

# The Use of new and novel Biocontrol agents for Berry pests

**Michael Gaffney**

Horticulture Development Department,  
Kinsealy, Dublin 17

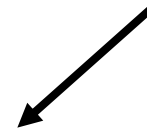
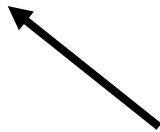
[Michael.Gaffney@teagasc.ie](mailto:Michael.Gaffney@teagasc.ie)

Mobile: 0871205840

# Overview of Insect Pest Control

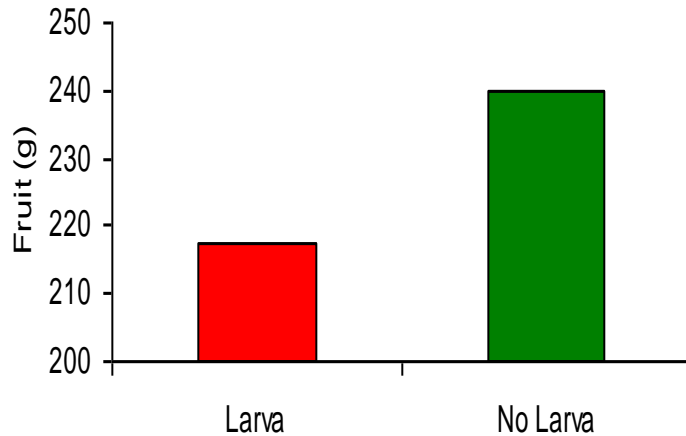
- Estimated that 50% of PPP's registered in EU by 2020 will be Biocontrol Agents
- The proposed 'Sustainable Use of Pesticides Directive' may restrict the use of some pesticides – Worker Re-entry
- Current available biocontrol products are increasingly effective

# Black Vine Weevil



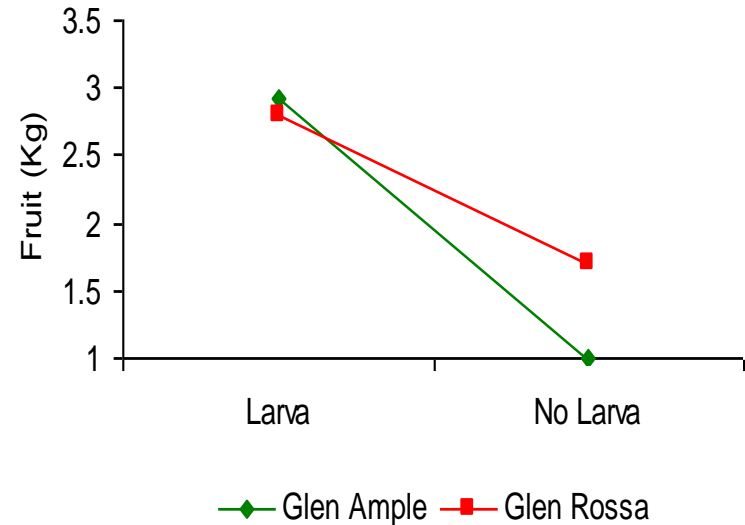
# What is the Damage?

