

Development of *Metarhizium anisopliae* strain F52 in North America and Europe

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**RETHINK  
TOMORROW**



## COMMERCIAL FORMULATIONS

- Met52 EC (AKA OD) - spores are suspended in an emulsifiable oil
  - Foliar and drench applications
- Met52 G - Granular spores are on the surface of sterile rice granules
  - Formulation suitable potting media/soil incorporation
- Insect targets: *thrips, mites, whiteflies, ticks and weevil larvae*



**Met52<sup>®</sup> EC**  
bioinsecticide

	% w/w
ACTIVE INGREDIENT Metarhizium anisopliae Strain F52*	11.0%
OTHER INGREDIENTS**	89.0%
Total	100.0%

\* Contains 1.6 x 10<sup>10</sup> Colony Forming Units (CFU)/gram of Met52 EC  
Based on 5x10<sup>11</sup> viable spores per gram of active ingredient  
\*\* Contains petroleum distillate



**Met52<sup>®</sup>**  
granular  
bioinsecticide

	% w/w
ACTIVE INGREDIENT Metarhizium anisopliae Strain F52*	2.0%
OTHER INGREDIENTS	98.0%
Total	100.0%

\* Contains 9.0 x 10<sup>9</sup> Colony Forming Units (CFU)/gram

FIRST AID	
IF IN EYES:	Hold eye open and rinse slowly and gently with water for 15 - 20 minutes. Remove contact lenses, if present, after the first 5 minutes. Then continue rinsing eye. Call a poison

## SIGNIFICANT REGISTRATIONS

- US
  - Met52 Granular – including food use and California
  - Met52 EC – including food use and California
- Canada
  - Met52 Granular
  - Met52 EC – dossier under review
- Europe
  - Annex 1 Registration of Active
  - Granular registered in Austria, Belgium, Denmark, France, Ireland, Italy, Luxembourg, Netherlands, Switzerland, and United Kingdom.
  - Met52 EC (OD) – pending 2012 submission

## KEY BENEFITS

- Well-suited for inclusion in an IPM (Integrated Pest Management) program
  - Multiple insect pest targets
  - Competitive efficacy with chemical insecticides
  - No known resistance, valuable tool for insecticide resistance management
  - Compatibility with many beneficial insects and other insecticides

# INITIAL BUSINESS TARGET EXAMPLES

Tick Control (US)



Ornamentals (Holland)



Nursery (US, EU, CAN)



Strawberry and Lettuce (California)



