

Ecological Innovations provide alternatives to pesticides in fruit and vegetable production

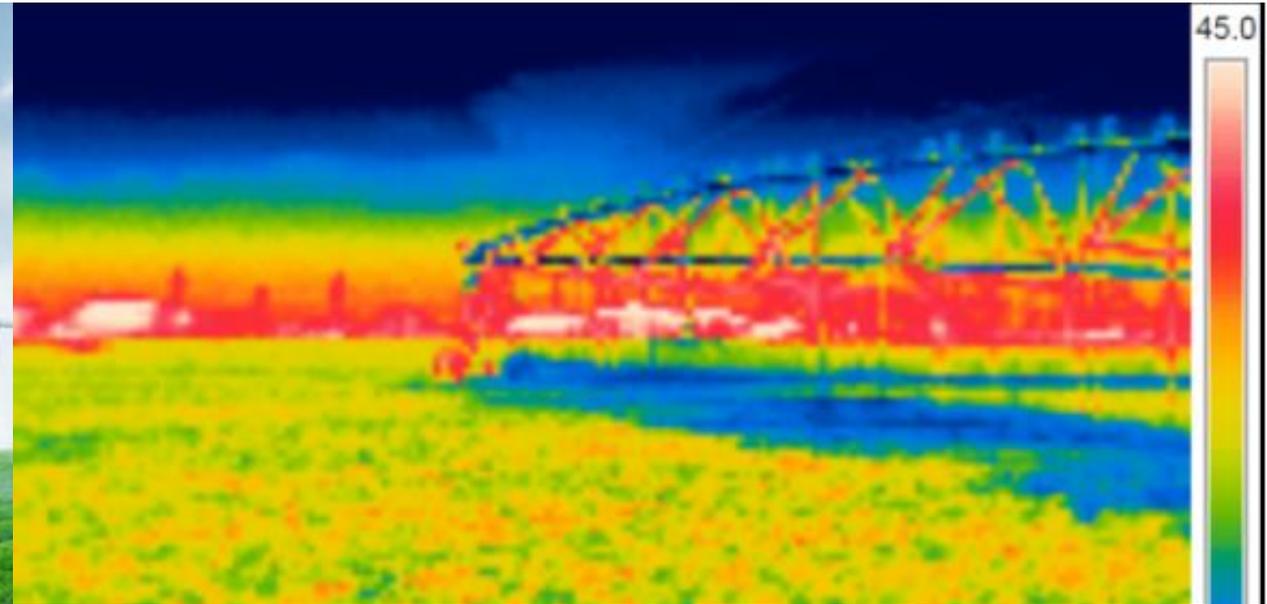
Felix Wäckers

Dir R&D BiobestGroup

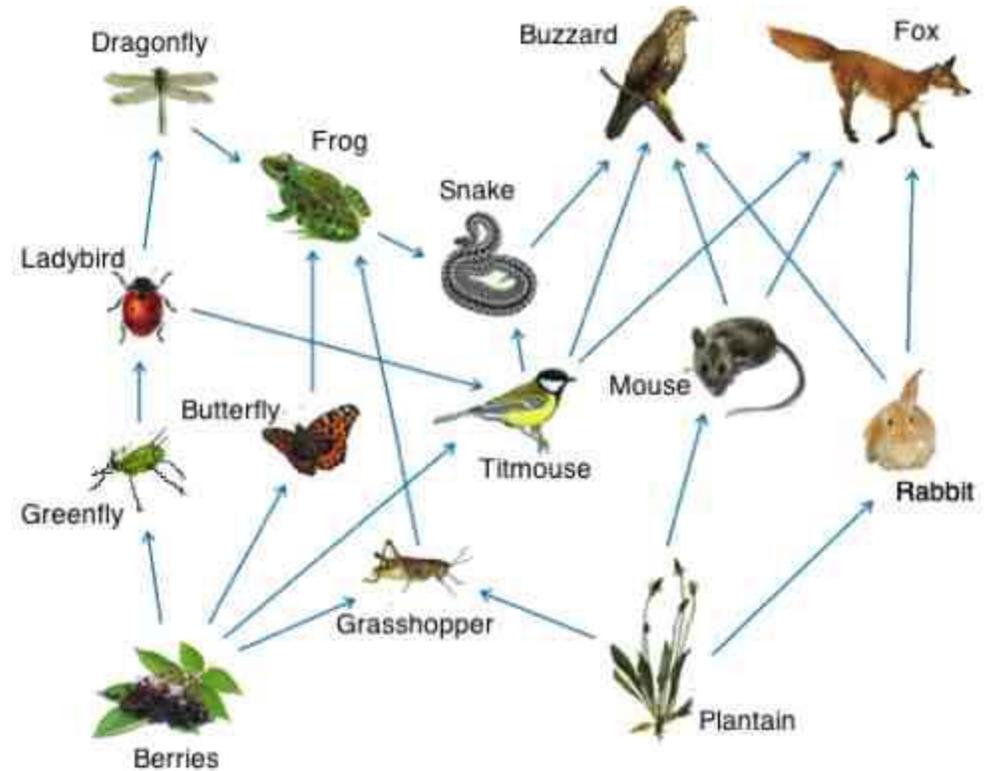
Prof Insect-Plant Interactions, Lancaster University



