



# Research Update: Worm control, herbicides, and TSWV Resistant varieties

March 2, 2010

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Associate Farm Advisor

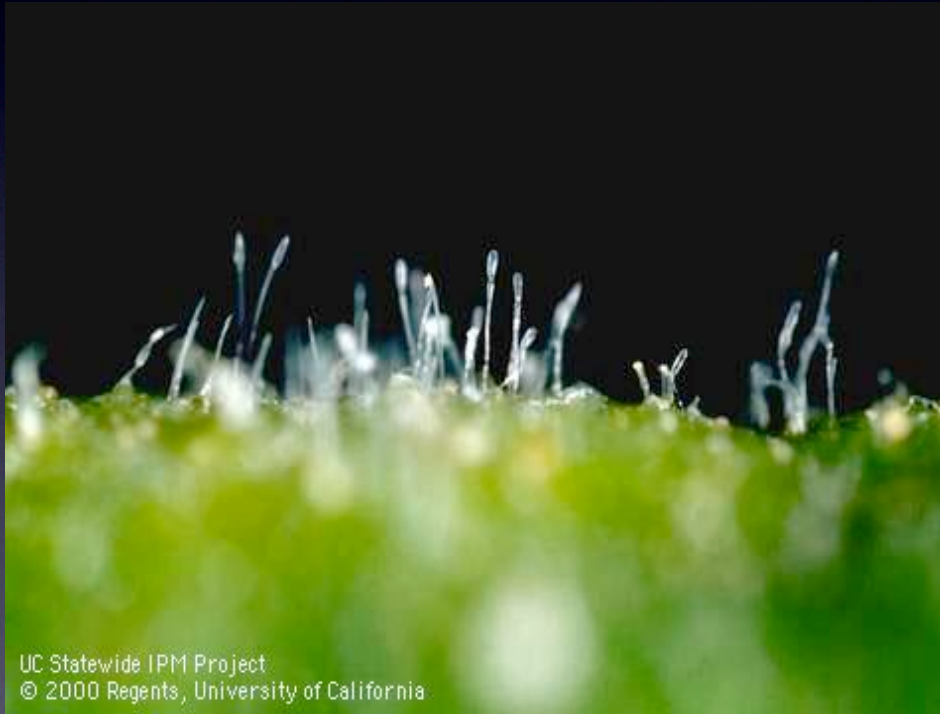
UCCE Merced & Madera Counties

# Projects

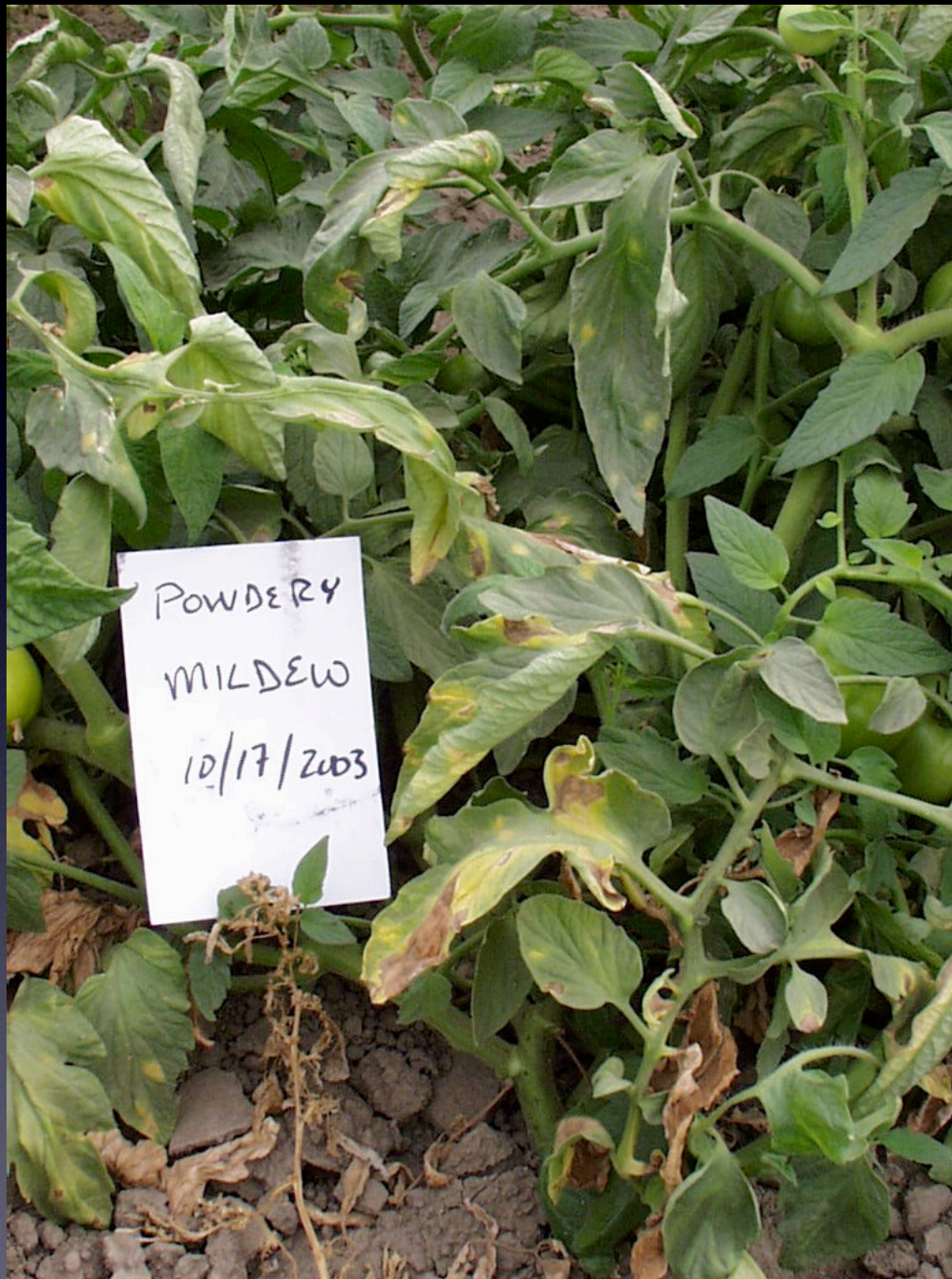
- Powdery Mildew
- Tomato worm control
- Sandea + Matrix herbicide trial
- TSWV Variety Trial
- Tomato Spotted Wilt