## Strawberry



*Effect of 5 Larva per plant =  
21g decrease in Fruit per plant*

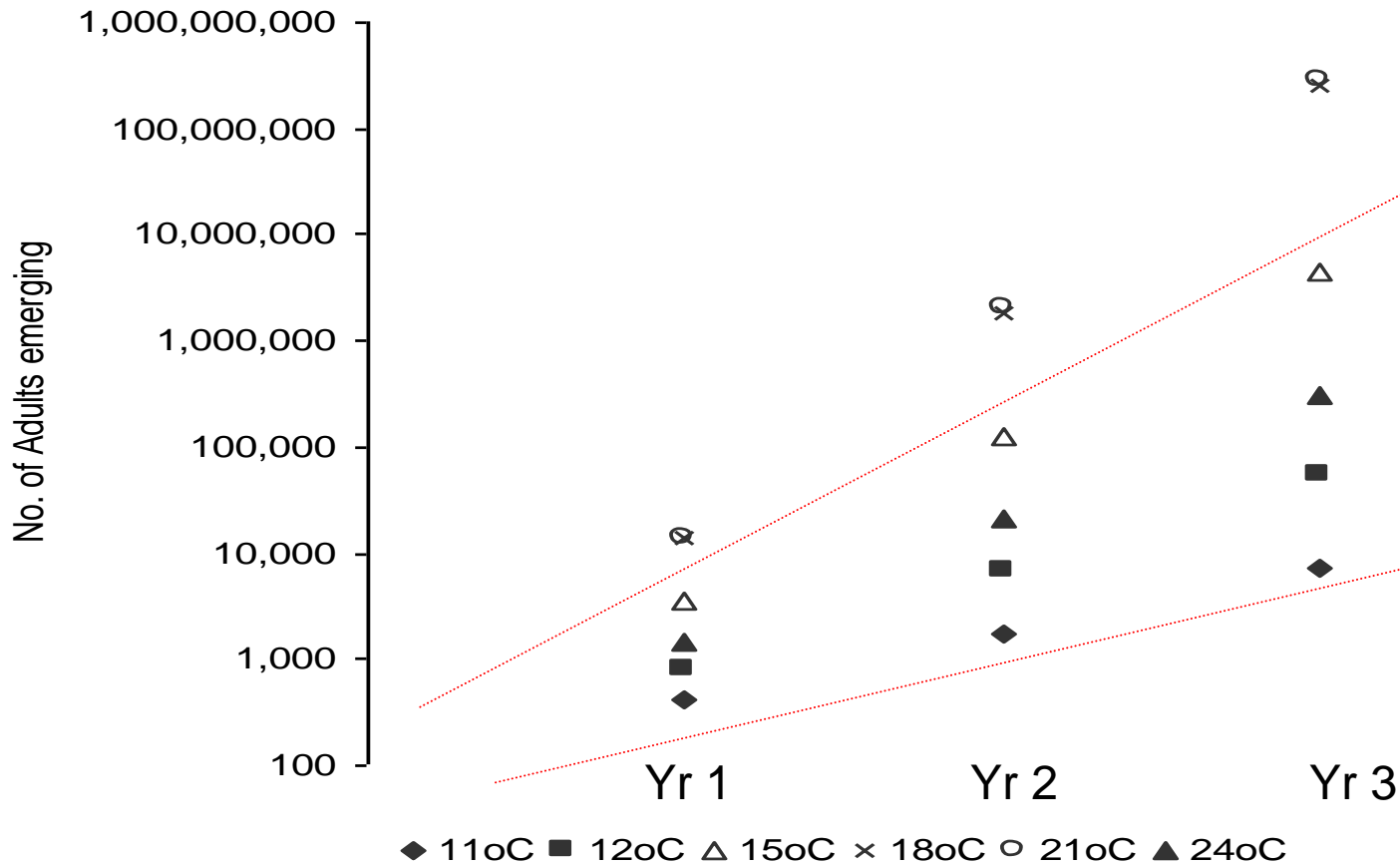
## Raspberry



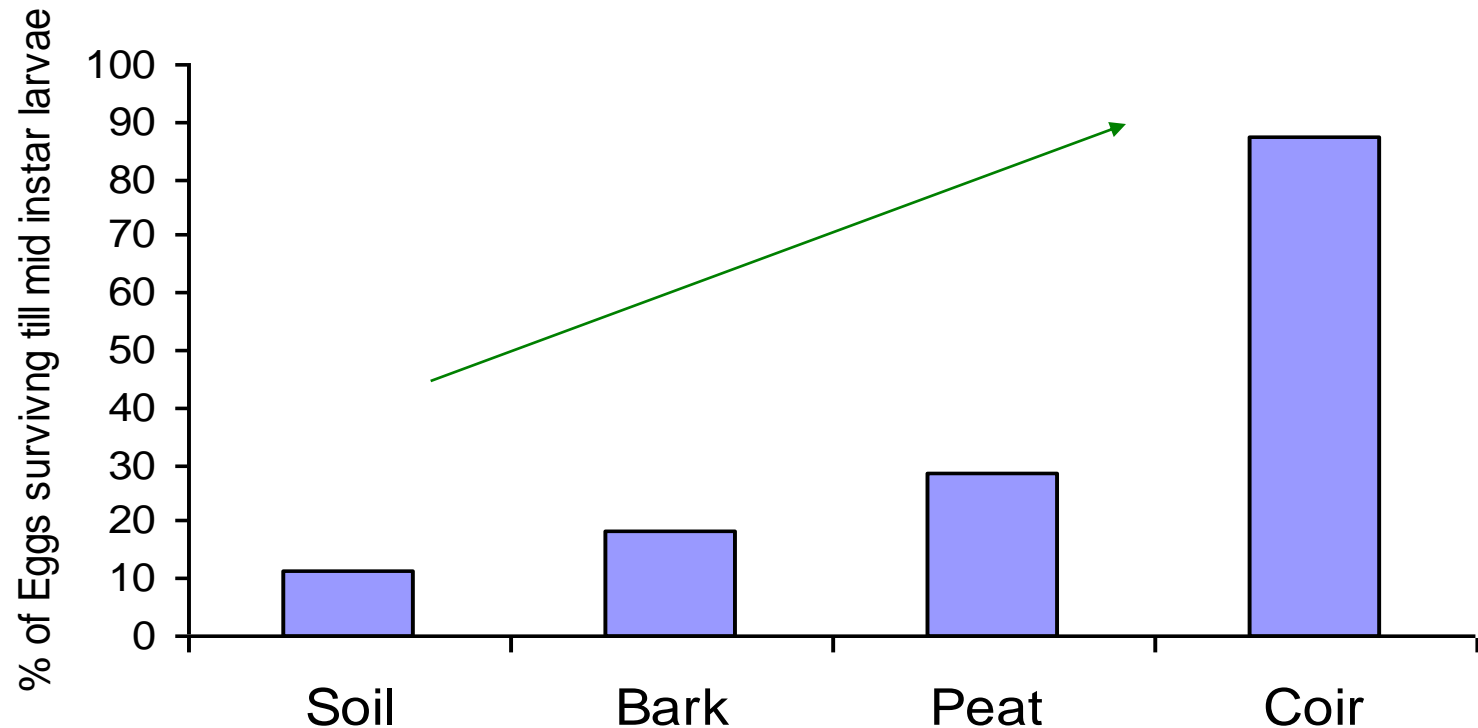
*1.52 Kg reduction per plant*

