apple trees from high infestation of parasitic mites. They need to be further verified considering also other agronomical aspects, but open a new opportunity for the exploitation of the agro-ecological approach in the management of organic apple orchards.

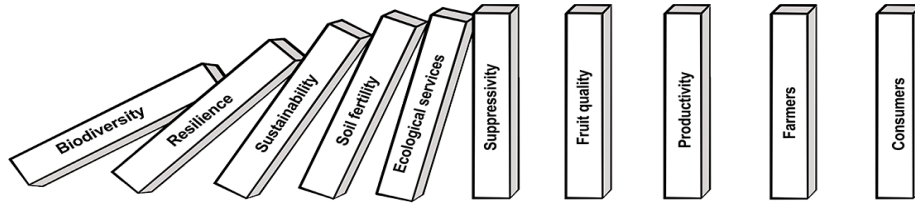
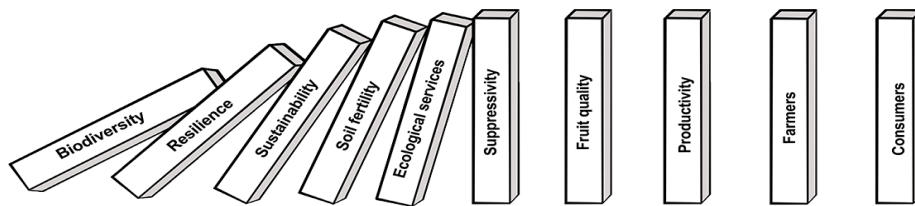


Photo 1. *Typhlodormus pyri* (Phytoseiidae), a species of beneficial mites commonly present in apple orchards



Photo 2. Species of the Stigmaeidae family of beneficial mites are less common, but were found in the trial.

Read more at the CORE Organic website: <http://www.coreorganic.org/>
 find publications from the project at: <http://www.domino-coreorganic.eu/>



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