# Powdery Mildew, *Leveillula taurica*



- Spring 2004, late season in 2007, 2008, 2009....
- Optimal development when temp < 86 F and RH > 40%.
- Sporulation heavier on underside of leaves.
- Sulfur, Rally (myclobatanil), Cabrio/Flint/Quadris (strobilurins) provide some control



05/05/09

19



2007



05/05/09

Pest Management Update Class

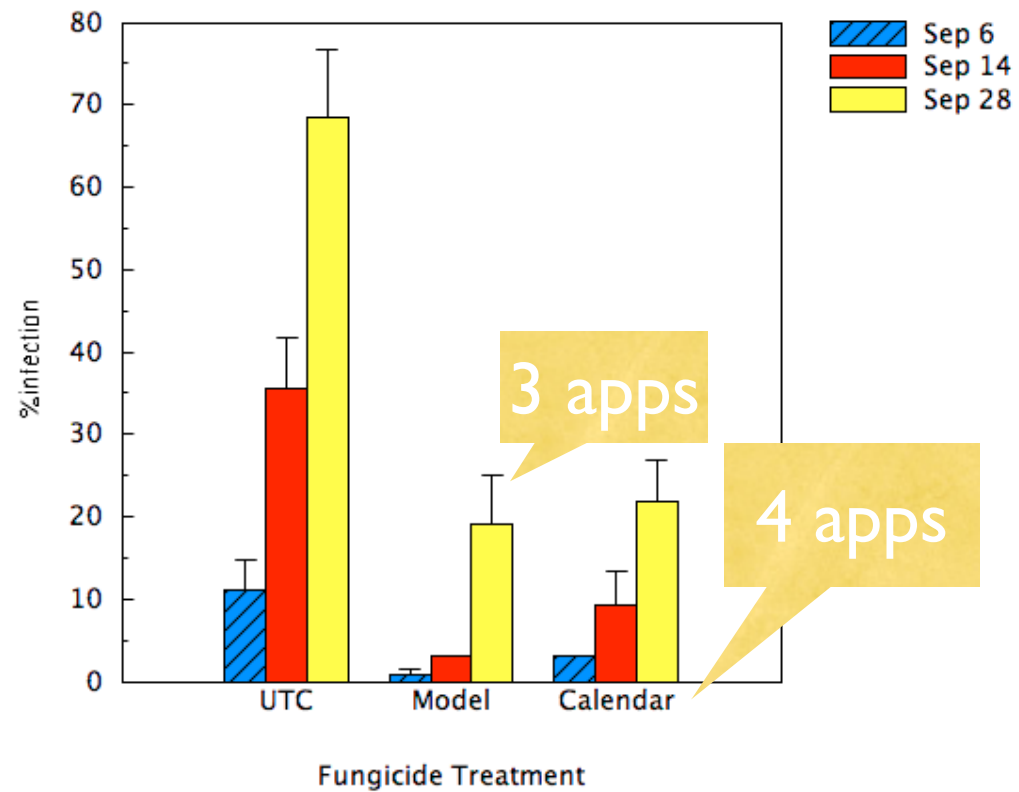
21

# Tomato Powdery Mildew Model Validation

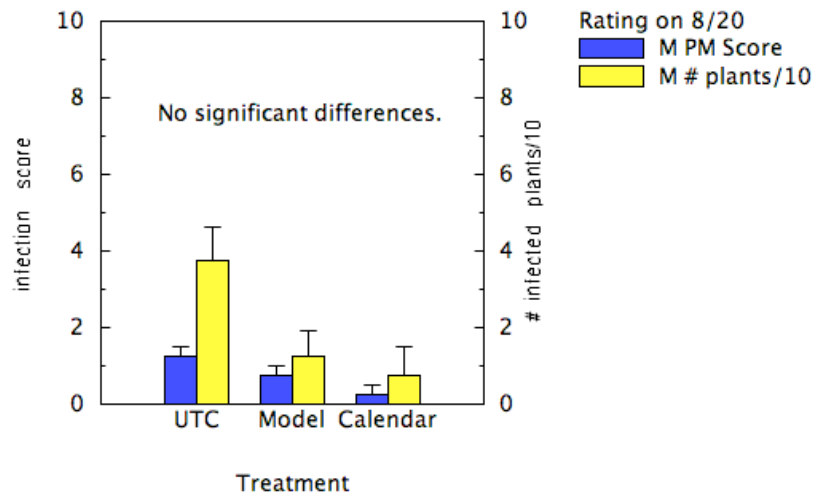


- 2006-08, Brenna Aegerter, SJ Co.
- Compare model forecast to “calendar spray”.
  - Temp
  - RH
  - Leaf wetness
- Rally/Cabrio rotation

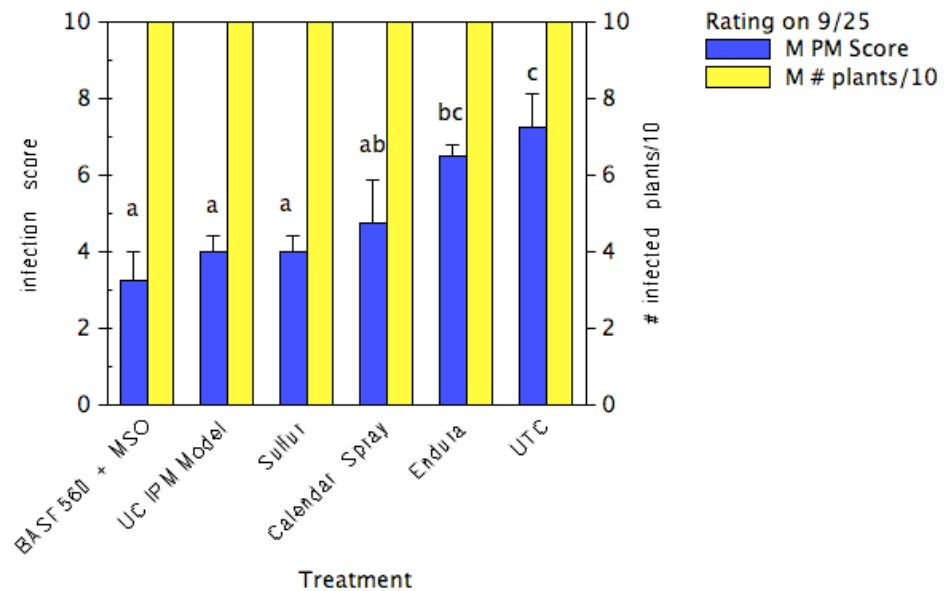
FM Tomato Powdery Mildew Test Plot  
Merced County 2007