**\*Clark et al., 2012. Crop Protection, Vol. 32, p76-82**

# Growth of Weevil Populations - Temperature

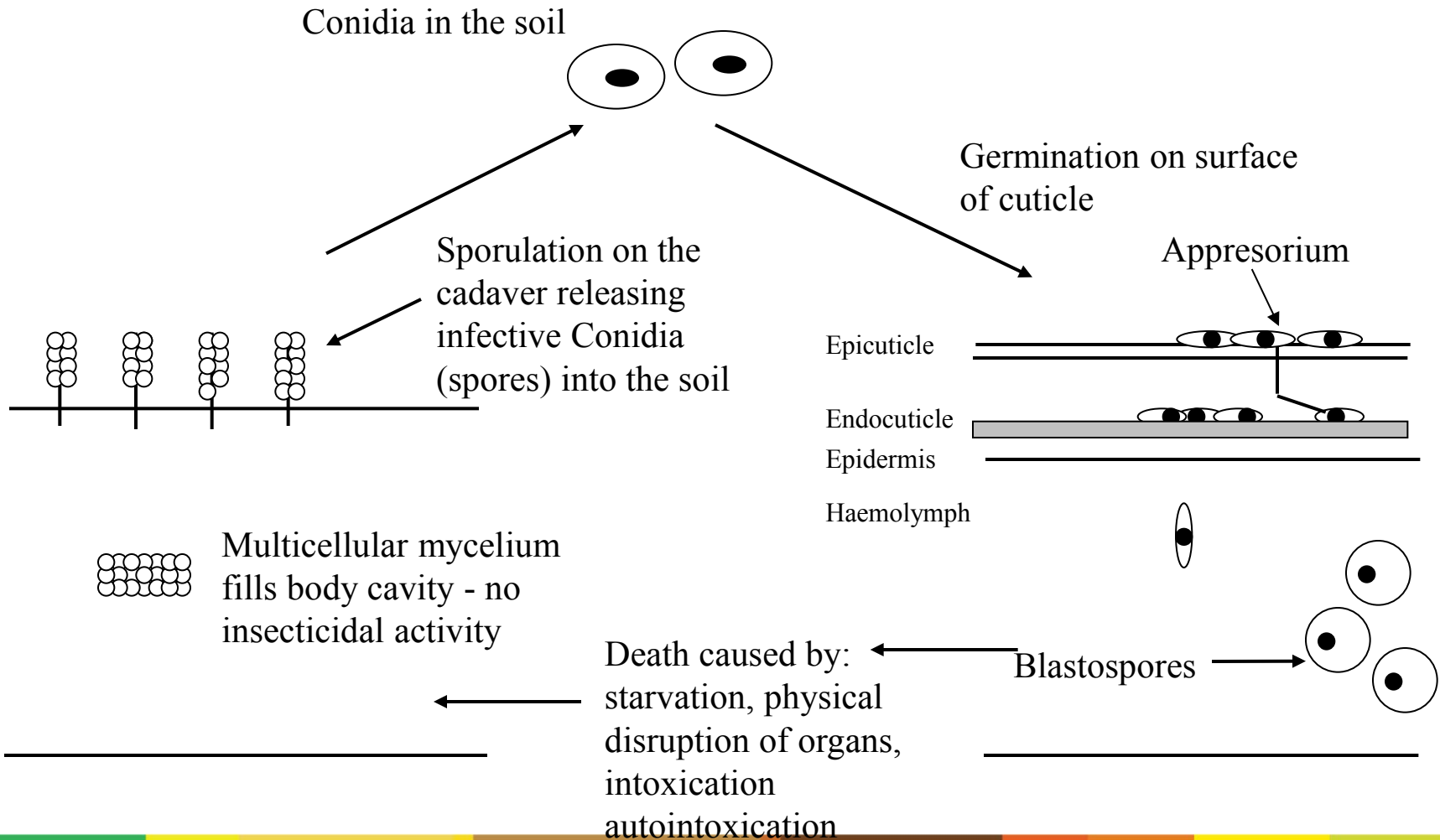


## Growth of Weevil Populations - Substrate



Shah et al., 2007. Biological Control:40, 246-252.

