Control of *Myzus cerasi* in cherry trees by functional biodiversity (using ecosystem services)

Summary

In modern intensive agriculture, the only effective method of controlling some pests has been based on the generic and indiscriminate use of insecticides, which even requires various active substances to be applied simultaneously to control a pest effectively. The vast majority of insecticides (and their waste products) have a persistence that can exceed 21 days, which means that if they are applied when fruit is ripening (which is usually when most insect damage occurs), residues of pesticide may be detected in the fruit. This leads to a loss of quality, and they cannot be sold in more demanding markets with higher sale prices. As a result, action must be taken to solve one of the main problems that affects the fruit sector when marketing their product: the presence of traces of synthetic insecticide residues.

Given the above, the general objective of the project is to **reduce the use of synthetic pesticides in cherry cultivation, and to replace them with a means of pest control based on fostering functional biodiversity**. In agronomy, functional biodiversity is considered to be all insects that act as auxiliary fauna or natural enemies that can control one or more pest insects. This project therefore aims to enhance functional biodiversity by implementing auxiliary crops (plant cover) which benefit humans, and are also known as an ecosystem service.

Objectives

The specific objectives of the project were:

- Determine the capacity and viability of implementing a plant cover system in cherry cultivation.
- Quantify the evolution (yearly and year-on-year) of the ecosystem associated with this plant cover in terms of its auxiliary fauna.
- Confirm the capacity of auxiliary fauna as the main or combined method for controlling *Myzus cerasi* in cherry cultivation compared to the usual pest control method.
- Assess the health and quality and the post-harvest development free of phytosanitary treatments (synthetic pesticides).
- Assess the economic and environmental impact (soil conservation, ecological footprint and water retention, among others) of the use of plant cover compared to the usual pest management measures.
- Transfer the results of the pilot project to the sector and the territory, so that those results can be applied to the cultivation of both cherries and to other crops with similar problems.

Description of the actions carried out in the project

The measures planned in this project are as follows:

I. Analyse the current state of the ecosystem by means of biodiversity indices related to the auxiliary fauna.
II. Implementation of plant cover based on selecting auxiliary crops and implementing them in the main crop.
III. Assess the effect of the auxiliary crop on the cherry crop. Assess the changes in biodiversity in the agroecosystem, the effectiveness of the biological control, the effect on the quality of the fruit, and the economic and environmental impact of the measures taken.

Final results and practical recommendations

- In overall terms, the cover increased the amount of natural enemies and pollinators on cherry farms, with no additional cost in terms of its management, and with no negative effects on the harvest or the quality of the cherry crops.

- Although the results are relatively good, further research is needed to develop a mixture of plants and management of auxiliary crops that is better suited to local conditions.

- Auxiliary cover must be kept in good condition in the long term, as establishing a new balance in the agroecosystem is a slow process which requires patience and persistence, and it may be several years before a sufficient degree of effective control is achieved enabling insecticide treatments to be dispensed with.

Conclusions

The plant cover established itself relatively well, but flowered to a lesser degree than expected. Work must continue to develop a mixture, and in particular, management more suited to local conditions.

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Subject area(s) of application

- ☒ Agricultural production system
- ☒ Agricultural practice
- ☒ Vegetable production and horticulture
- ☒ Biodiversity and environmental management

Geographical area(s) of application

PROVINCE(S): LLEIDA

REGION(S): EL SEGRIÀ

Project website

https://www.grupocatala.com/sostenibilidad/id/

More information on the project

PROJECT DATES	TOTAL BUDGET
Starting date: July 2019	Total budget: €195,318.36
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	Own funding: €55,278.78

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