Tomato Powdery Mildew Trial 2008  
Merced 1



Tomato Powdery Mildew Trial 2008  
Merced 2



# PM Model Trial



# PM Model Trial



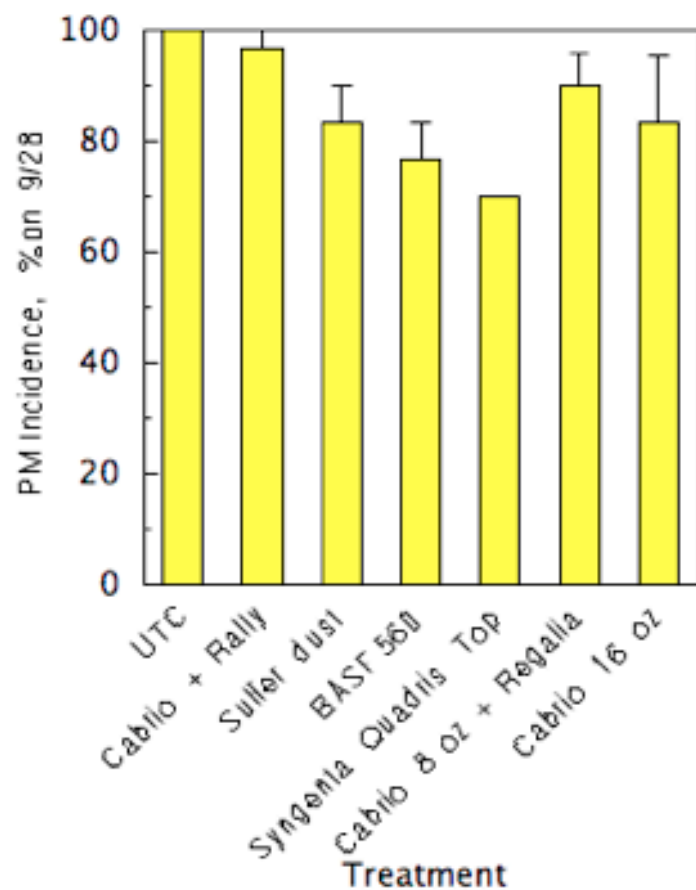
# PM Model Trial



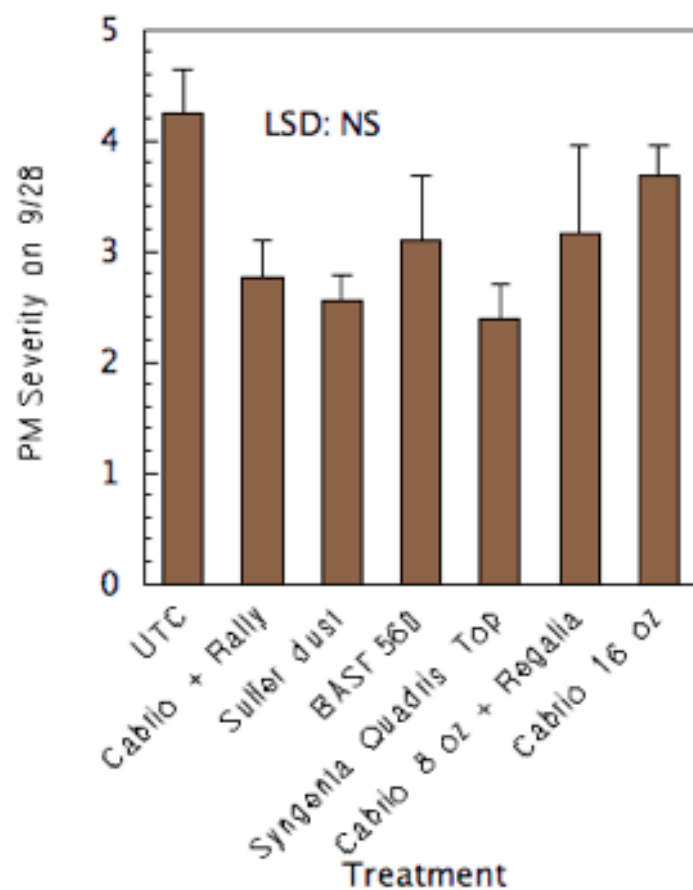
# PM Model Trial



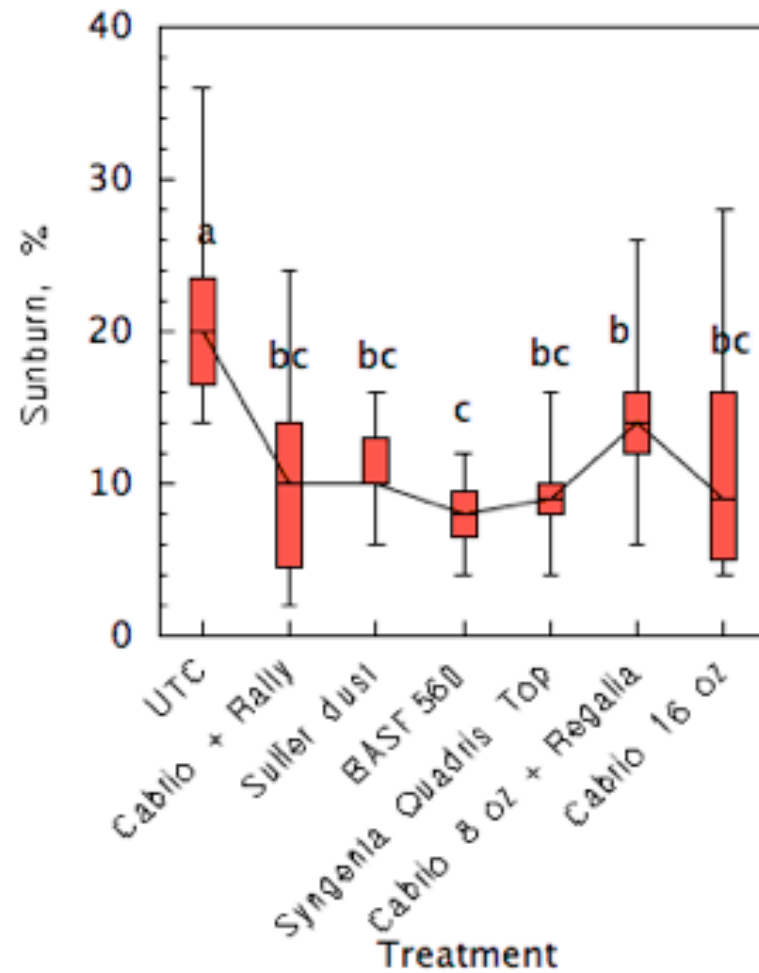
Tomato Powdery Mildew Trial  
Gustine, CA 2009