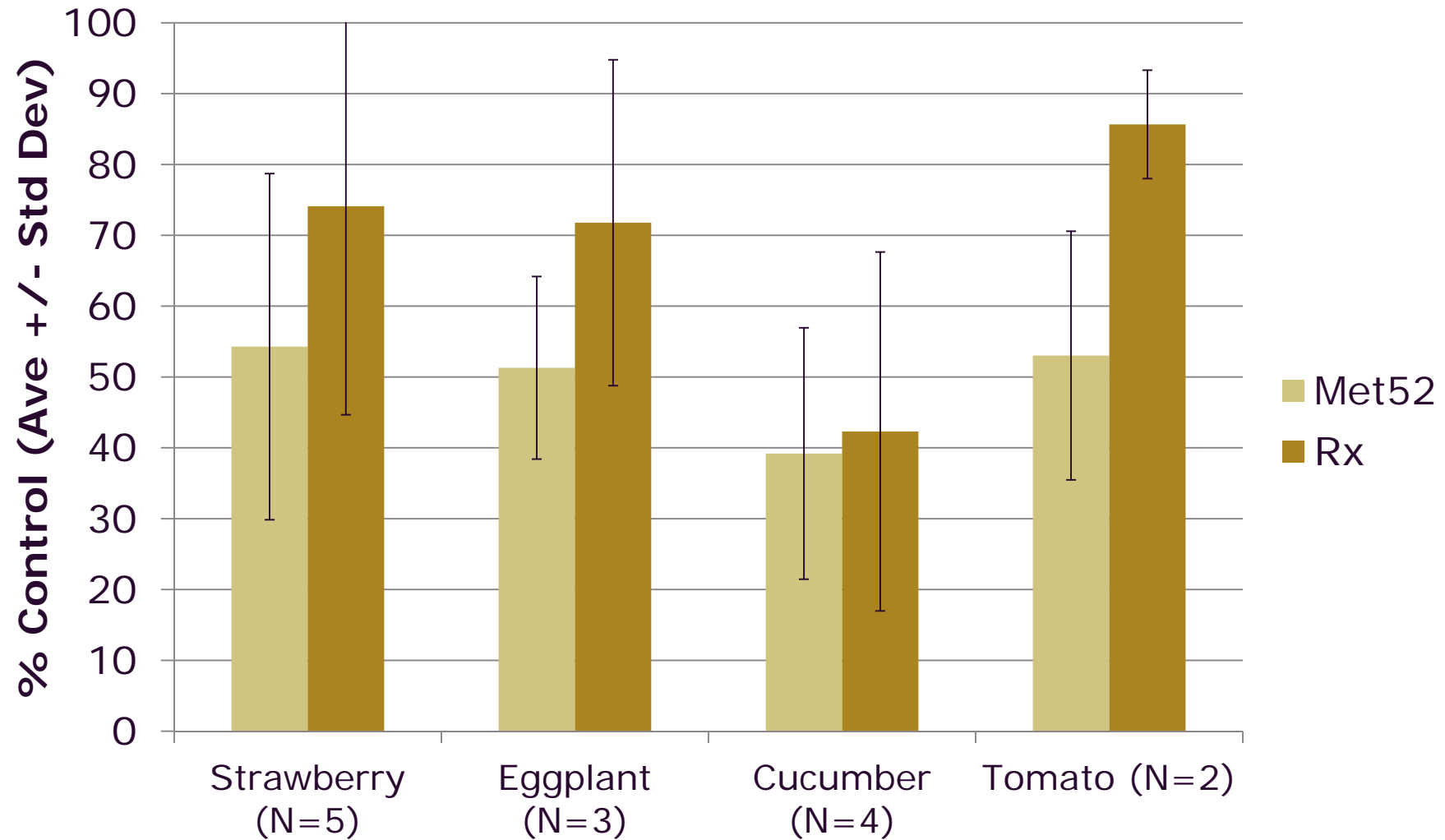
Vegetable Production (Spain)