Innovations in Crop Protection



Ecological Innovations



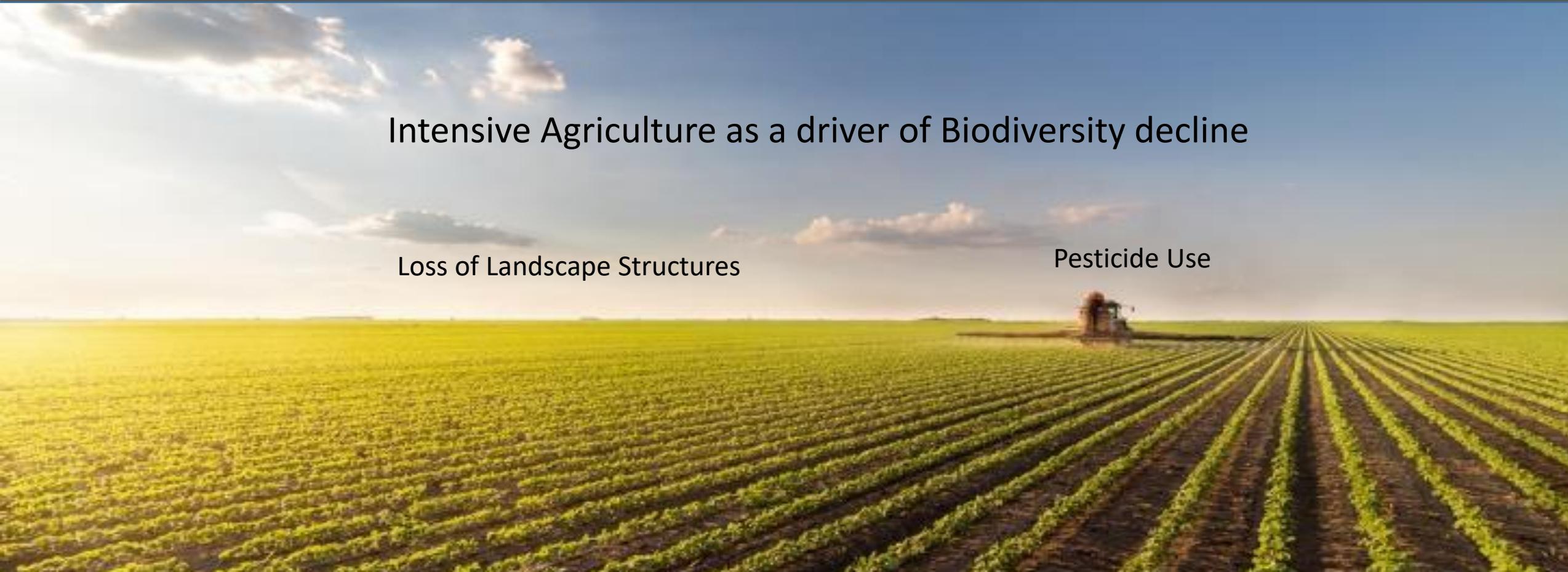
Example 1

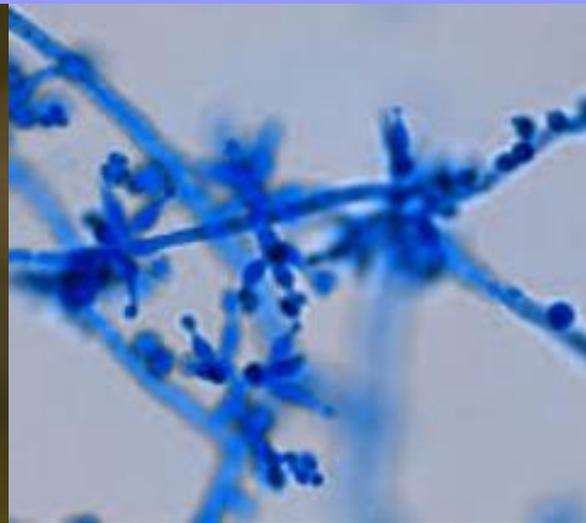
Bringing back biodiversity

Intensive Agriculture as a driver of Biodiversity decline

Loss of Landscape Structures

Pesticide Use





Targeted Flower strips can help

- Support (wild) pollinators
- Provide food and shelter for beneficial insects delivering natural pest control
- Suppress weeds (replace herbicide applications)
- Reduce erosion
- Improve soil quality/nutrients



**Getting More Power from Your Flowers:
Multi-Functional Flower Strips Enhance Pollinators
and Pest Control Agents in Apple Orchards**

Alistair John Campbell ^{1,*} , Andrew Wilby ², Peter Sutton ³ and Felix Wäckers ^{2,4}