Tomato Powdery Mildew Trial  
Gustine, CA 2009



Tomato Powdery Mildew Trial  
Gustine, CA 2009



# Main worm pests in California tomatoes

- Beet armyworm
- Tomato fruitworm
- Western yellowstripe armyworm
- Tomato pinworm
- Loopers
- Hornworms & cutworms



# Beet Armyworm

Spodoptera exigua



# Damage



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# Control

- **Fresh market tomatoes**
  - ✦ No fruit sampling thresholds established.
  - ✦ Leaf sample instead, after flowering.
  - ✦ 30 leaves, look for eggs,  $> 4$  consider treating

# Beet armyworm

- Avaunt (indoxacarb)
- Intrepid (methoxyfenozide)
- Success/Entrust (spinosad)
- Bt (Dipel, Xentari)
- Lannate (methomyl)
- Asana (esfenvalerate)
- Danitol (fenpropathrin)
- Coragen (chlorantrniliprole)
- Synapse (Flubendiamide)
- Radiant (spinetoram)



Proclaim, Rimon

# Tomato Fruitworm

(*Heliothis zea*)



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# Tomato Pinworm

*Keiferia lycopersicella*



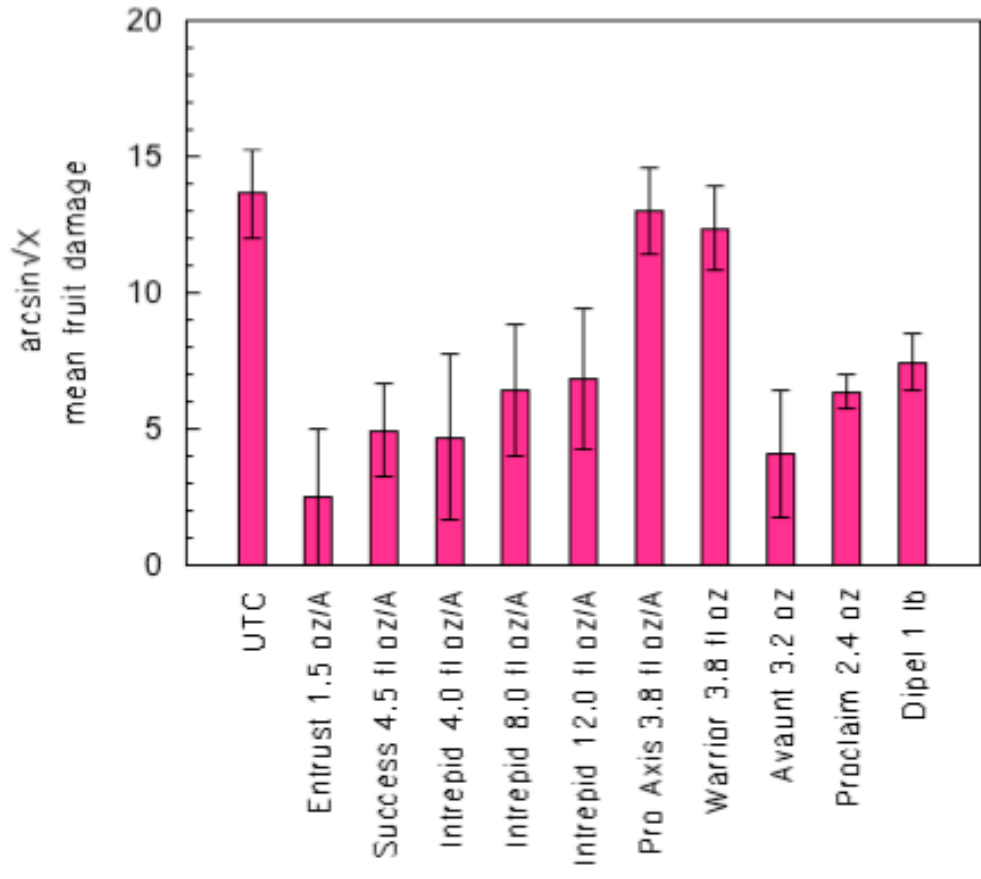
# Research Trials



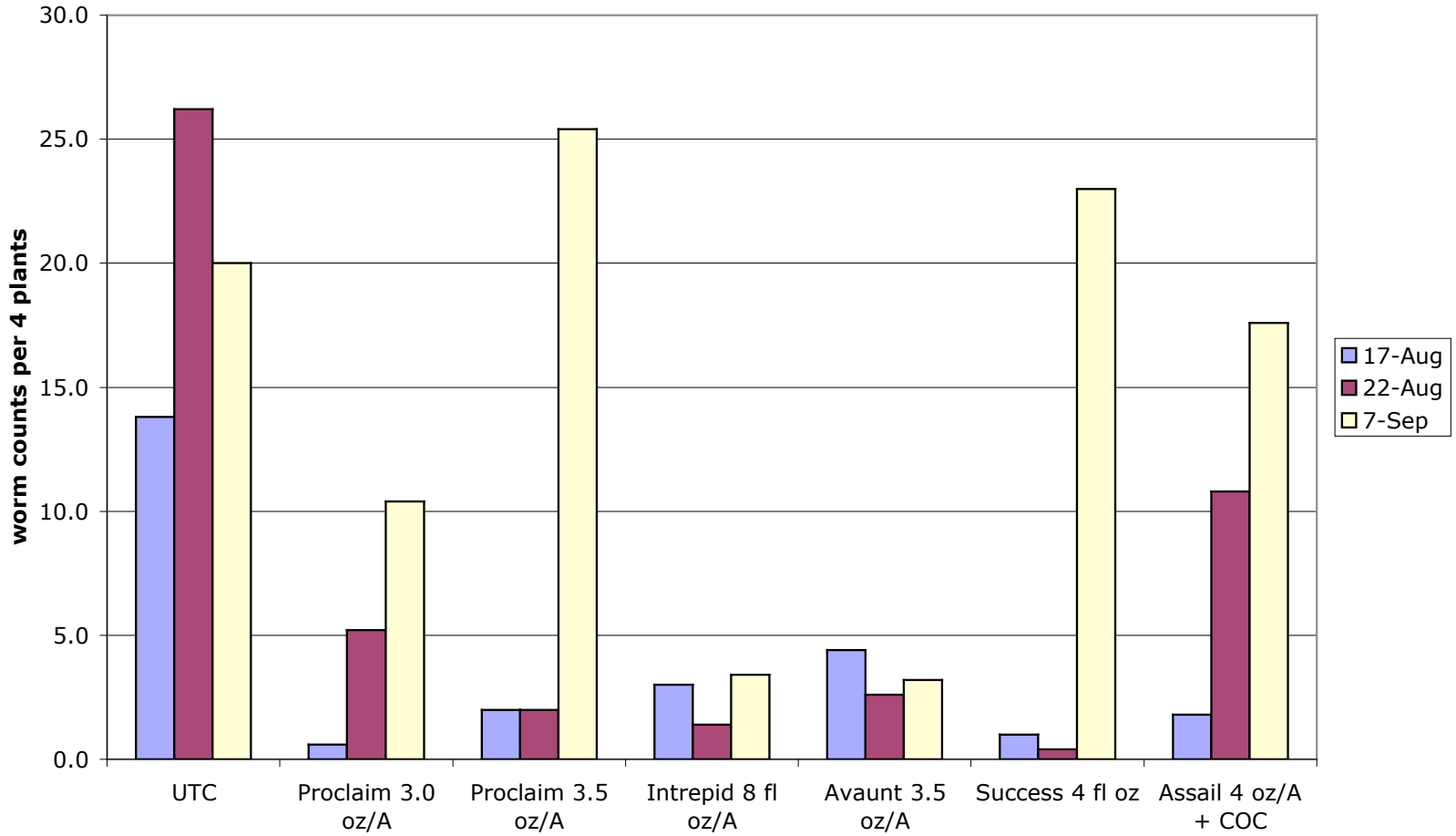
# Worm trial in fresh market tomatoes 2003

1. Entrust 1.5 oz/A
2. Success 4.5 fl oz/A
3. Intrepid 4 fl oz/A
4. Intrepid 8 fl oz/A
5. Intrepid 12 fl oz/A
6. Pro Axis 3.8 fl oz/A
7. Warrior 3.8 fl oz/A
8. Avaunt 3.2 oz/A
9. Proclaim 2.4 oz/A
10. Dipel 1 lb/A
11. UTC