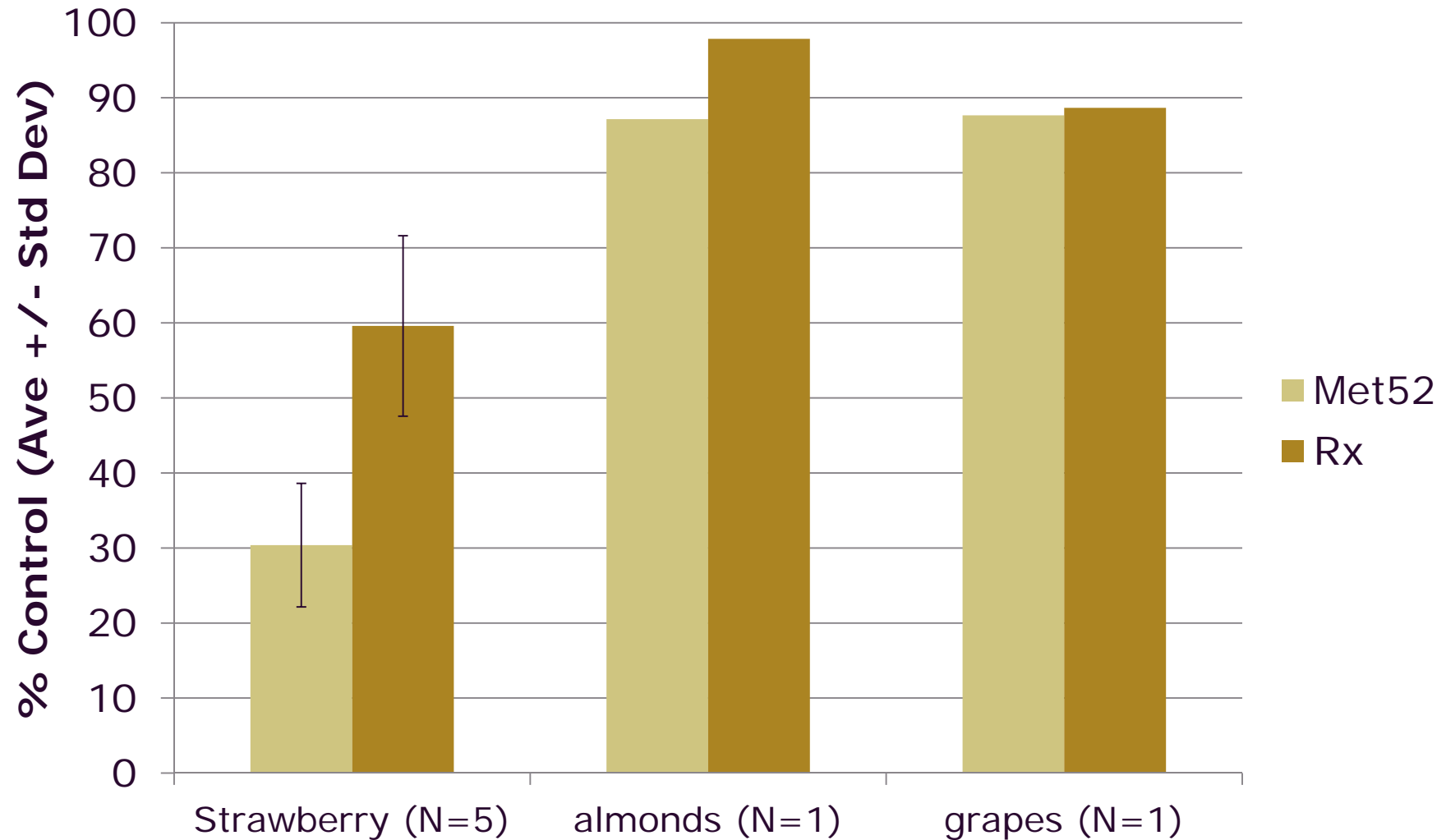
Table Grapes (EU)