Our largescale projects in the Netherlands, Belgium, UK, Switzerland and Germany have shown that informed use of Functional AgroBiodiversity (FAB) on farms

- **Increases biodiversity**
- **Can reduce pesticide use by 90 %**
- **Can increase yields by 10-30%**

FAB thus supports productive farming while contributing to key conservation and policy objectives



Example 2

Turning ant from foes to friends



BIO KILL™

micro-fast

**BREEDWERKEND INSECTICIDE
INSECTICIDE A LARGE SPECTRE**



- ▶ **TEGEN MIEREN**
- ▶ 2 werkzame stoffen
- ▶ Snelle start- en extra lange nawerking
- ▶ Goed zonlicht bestendig

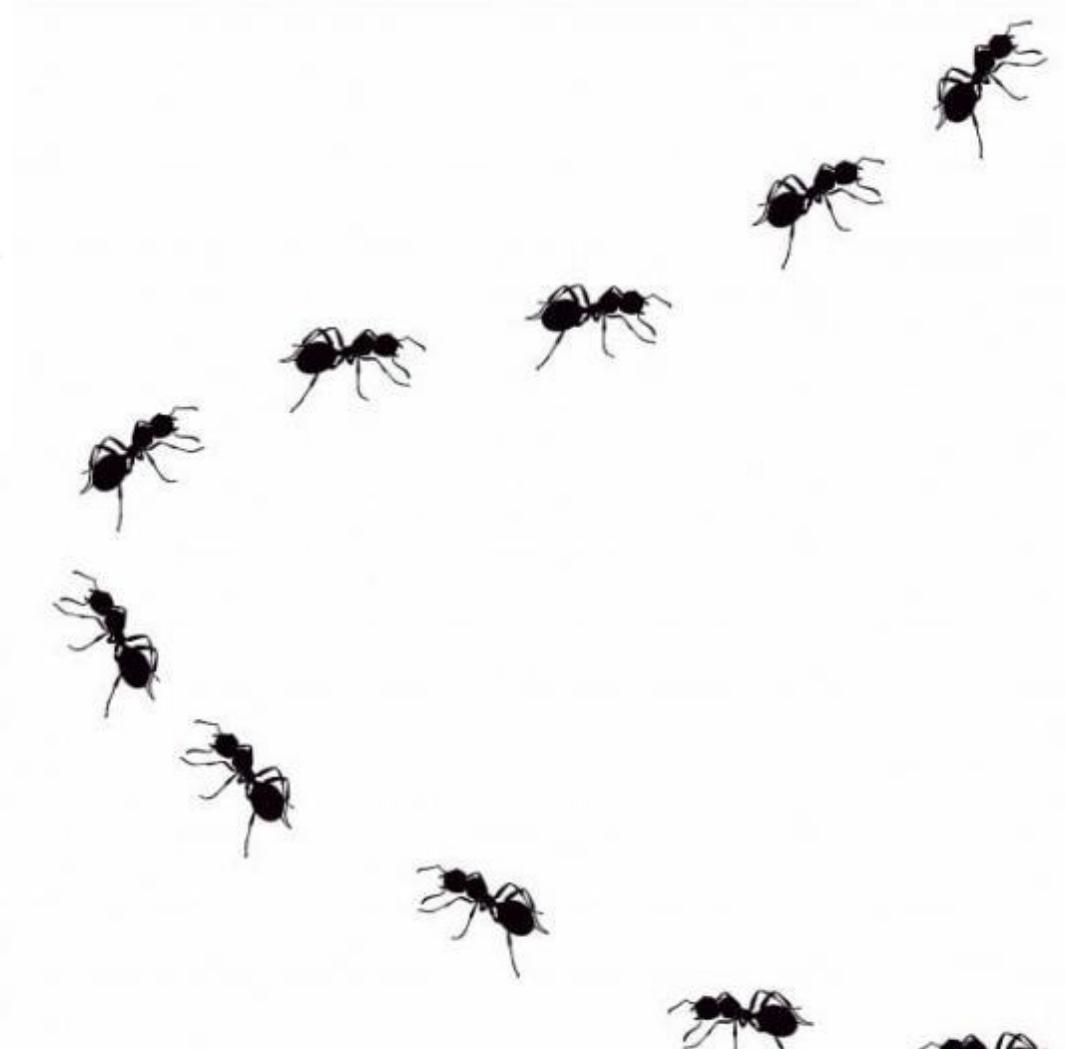
- ▶ **CONTRE FOURMIS**
- ▶ 2 matières actives
- ▶ Effet choc et longue rémanence
- ▶ Résiste bien aux rayons solaires