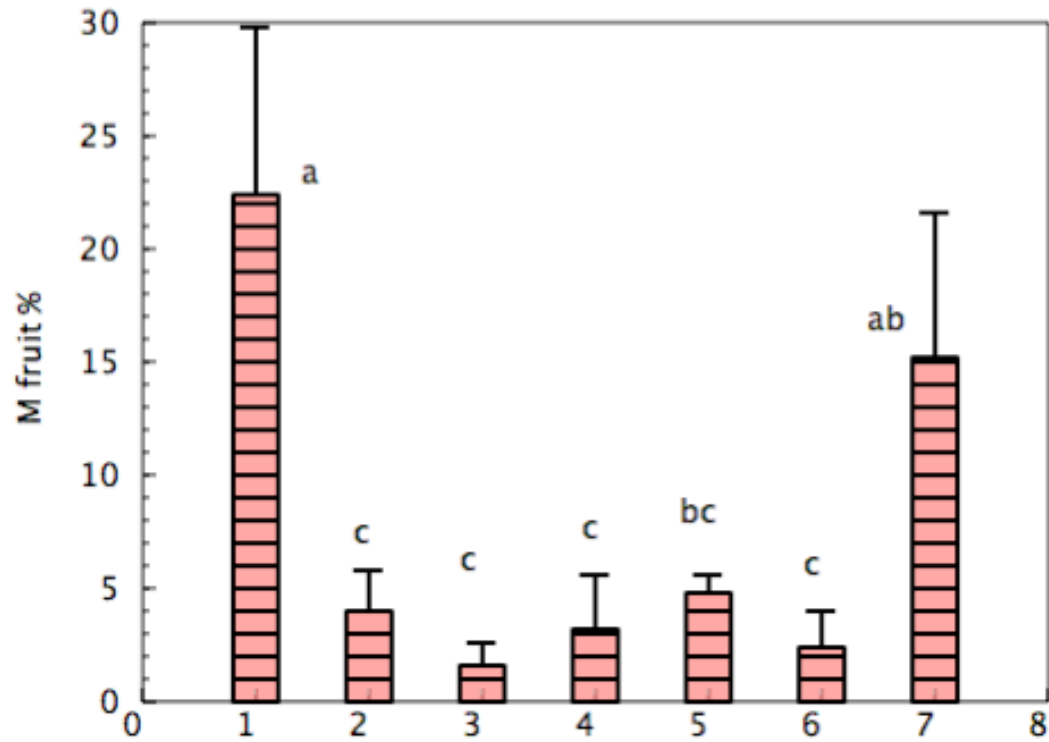
dow worm 2003 Graph



## 2006 Tomato Worm Trial Gun