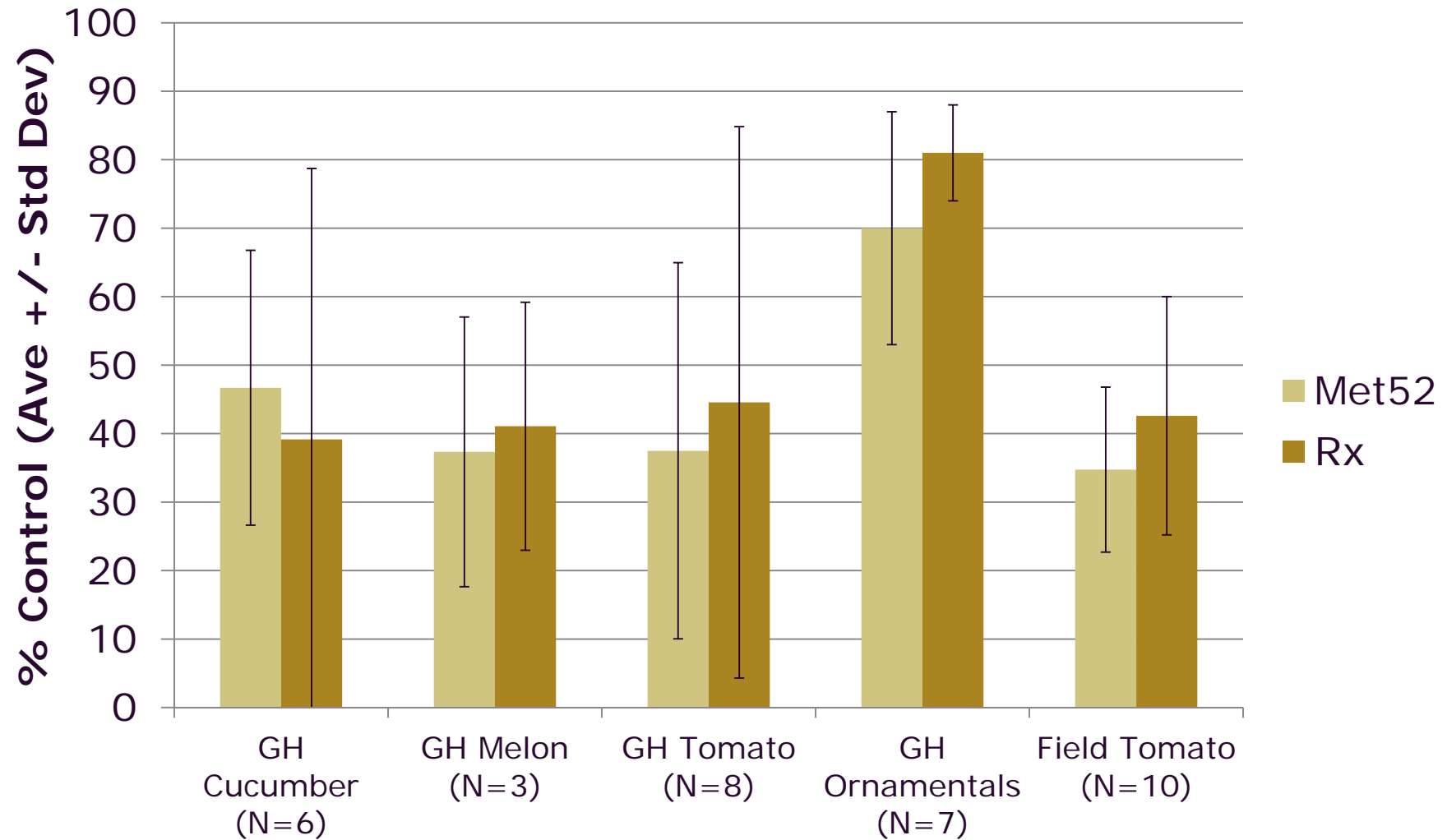
## MITES (PROTECTED 2008-2011)