Ants as bodyguards



Ant Distraction



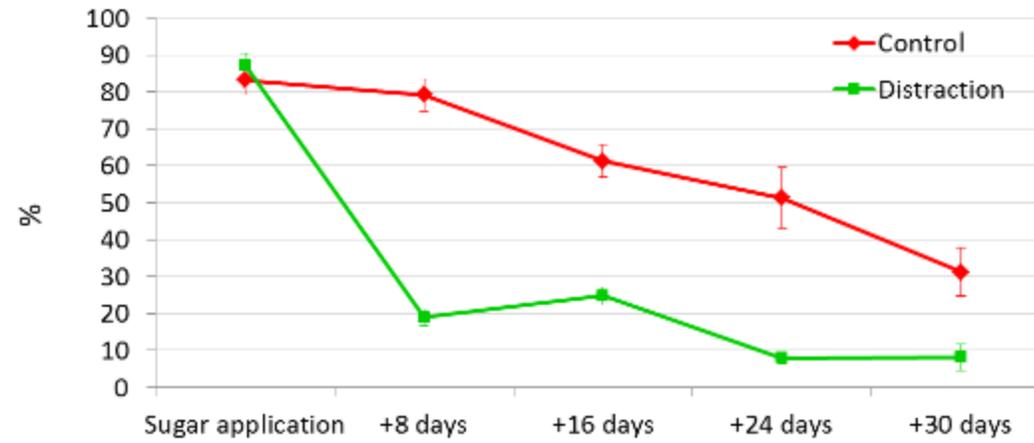
Ant Distraction



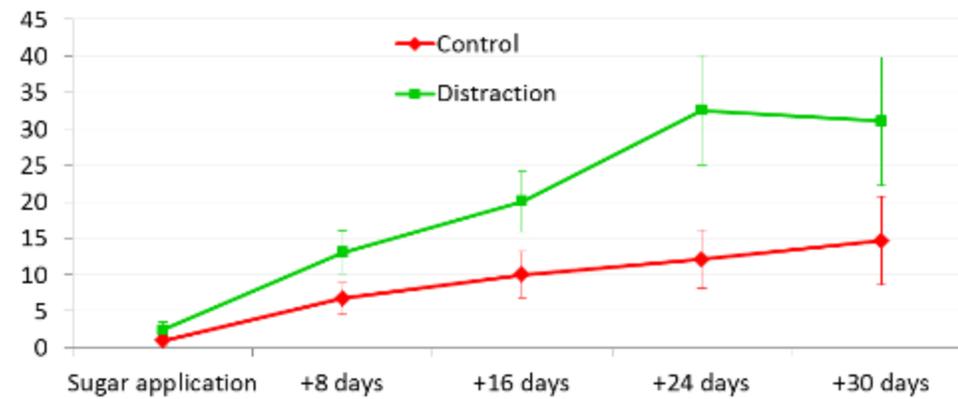