Club North

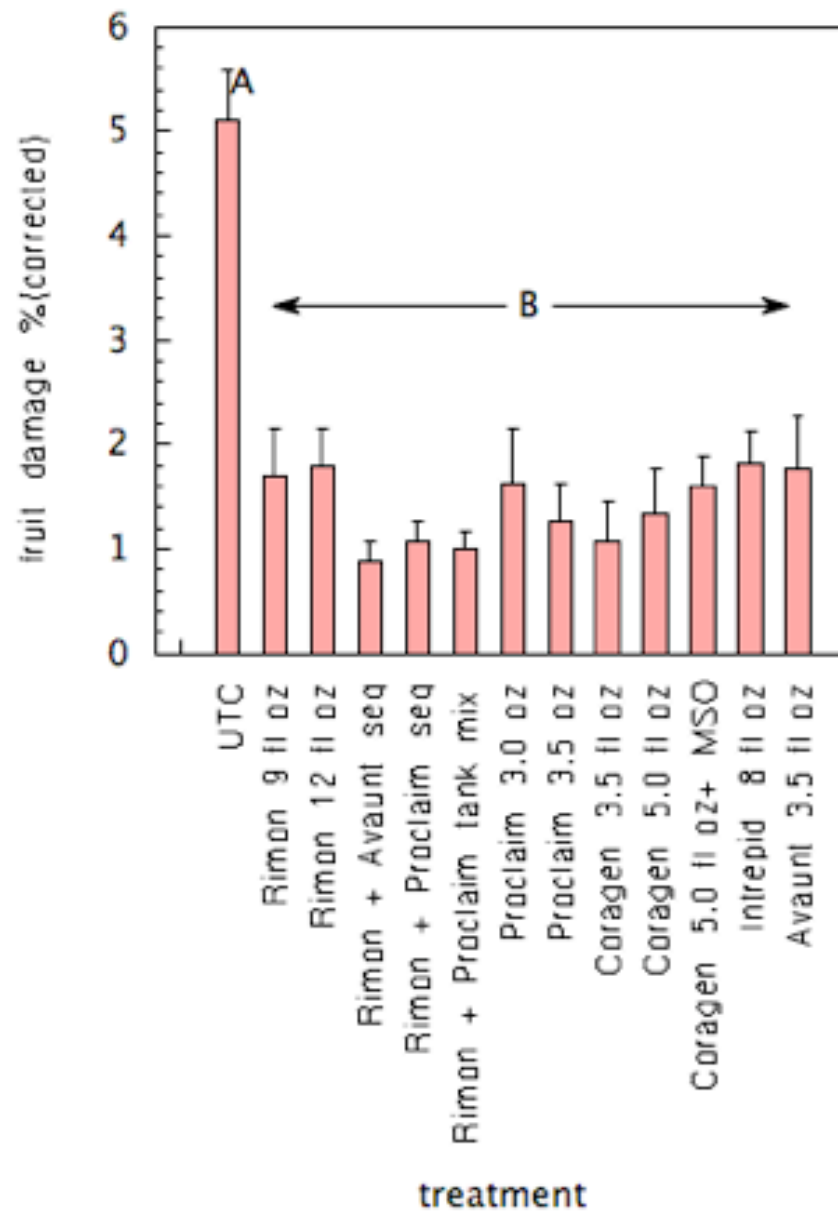
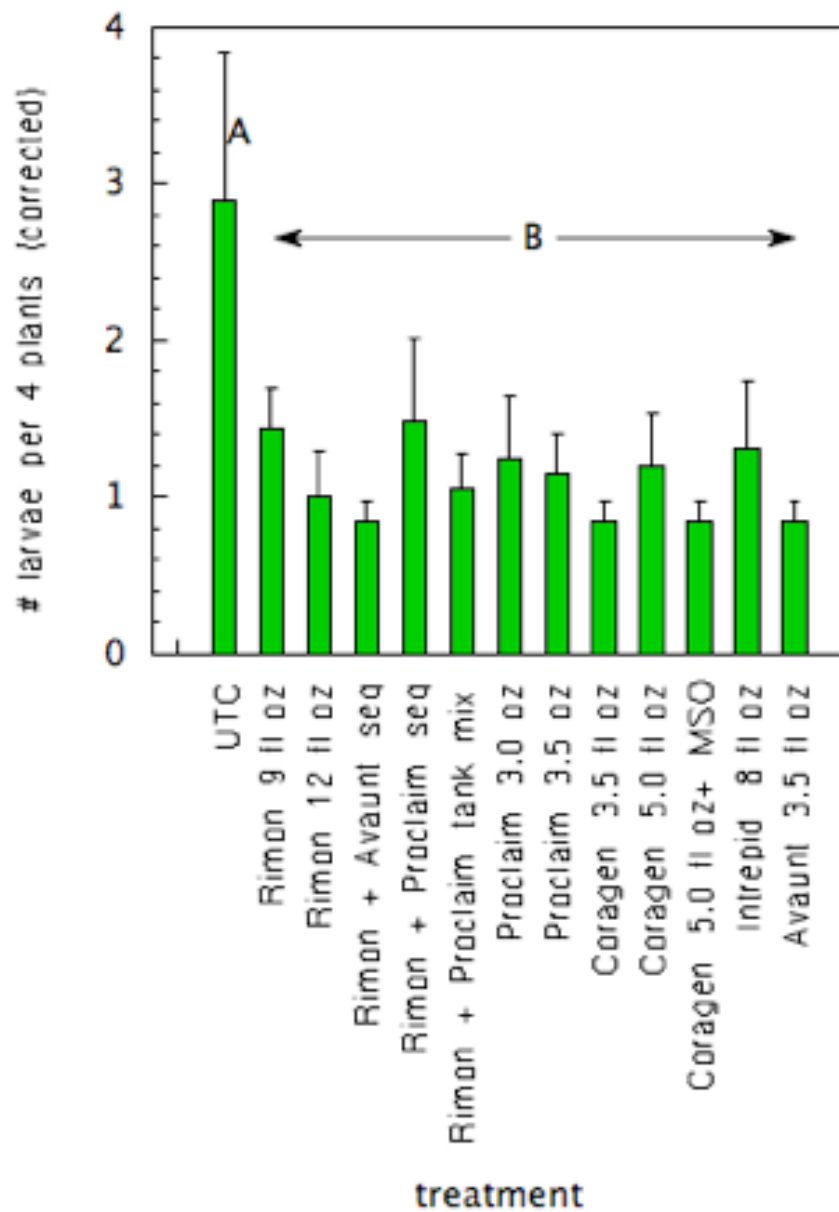