## MITES (OUTDOORS 2008-2011)

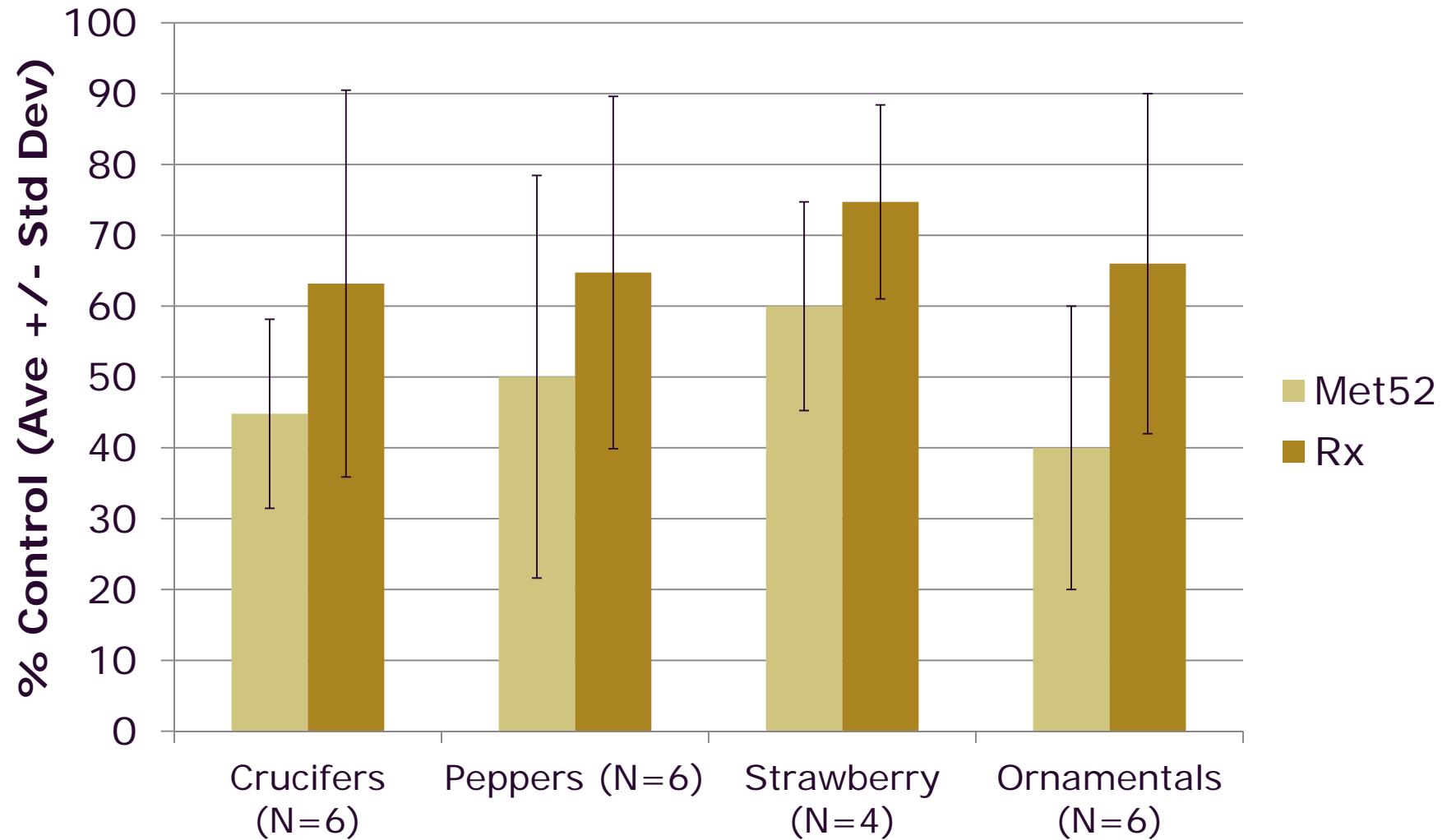


## WHITEFLIES 2008-2011

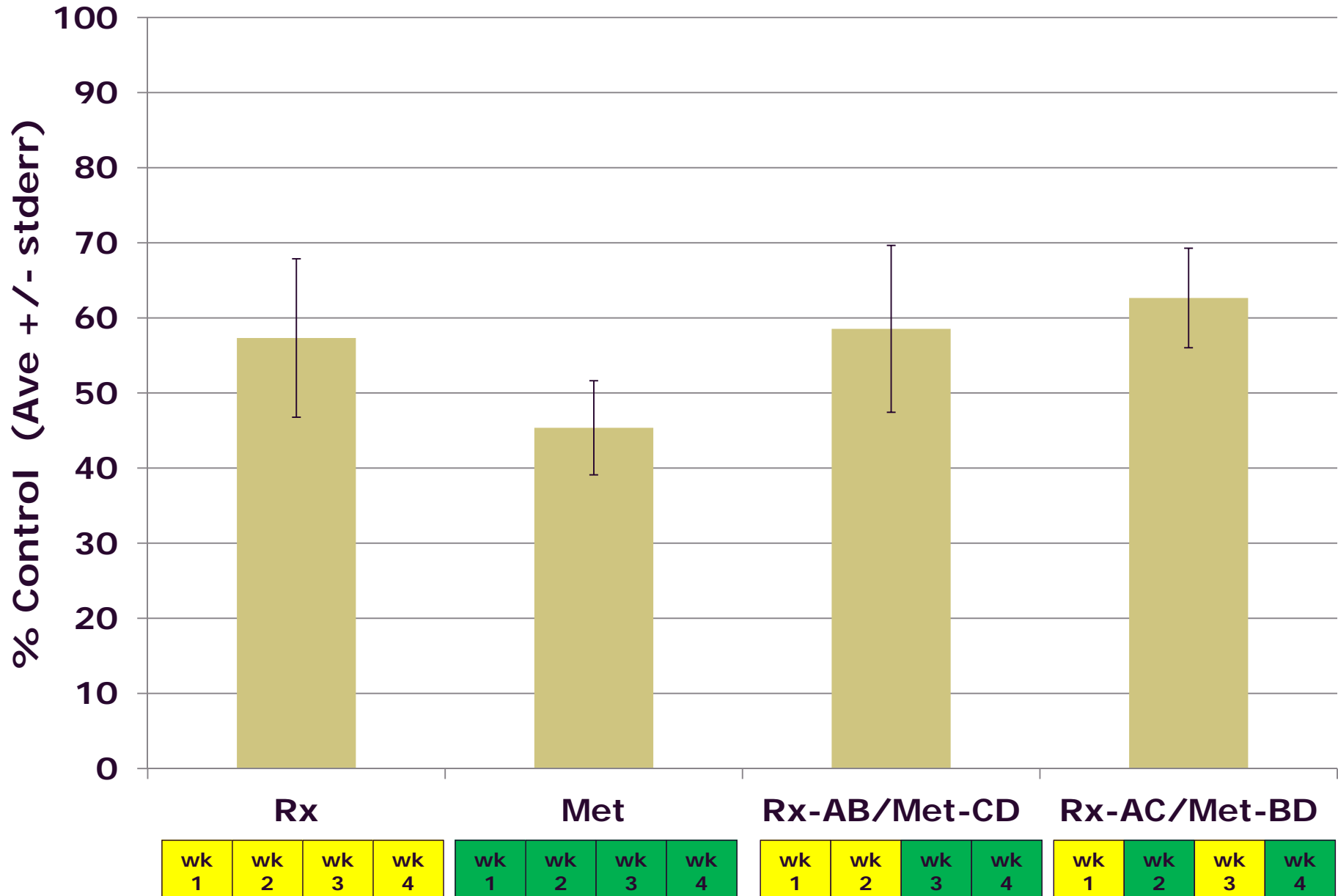