Citrus Trials 2015

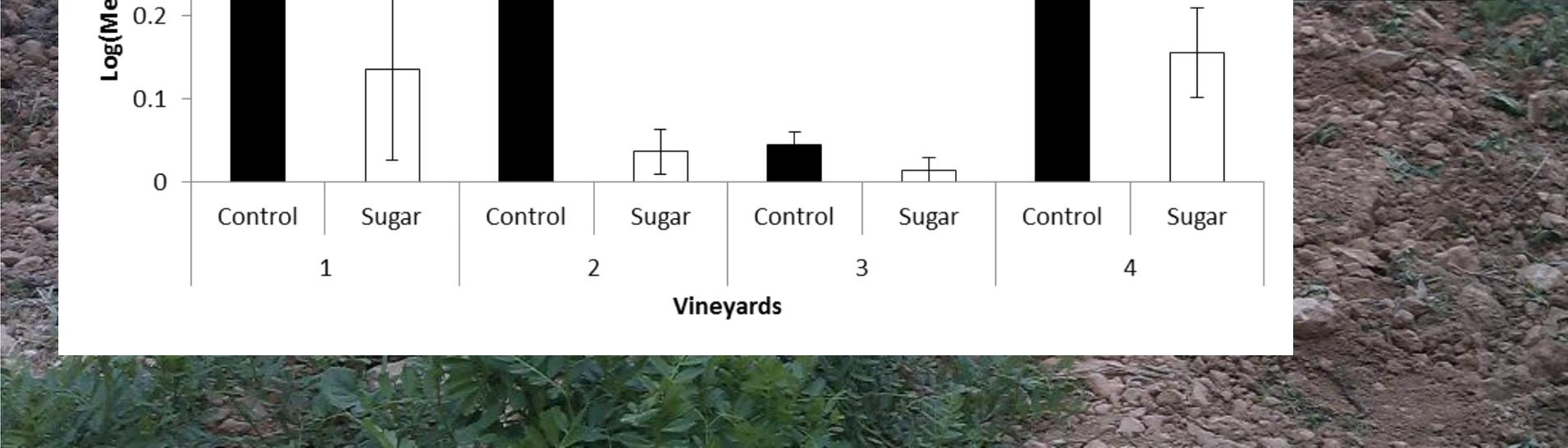
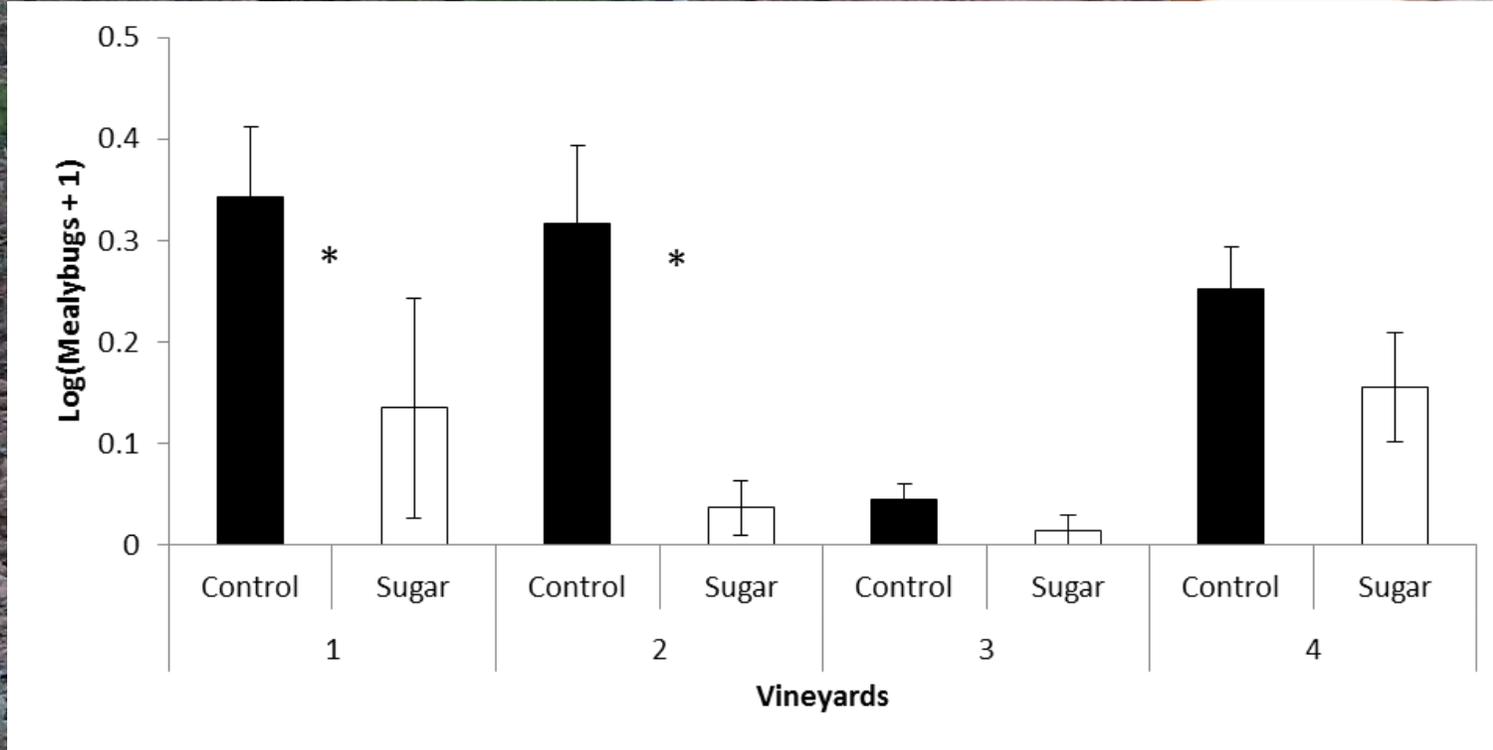
% mealybug colonies occupied by ants



