Cite as: Reinbacher, L., Muller, R., Friedli, M., Boutry, C., Amsler, S., Baumgartner, F., Pfiffner, L., Saussure, S., Lucas-Barbosa, D. (2024). Flower reservoirs in organic stone fruit orchards: Promoting functional biodiversity with a low input strategy. *Proceedings of the 21st International Conference on Organic Fruit-Growing*, Filderstadt 2024.02.19-21. Ed. FOEKO e.V. 2024: 132-133

Short communication

Flower reservoirs in organic stone fruit orchards: Promoting functional biodiversity with a low input strategy

L. Reinbacher, R. Muller, M. Friedli, C. Boutry, S. Amsler, F. Baumgartner, L. Pfiffner, S. Saussure and D. Lucas-Barbosa[1]

Abstract

Promotion of biodiversity has great potential to contribute to organic fruit growing by increasing and facilitating natural pest control. Flower strips are a known management strategy used in orchards and vegetable production and used to provide habitat for beneficial insects increasing biocontrol of pests and pollination of crop plants. However, in organic stone fruit production perennial flowers strips are not as widely implemented because of the logistical challenges (for example additional machinery) and high efforts needed for maintenance of flowers strips. Pest population build up in orchards is facilitated by enclosures and therefore there is a need to promote biocontrol agent's diversity and abundance in orchards as well as pollination. The overall goal of this research project is to test whether flower reservoirs implemented in areas adjacent to the tree rows and in anchoring areas where tractors do not transit can provide similar benefits as those provided by flower strips in the orchard alley, while reducing the logistical challenges and maintenance efforts needed from farmers, and therefore, increasing its acceptance and implementation.

Keywords: Functional biodiversity, stone fruits, biocontrol, pollination

Introduction

Flower strips in orchards are a known management strategy to provide habitat for beneficial insects, increase biocontrol of pests and pollination of crop plants (Campbell et al., 2017; Jacobsen et al., 2019). However, they are not widely implemented (Gilg & Holliger, 2023) because of the logistical challenges and high efforts in maintenance. We want to test if flower reservoirs adjacent to the tree rows provide similar benefits while at the same time increase the acceptance of this management strategy. To prevent some insect pests from entering orchards, physical barriers (i. e. insect nets) can be installed. These barriers may however also prevent beneficial insects from entering and leaving the orchards. Flower reservoirs could provide food sources and habitat inside the insect nets for pollinators and biocontrol agents that depend on floral resources, like hoverflies. Flower reservoirs could increase both biocontrol and pollinator abundance and diversity in these orchards, and could be combined with the release of biocontrol agents when needed.

Material and Methods

Flower reservoirs will be established perpendicular to the tree rows (Figure 1) on commercial organic cherry and apricot orchards. Reservoirs will be implemented in areas adjacent to the tree rows and in anchoring to facilitate traffic and reduce disturbance to beneficial insects. We plan to have three orchards with flower reservoirs and three without flower reservoirs in 2024. In the subsequent two years the goal is to have 12 orchards in total. Assessments will be done from April to September.

[1] Research Institute of Organic Agriculture FiBL, CH-5070 Frick, lara.reinbacher@fibl.org

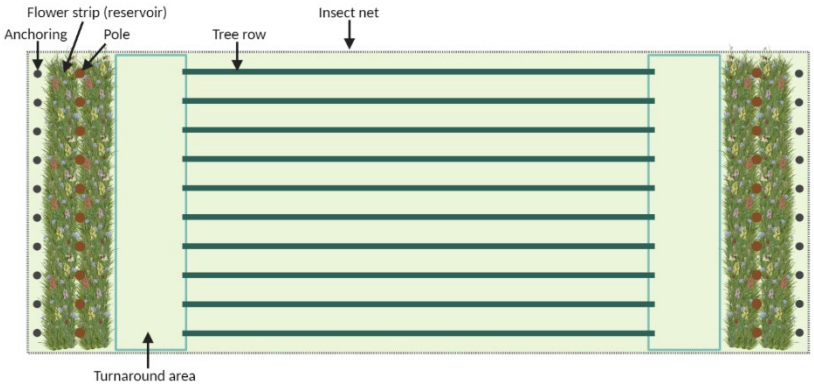

Figure 1: Schematic representation of an orchard in which flower reservoirs are implemented, highlighting key aspects of stone fruit orchard infrastructure.

Specific objectives:

- To optimize and further develop flowering mixtures for use in cherry and apricot production adapted to regional climate conditions
- To monitor the development of the plant species within the flower reservoirs from flowering to fruit harvesting and determine correlation with pollinator visitation frequency and natural control of pests on trees
- To assess whether implementation of flower reservoirs enhance pollinator visitation frequency to flowering trees and provide habitat for pollinating insects
- To test whether the release of biocontrol agents in flower reservoirs early in the season reflects in the establishment of populations in orchards and increased biocontrol of the target pests on the trees

Results and Discussion

We expect our project will contribute to the targeted enrichment of flora and fauna biodiversity in an agroecosystem. The project has a great potential to facilitate acceptance of this management strategy and provide more flexibility in implementation that can be adapted to each orchard. Therefore, we expect that a widespread use of this self-regulating strategy will be encouraged as farmers will benefit from natural pest control and pollination for their trees.

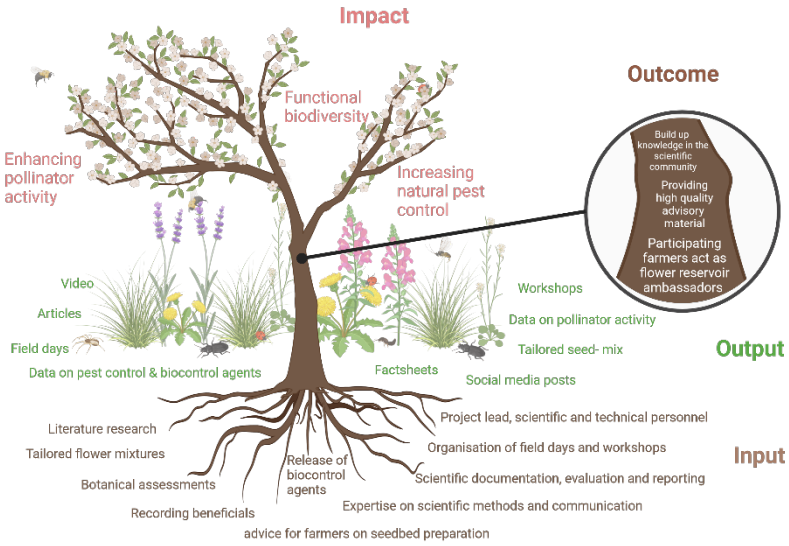

Figure 2: Input, output, outcome and impact of the research and implementation project that aims at promoting functional biodiversity in stone fruit orchards.

References

Campbell, A. J., Wilby, A., Sutton, P., & Wäckers, F. (2017). Getting more power from your flowers: multi-functional flower strips enhance pollinators and pest control agents in apple orchards. *Insects*, *8*(3). https://doi.org/10.3390/insects8030101

Gilg, R., & Holliger, E. (2023). *Nationale Branchenlösung «Nachhaltigkeit Früchte NHF»*.

Jacobsen, S. K., Moraes, G. J., Sorensen, H., & Sigsgaard, L. (2019). Organic cropping practice decreases pest abundance and positively influences predator-prey interactions. *Agriculture Ecosystems & Environment*, *272*, 1–9. https://doi.org/10.1016/j.agee.2018.11.004