

Versatile floral margins for tunnel grown crops

The Challenge

Excess runoff of rainwater from polytunnels can cause localised flooding, soil erosion and silting of water courses. Although rainwater captured from polytunnels can be stored and used to irrigate the crops, it is not always practical to retrofit rainwater harvesting systems to polytunnels. As a result, there might still be runoff risks after periods of heavy rainfall.

In a nutshell

We are testing different floral margins for their ability to improve soil, reduce rainwater runoff from soil, be robust for vehicle travel and provide pest control and pollination ecosystem services to tunnel grown crops.

Recent changes in pesticide approvals have renewed interest in enhancing and increasing wild natural enemies and insect pollinators into crops to provide pest control and pollination.

Study Aims

Based at the [NIAB EMR Water Efficient Technology \(WET\) Centre](#) this study has been testing a range of floral margins for their ability to improve soil, reduce rainwater runoff from soil, be robust for vehicle travel (winter-green), and simultaneously provide ecosystem services (namely pest control and pollination) to tunnel grown crops. The small replicated plots trial four treatments sown adjacent to commercial/demonstration strawberry crops in polytunnels with and without rainwater harvesting systems.

Unsown (control)	Sainfoin	Chicory	Perennial wildflower mix
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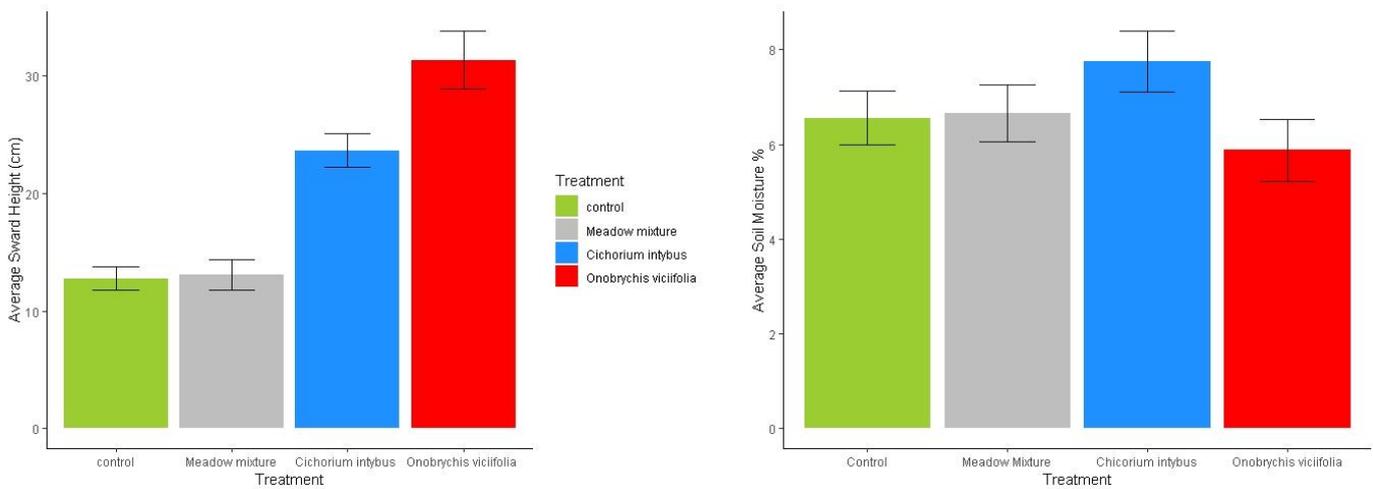
Results

Assessments from 2019 (year one) have established baseline data. A list of principal findings is given below:

- In year one there was no impact of the treatments on soil compaction, soil structure, root depth or water content;
- Chicory and sainfoin plots established well in year one, showing significant impacts within the first year;
- Soil moisture was lower in plots sown with chicory compared to the control and meadow mixture plots;
- Sainfoin attracted more bumblebees (important strawberry pollinators), but potentially more capsids (strawberry pests);
- Chicory (74% soil coverage) and sainfoin (81% soil coverage) plots were dominated by the sown species;
- Flora in the wildflower plots did not look impressive during year one. In year two the plots were well established, providing a variety of flora for natural enemies and pollinating insects;



- Wildflower plots were dominated by annual weed in June 2019. However, by May 2020 the plots were dominated by the sown mix of wildflowers and fine grasses (see photo).



Graphs of (left) average sward height and (right) average soil moisture from Year 1 for each treatment plot at the NIAB EMR Wet Centre.

How to establish a wildflower margin

- Selection of a perennial, ideally native, wildflower seed mix should be driven largely by soil type. Seed companies can give advice on this. Seed mixes should contain a range of native open, legume, and complex flower types with non-competitive grass species as a high percentage of the mix.
- Pollen, nectar and structural resources will provide insect pollinators and natural enemies of fruit pests with habitat and food to increase their numbers local to crops.
- In preparation for sowing, soil should be weed free and have a fine tilth. Once the wildflower seeds are broadcast (not drilled) they should be rolled to help seeds make contact with the soil. Following this, a period of rain, or irrigation, is desirable to encourage germination. Sowing can be done in the autumn or spring.
- In the first year the sward should be regularly cut to 10 cm to encourage establishment and reduce the dominance of annual plants. Perennial wildflowers will flower from year two.
- From year two, in general, one autumn cut is recommended with the option of an additional midsummer higher cut – depending on weather conditions.

Next Steps

The first year of data collection has revealed some interesting findings and has given an idea of future direction. The perennial wildflower mix flowered for the first time in 2020. We will procure funding for further work on floral margins and soil properties to assess drainage. With funding from the Agriculture and Horticulture Development Board (AHDB) and Interreg, we have been monitoring the impact these margins have on beneficial insects including identification of natural enemies and pollinators, but importantly any insect pests that may utilise the different flora. These findings will enable growers to tailor wildflower seed mixes for use adjacent to tunnelled crops. Findings will be provided in separate factsheets.