# Infection Cycle of *Metarhizium anisopliae*



# Metarhizium and Vine Weevil

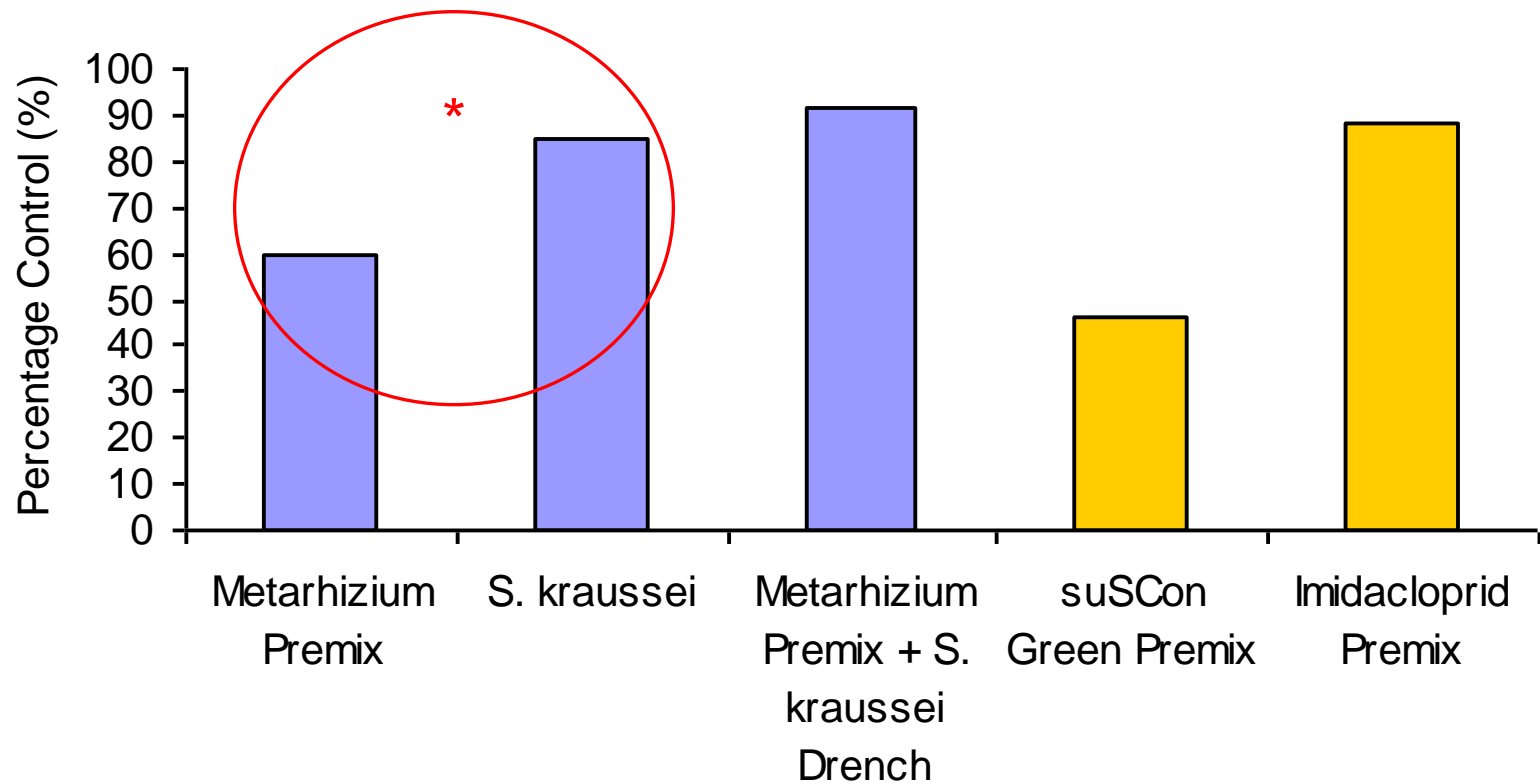




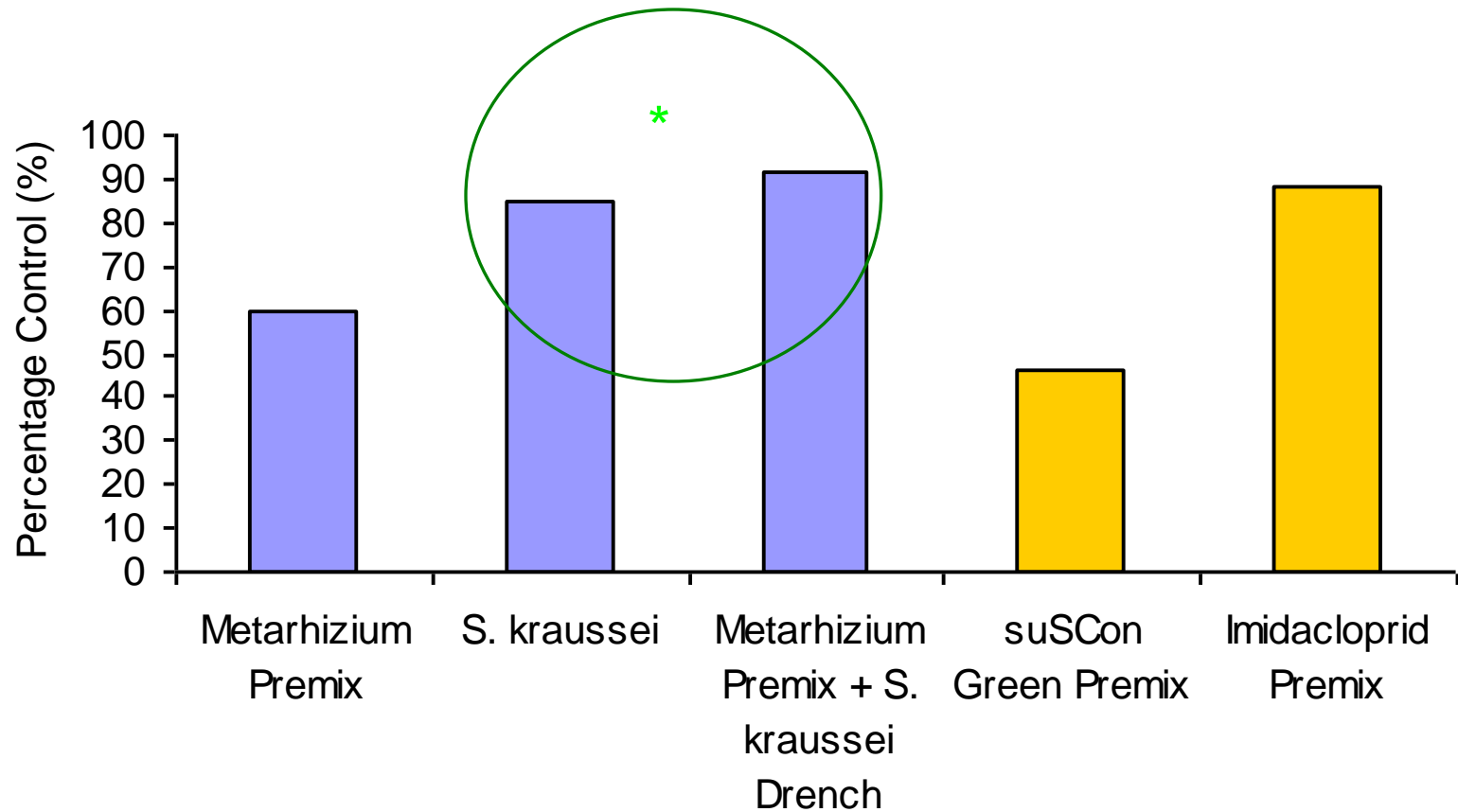
# Nursery Scale Trial



# Nurse Scale Field Trial

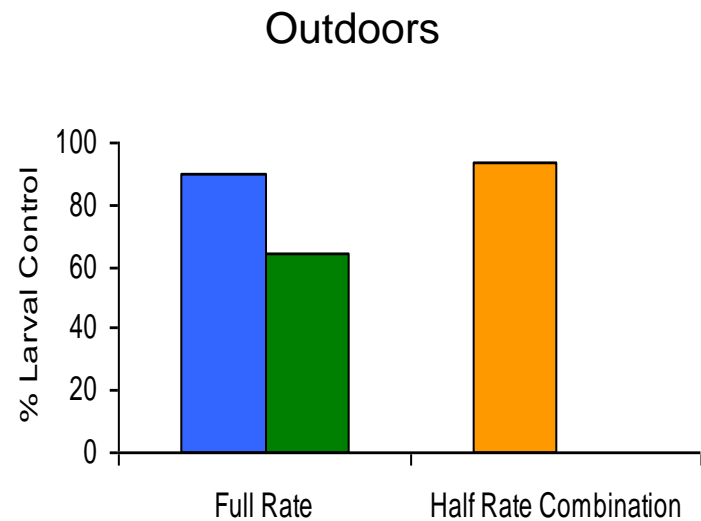
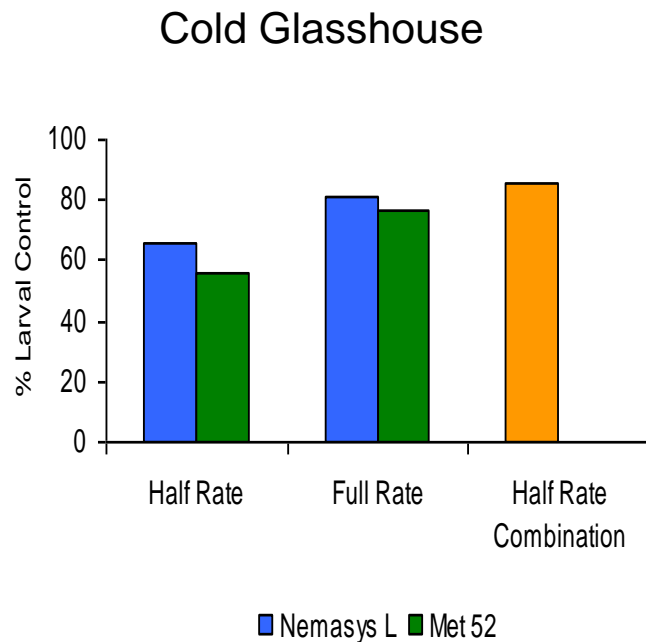