## THRIPS (PROTECTED 2008-2011)

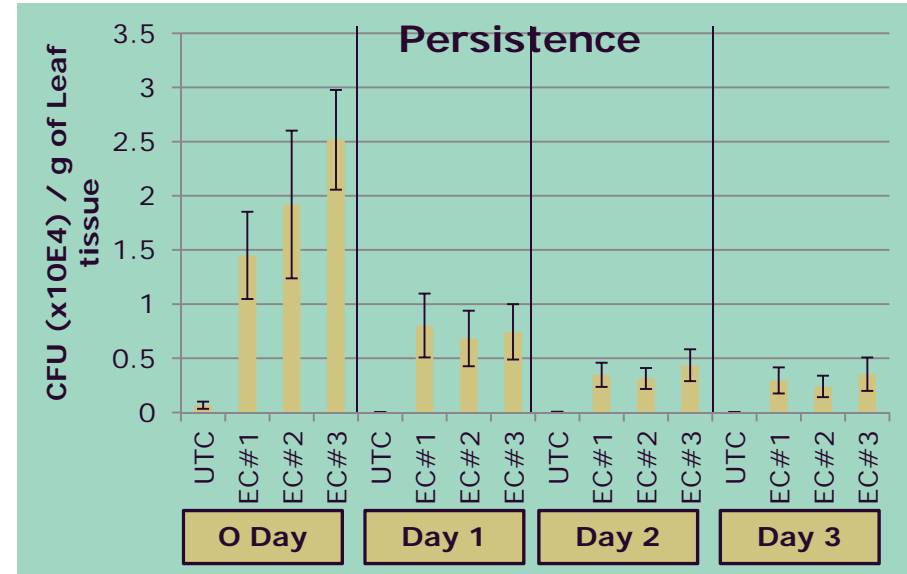
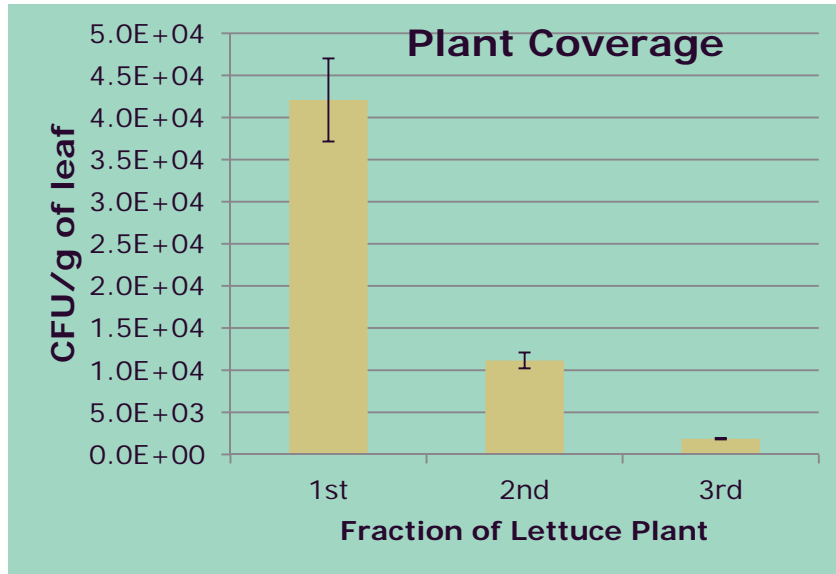