% parasitized mealybugs per colony



Ant distraction in vineyards (mealybugs)



Rosy Apple Aphid

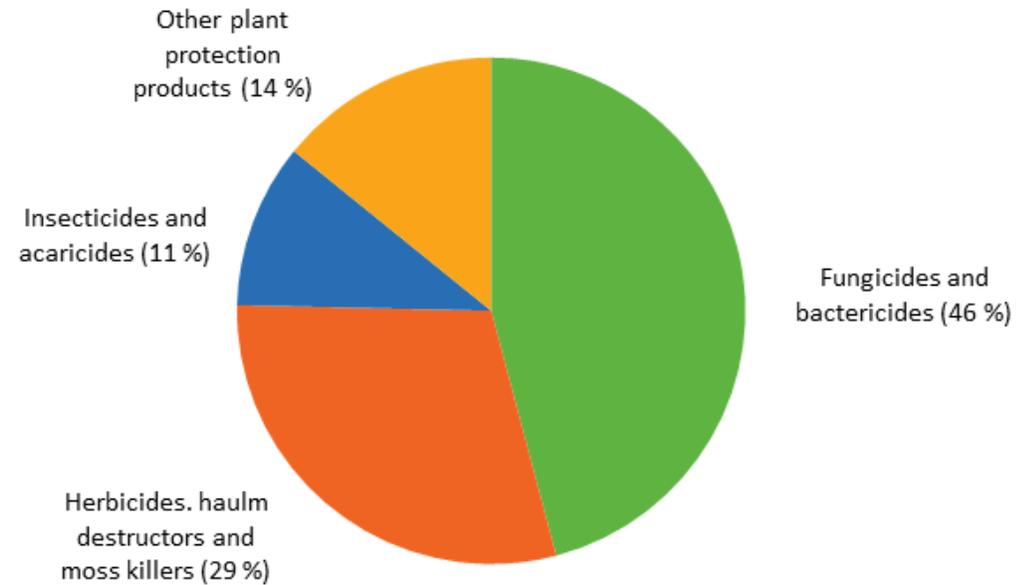


Example 3

Disease Control



Pesticide sales by category, 2016
% of total volume in kilograms



Note: Figures are based on data received from 20 EU Member States

Mites instead of fungicides?