# Nurse Scale Field Trial



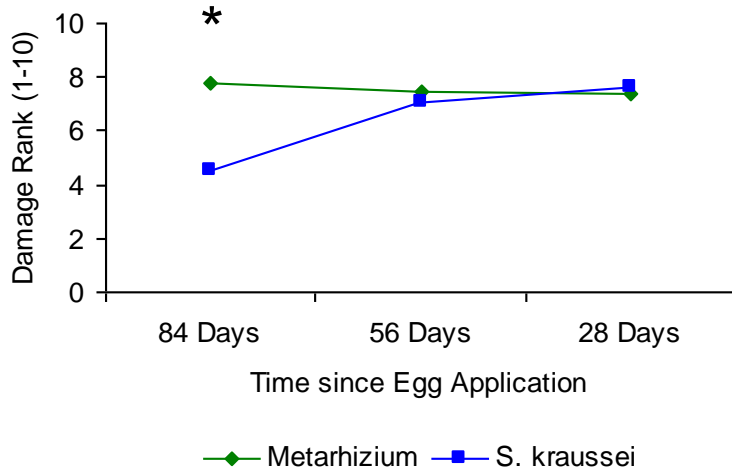
# Control Options

## Nematode Application v Metarhizium Application

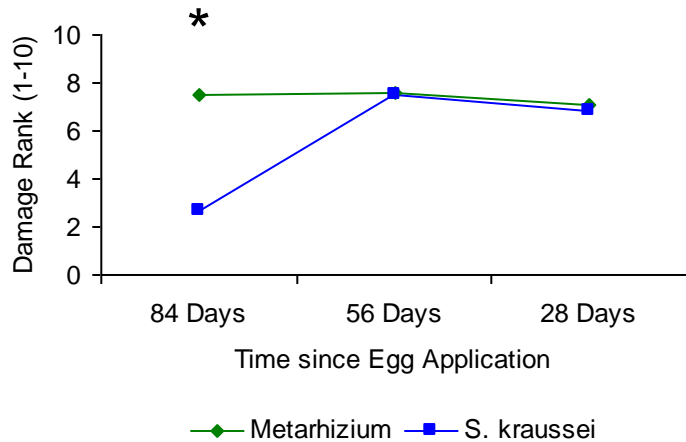


*Tactical Deployment?*

# Tactical Deployment?



*Metarhizium conidia can persist and remain efficacious*



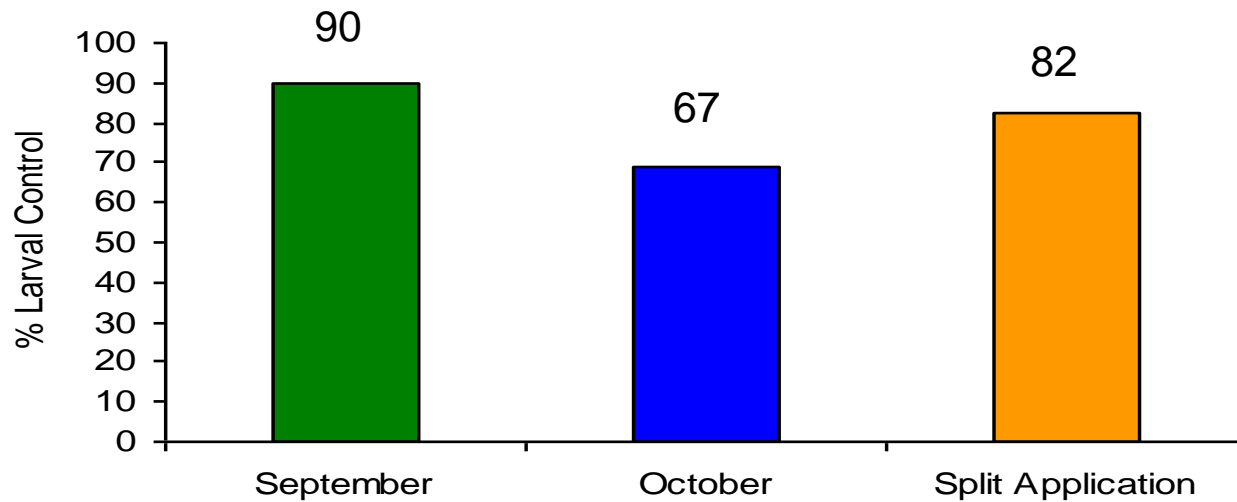
Gaffney *et al.*, 2006 IPPS

# Timing of Nematode Application

*S. Kraussei*

20 BVW eggs/pot

Effect of Temperature

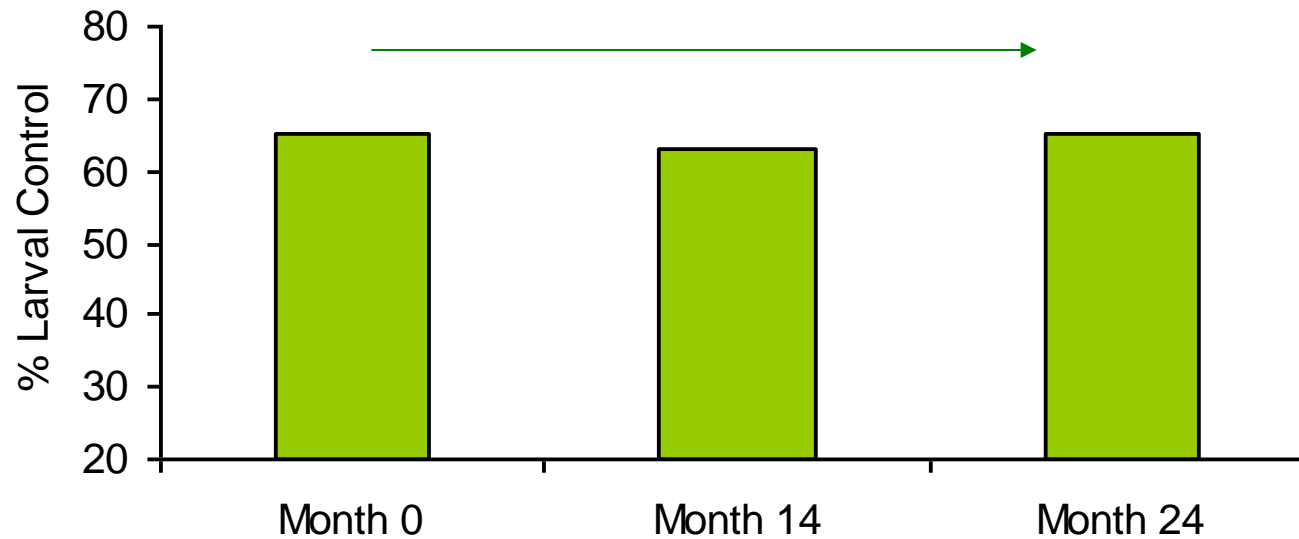


Average Temperature 7 Days Post Application

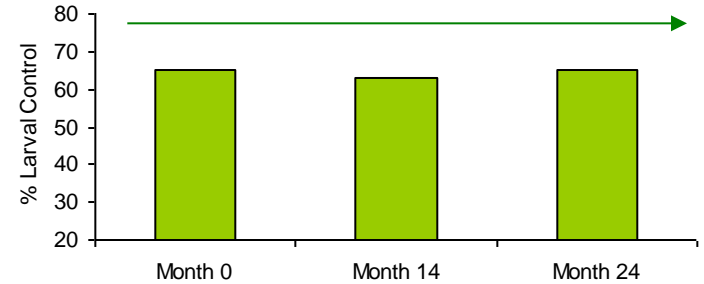
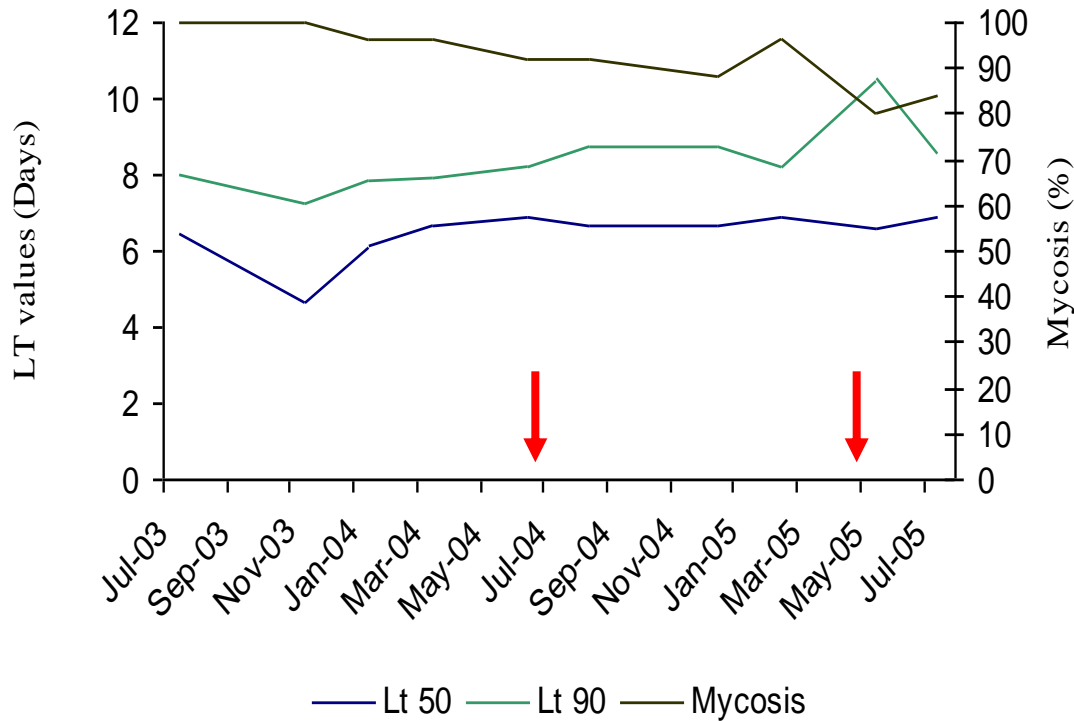
September: 14.1 C