### Met In IPM -12 Trials (6 Thrip, 3 WF, 3 Mite)

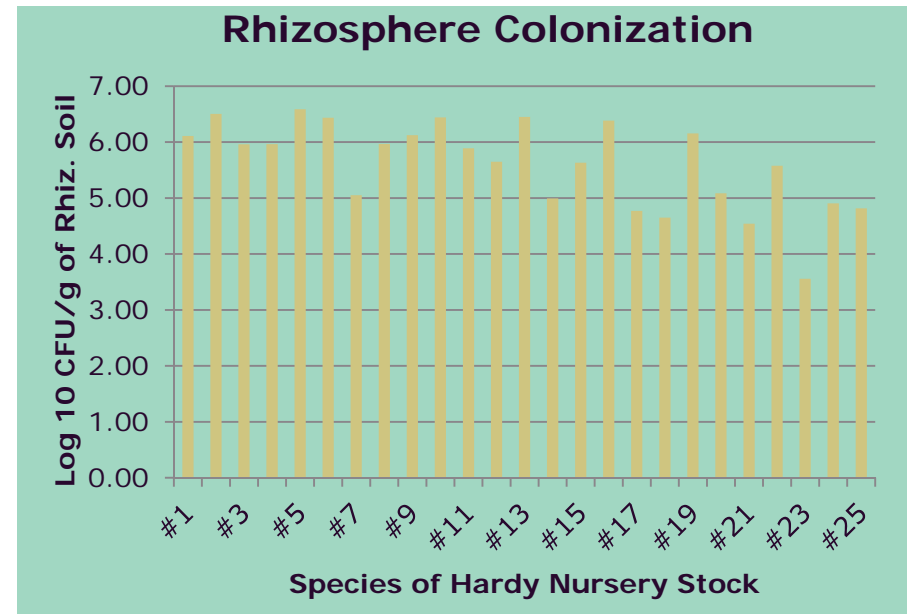
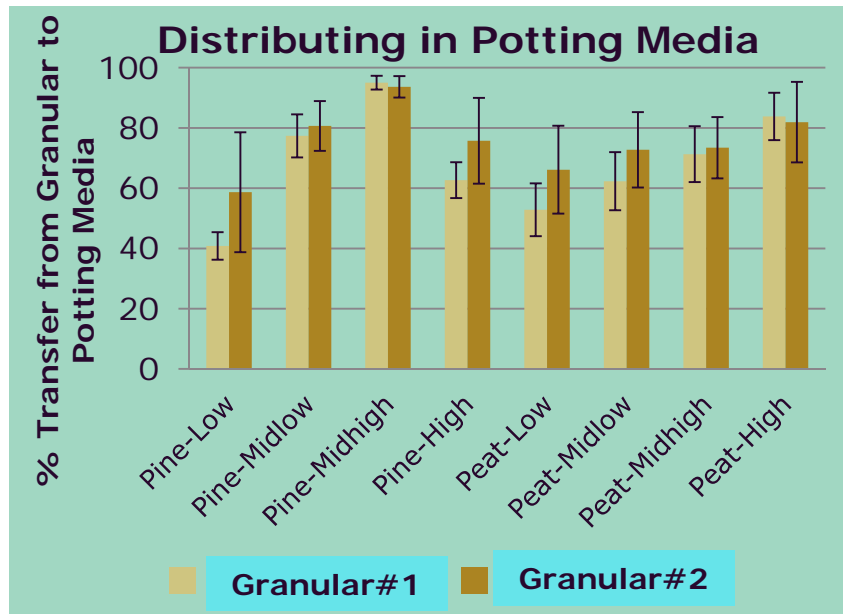