Fruit Damage  
Gun Club North

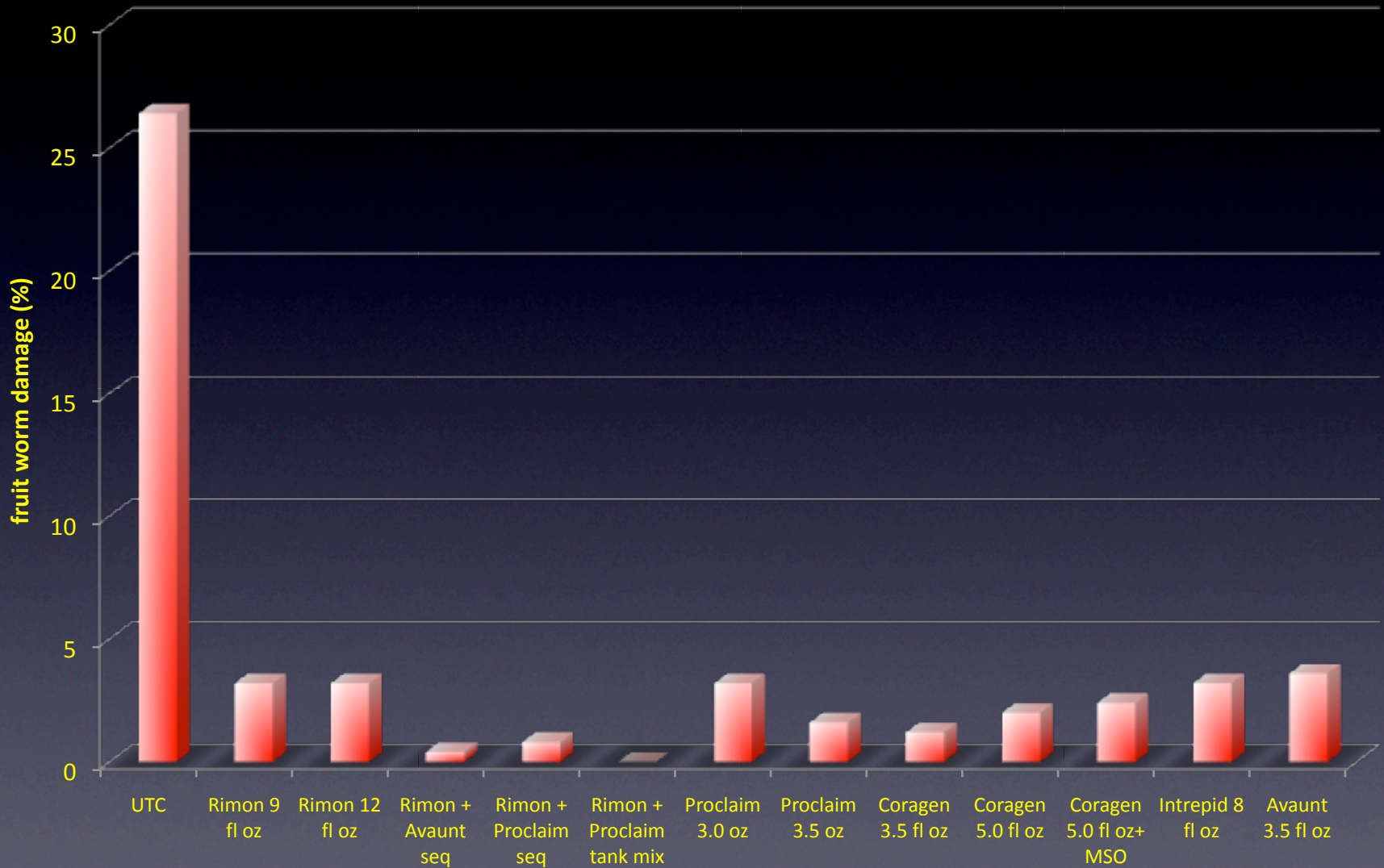


2006

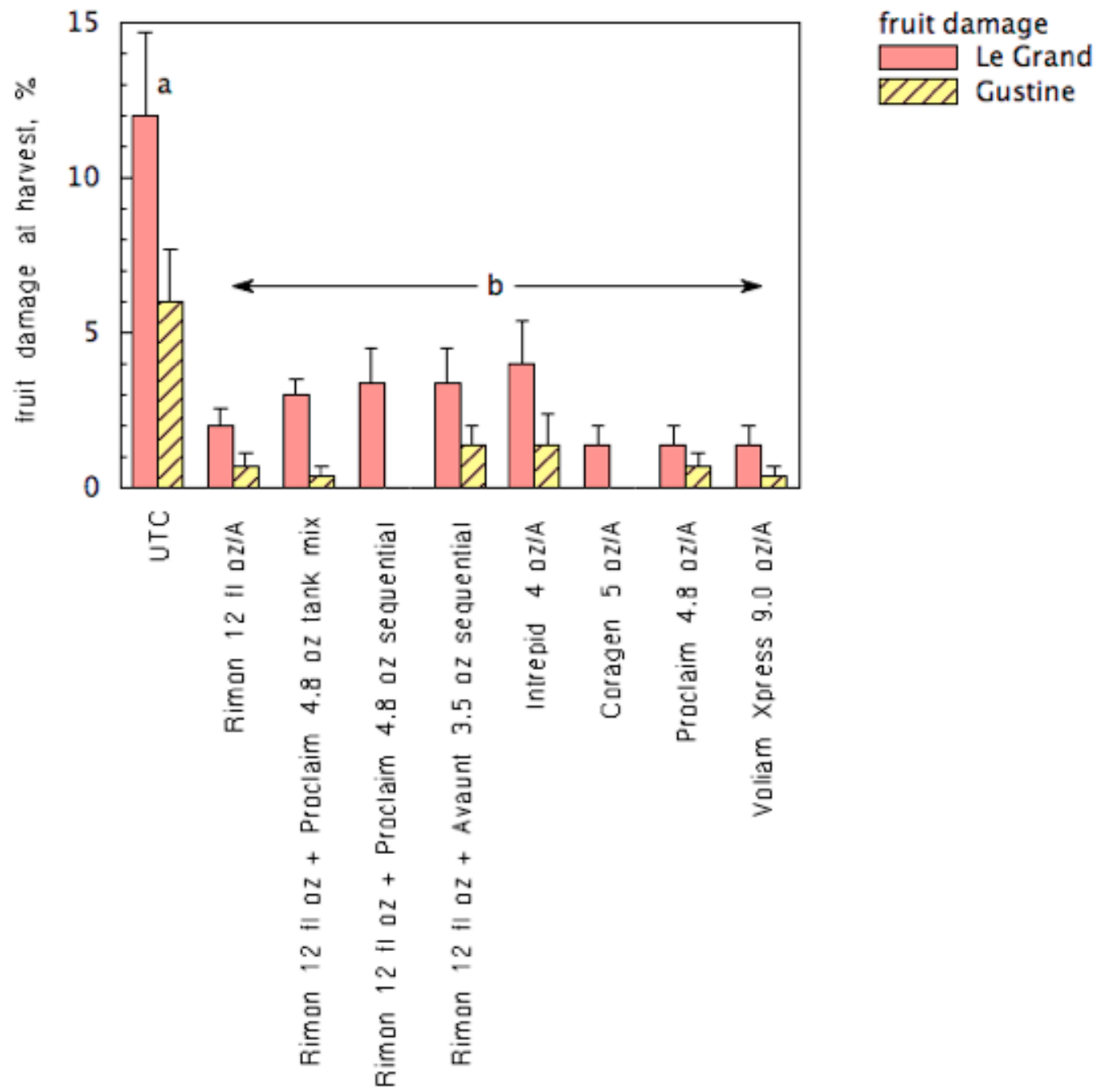
# 2008



## Fresh Market Tomato Worm Trial 2008



2009





# Weed Management

**Yellow nutsedge** *Cyperus esculentus*



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**Black nightshade** *Solanum nigrum*

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**Hairy nightshade** *Solanum sarrachoides*

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# UC IPM Guidelines

