

3D Farming – Making biodiversity work for the farmer

Objective

To use field margin management to increase biodiversity on farmland and to manipulate beneficial insects so that they may provide effective aphid control.

Introduction

Modern intensive farming is perceived as being the principal cause of declining biodiversity in the countryside.

Recent attempts to reverse this trend involve the promotion of a range of field management options, including the establishment of wildflower and/or grass strips. Increasing the range of plant species in field margins will lead to diversification of the margin fauna, including beneficial insects and spiders.

There is considerable potential to manage such field margins, increasing their biodiversity and to increase simultaneously natural pest control, particularly of aphids.

Integrated Pest Management strategies depend upon successful manipulation of both the target pest and its natural enemies. This assumes an understanding of the spatial distribution of both natural enemies and their prey over time within the field and its margins.

It is important to determine how far into the crop the beneficial effects of field margin management and natural enemy manipulations extend to assess the efficiency of the biocontrol agents.

This project aims to develop field margin management strategies that will allow farmers to promote natural

biodiversity and reduce pesticide use, without jeopardising profitable crop production. It is essential to develop these approaches in a unified way and test them on a commercial field scale.

Approach

At each of four sites, aphid sex pheromones and wild flowers in field margins will be used to manipulate aphid parasitic wasps and hoverflies, respectively. Margins developed to increase biodiversity will be utilised and surveyed botanically.

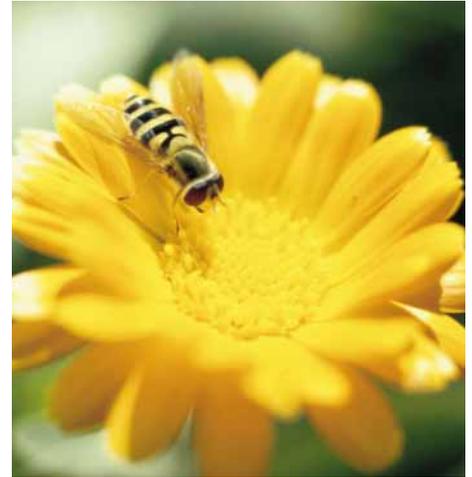
Predators and parasitic wasps will be regularly sampled in these margins, in unmanipulated control margins and at increasing distances into the crop, using a variety of trapping techniques.

Pest aphid populations will be monitored at increasing distances into the crop throughout the season. At a further site an intensive grid sampling scheme will be used to study the spatial and temporal distribution of pest aphids and selected natural enemies across fields of varying sizes and subject to varying crop and margin management practices.

New statistical techniques will be used to analyse this spatial information and identify which factors are the most important predictors of invertebrate distribution and diversity.



- ▶ Parasitic wasps are attracted by aphid sex pheromones.
- ▶ Previous work has shown that synthetic pheromones can be released in field margins to enhance parasitic wasps for aphid control.



- ▶ Hoverflies need nectar/pollen to produce their eggs.
- ▶ Wild flowers in field margins can increase hoverfly numbers and thus reduce aphids.

Results to date

This project started in May 2000 and runs for an initial four years.

Plans for exploitation

Much of the information on field margin management and its effects on biodiversity and pest control will be available for exploitation by the farming industry immediately after the project is completed. By supplying farmers with advice that makes both economic and

environmental sense, the project will encourage more sustainable practices.

Advisors will be able to use the information to explain the principles and promote farmer uptake.

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