October: 9.3 C

## Persistence of Met 52



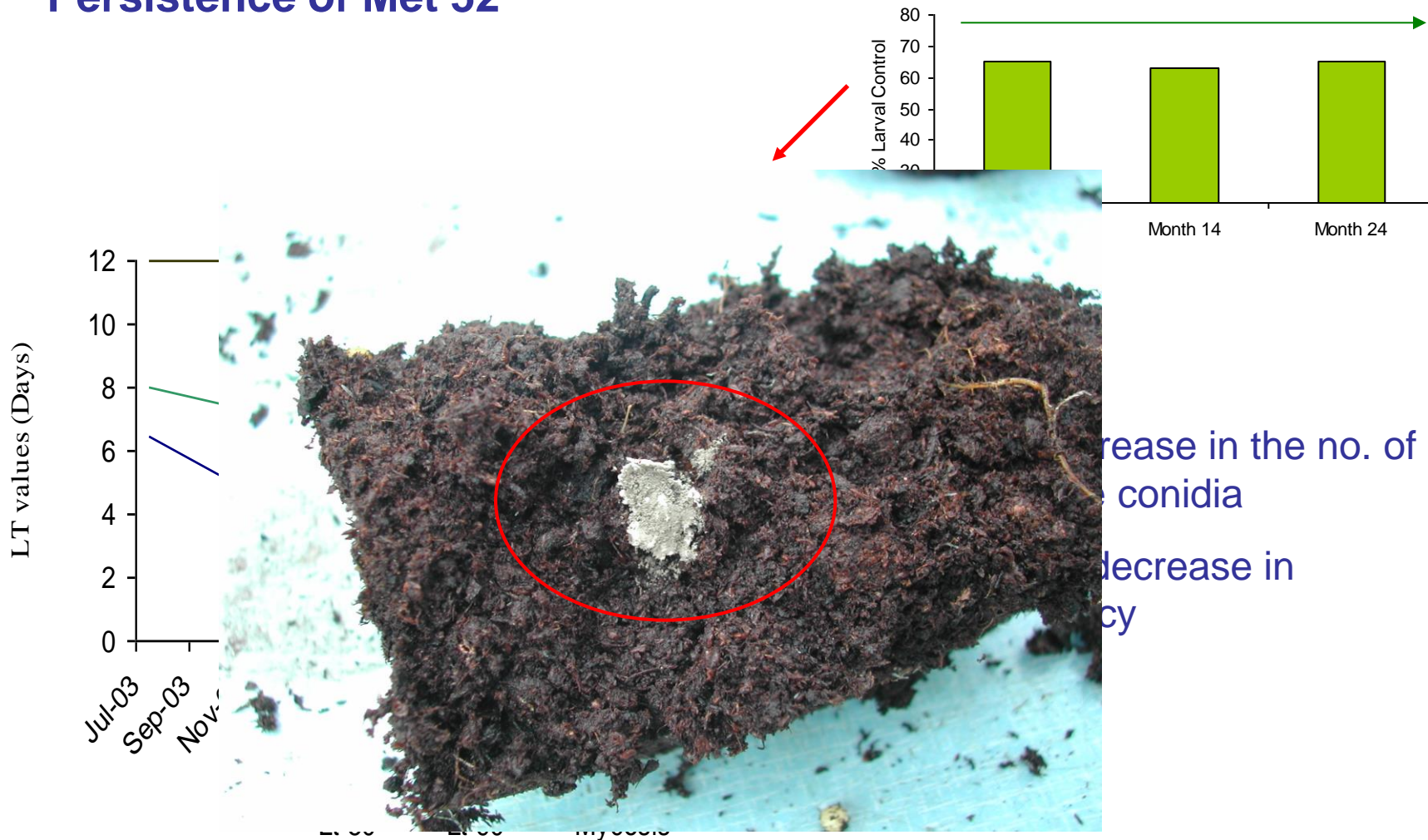
# Persistence of Met 52



- Decrease in the no. of viable conidia
- No decrease in efficacy



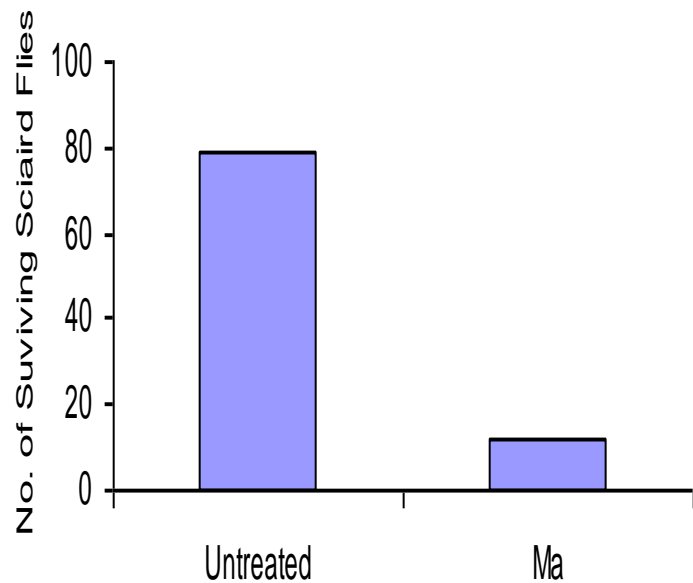
# Persistence of Met 52



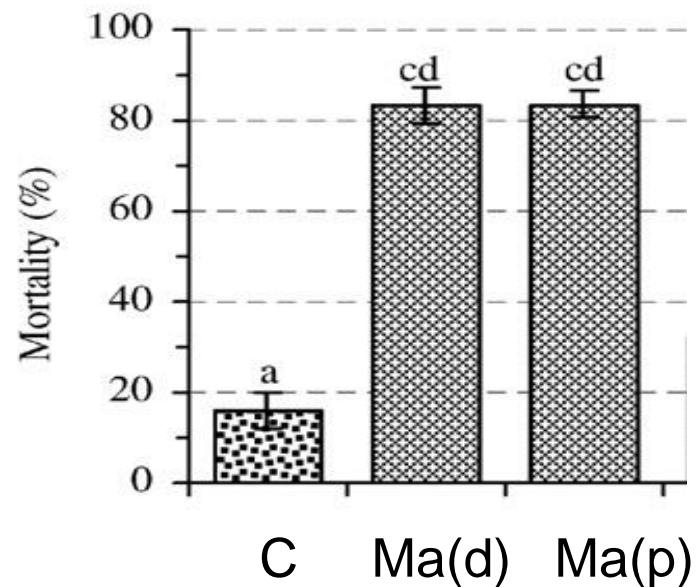
Increase in the no. of  
conidia  
decrease in  
cy

## Secondary Benefits to using *Metarhizium*

### Sciarid Larvae



### Thrips pupae



Ansari *et al.*, (2007) *Biological Control* 4 293-297

# Applying Nematodes and Metarhizium

## Nematode Application Guide

- Remove filter screens
- Do not apply in direct/bright sunlight
- Do not apply to dry compost
- Do not apply unless you have / expect to have at least 4-5 hours of temperatures above 10oC for the following 7 days

## Metarhizium Application Guide

- Applied as a premix – be vigorous!
- Does require a 'settling' in period