# TRACKING IN FIELD TO UNDERSTAND EFFICACY

Foliar



Soil/Roots



## BENEFICIAL INSECT COMPATIBILITY

Pests	Beneficial	Beneficial Spp.
Thrips, whitefly	Predatory Mite	<i>Amblyseius spp.</i>
Mites, whitefly	Predatory bug	<i>Macrolophus caliginosus</i>
Generalist	Predatory bug	<i>Nesidiocoris tenuis</i>
Thrips	Predatory bug	<i>Orius spp.</i>
Generalist	Lacewing	<i>Chrysopa sp.</i>
Thrips (soil), fungus gnats	Rove beetle	<i>Atheta coriaria</i>
Thrips (soil), fungus gnats	Predatory Mite	<i>Hypoaspis miles</i>
Flies	Parasitic Wasp	<i>Nasonia vitipennis</i>
		<i>honeybees</i>
		<i>earthworms</i>

# FOLIAR FUNGICIDE COMPATIBILITY

## (Applied Separately, not Tank Mixed)

### Compatible

- FLUOPICOLIDE
- TEBUCONAZOLE
- IPRODIONE
- MEFENOXAM
- DIFENOCONAZOLE
- MYCLOBUTANIL
- CYPRODINIL
- PROTHIOCONAZOLE
- FENHEXAMID
- FLUAZINAM
- FOSETYL-AL
- DIMETHOMORPH
- COPPER SULFATE
- SULFUR
- FLUOXASTROBIN
- CYMONAXYNL
- TRIFLOXYSTROBIN

### Compatibility Concerns

- Chlorothalonil
- Azoxystrobin
- Boscalid,
- Thiram
- Mancozeb
- Captan

## COMPATIBLE FUNGICIDES IN THE SOIL (Applied Separately, not Tank Mixed)

- Azoxystrobin
- Benomyl
- Bupirimate
- Captan
- Carbandazim
- Chlorothalonil
- Dimethomorph
- Etridiazole
- Fenarimol
- Fludiox + Mefanox
- Fludioxanil
- Fosetyl-Al
- Furalazyl
- Iprodione
- Mafanoxam
- Phosphorus acid/K-salts
- Propanocard
- Pyraclostrobin
- Pyrazophos
- Quintozene
- Thiophanate-methyl
- Triflozystrobin
- Triflumizole
- Trichlofos-methyl
- Zineb

Morehouse et al 1992  
Bruck et al 2009

## TAKE HOME MESSAGES

- Demonstrated efficacy on a range of pests and significant potential for expansion.
- Valuable tool in integrated pest management and insecticide resistance management.
- Using selective media plating and qPCR to accelerate field efficacy development – track in field.
- Demonstrated compatibility with a range of beneficials and fungicides.