Pronematus ubiquitus (Pu)

Biologicals used in disease control

Bacteria

Bacillus (Serenade, Sonata)
Pseudomonas
Streptomyces

Fungi

Ampelomyces (AQ 10)
Trichoderma
Clonostachys

Viruses

Bacteriophagen

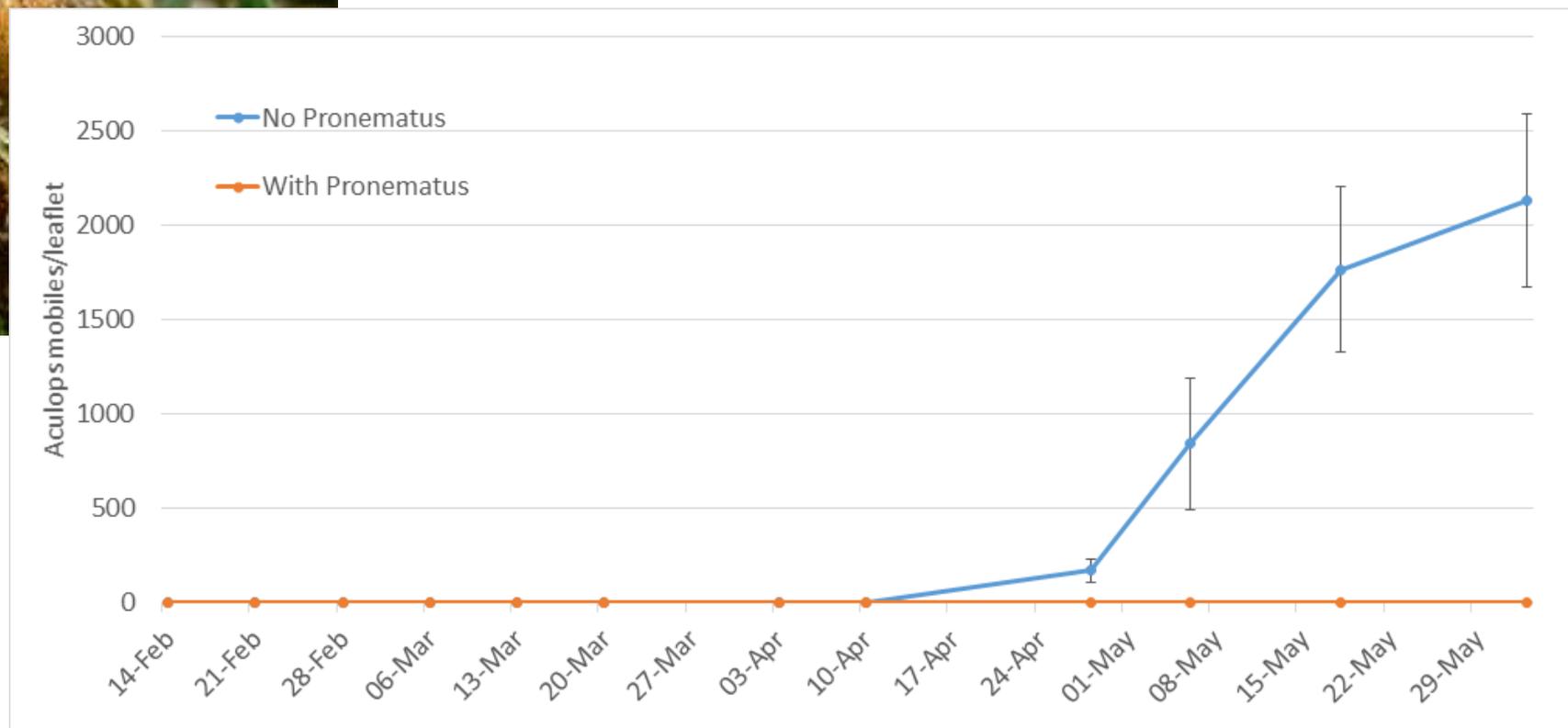
Pronematus: not just any mite



Unique characteristics:

- Size
- Omnivore. Can feed on
 - Small pests
 - pollen
 - fungi
 - Plant sap
- Can be used preventatively
- Large populations





UNTREATED

P. ubiquitus



Grapes

Grape Phylloxera, *Daktulosphaira vitifoliae* ?



Alternatives to pesticides?

Thank You

It's in our nature!

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