- Do not let the growing media dry out

# Control of Adult weevils?

UK situation – Talstar (Bifentrin) withdrawn in 2010

Current Trials assessing –

Steward	indoxacarb	Killed 60-70% of Adults Present*
Chess	pymetrozine	Killed 60-70% of Adults Present
Hallmark	Lambda-cyhalothrin	Some effect in 2010, none in 2011
Calypso	Thiacloprid	Not Effective
Gazelle	Acetamiprid	Not Effective
Pyrethrum 5EC	Natural Pyrethrin	Not Effective
Toppel	Cypermethrin	Not Effective

\*Steward has a specific restriction on Soft Fruit in the UK

## Future Options?

*T. Pope, HDC News March 2012 24-25*

## Azadirachtin – A possibility for Soft Fruit?

Azadirachtin A was registered in the EU last summer.

It is a plant chemical extracted from the fruit kernel of the Neem tree.

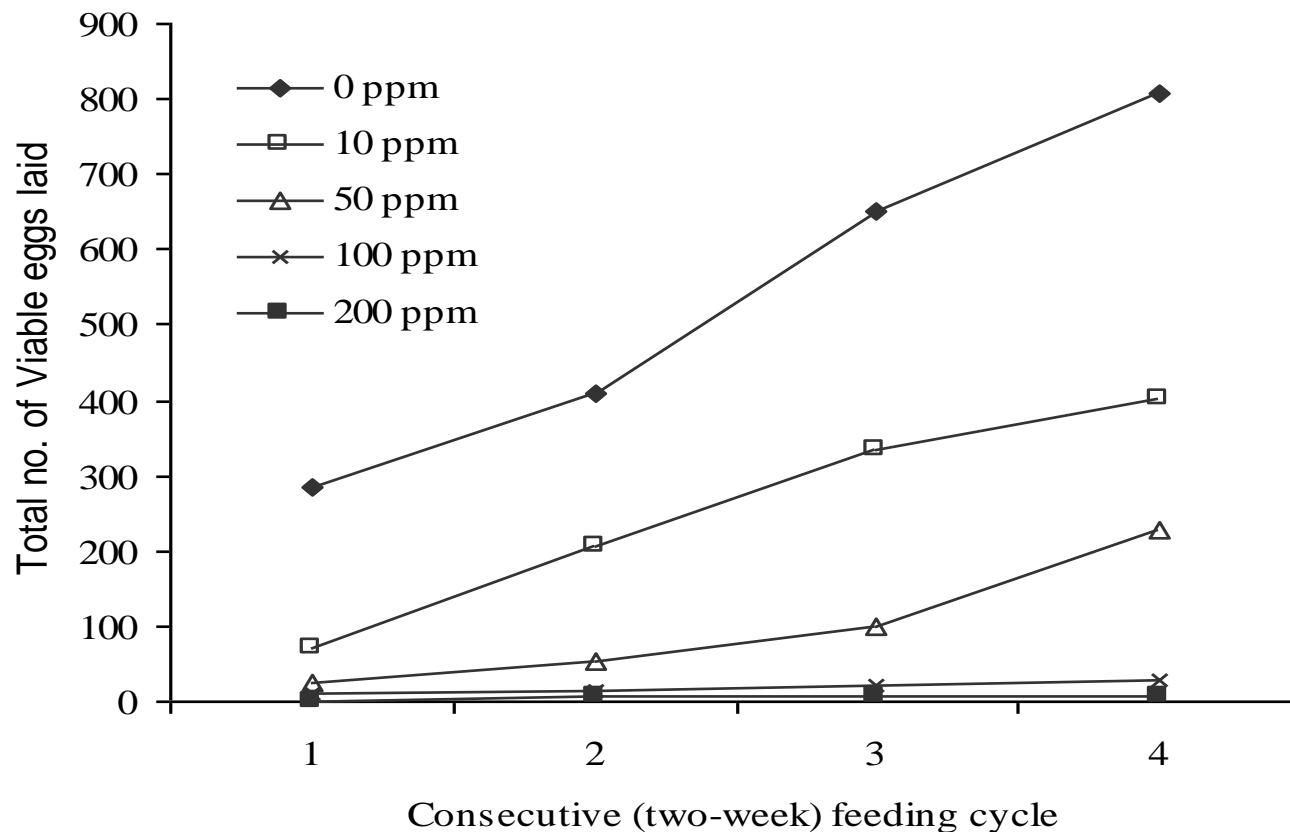
First use is likely to be against PCB on potato in Germany

However work conducted in Kinsealy has identified its ability to cause sterility in adult weevils

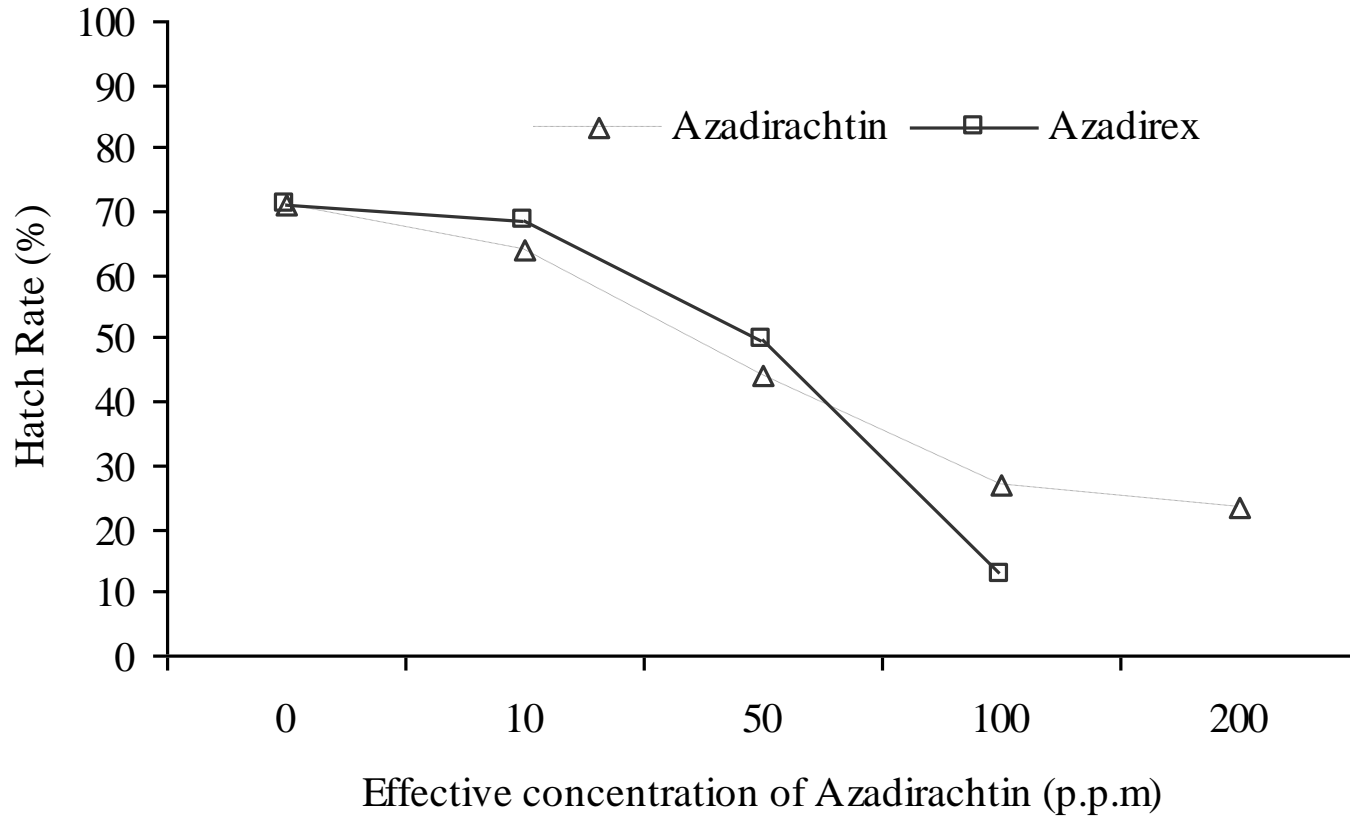
Also has recorded efficacy against RSM, Aphids and Thrips

Is also fungicidal, with reported effects against *Botrytis spp.* and Powdery Mildew.

## Azadirachtin – Effect on Adult Egg laying



# Azadirachtin – Effect on BVW Egg Survival



## What's the Future of Pest Control ?

Work in Wageningen and USDA has led to the identification of the vine weevil aggregation pheromone (Kaironome) – potentially these could be baited with Insecticide and used to lure adults into traps

Work in the UK is looking at Traps, with the Roguard trap showing initial promise. Again this could be baited with insecticide to kill arriving adults

UVB Light as a Control option? UV has direct effect on RSM and some Aphids – Cladding available now, Bulbs 5 yrs +

Work in Teagasc and NUIM at conditioning EPN (Ends 2012)



# Thank You

Technical updates on the work discussed in this presentation will be available from your Teagasc Advisor or the Teagasc website shortly.

Thanks to Teagasc for Funding the Work,  
Prof. Tariq Butt for supplying the fungal strains  
Dr Munno Prasad and Bord Na Mona  
Staff at Kinsealy Research Centre

# Questions?