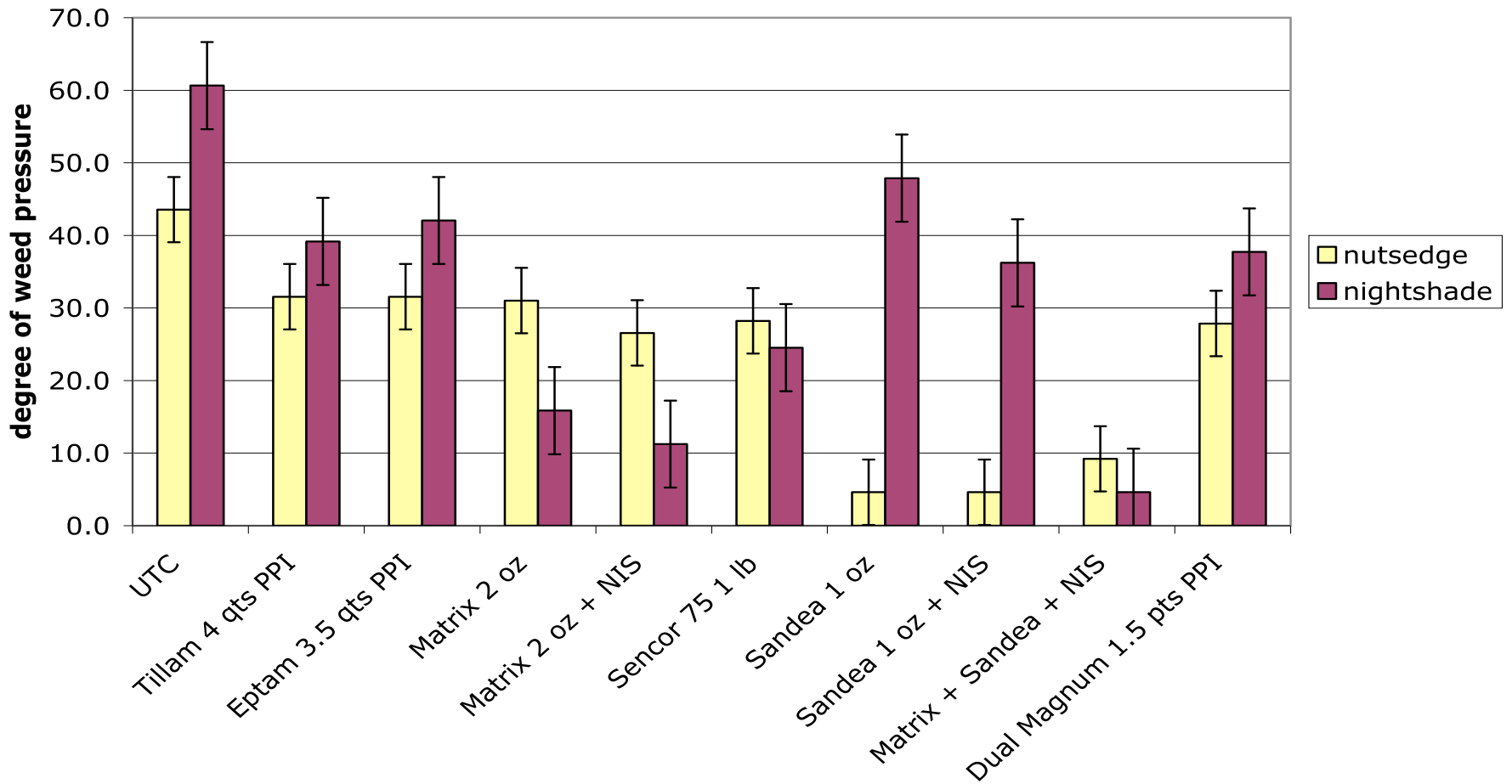
- Nightshade
  - Metam sodium
  - Matrix at 2 true leaves
  - Sencor at 5 - 6 true leaves
  - Crop rotation (RR cotton)
  - Deep plowing
  - Dual Magnum ?? IN TABLE PPI & Layby
- Nutsedge
  - **Tillam PPI**
  - **Metam sodium**
  - **Dual Magnum at layby**
  - **Sandea post emergence**
  - **Rotate to corn or beans**
  - **Deep plowing**

# Herbicide Trials

- Pre & post application of Sandea and Matrix
- PPI Sprinkle incorporated
- Fresh Market and processing tomatoes
- 2003, 2004, 2008



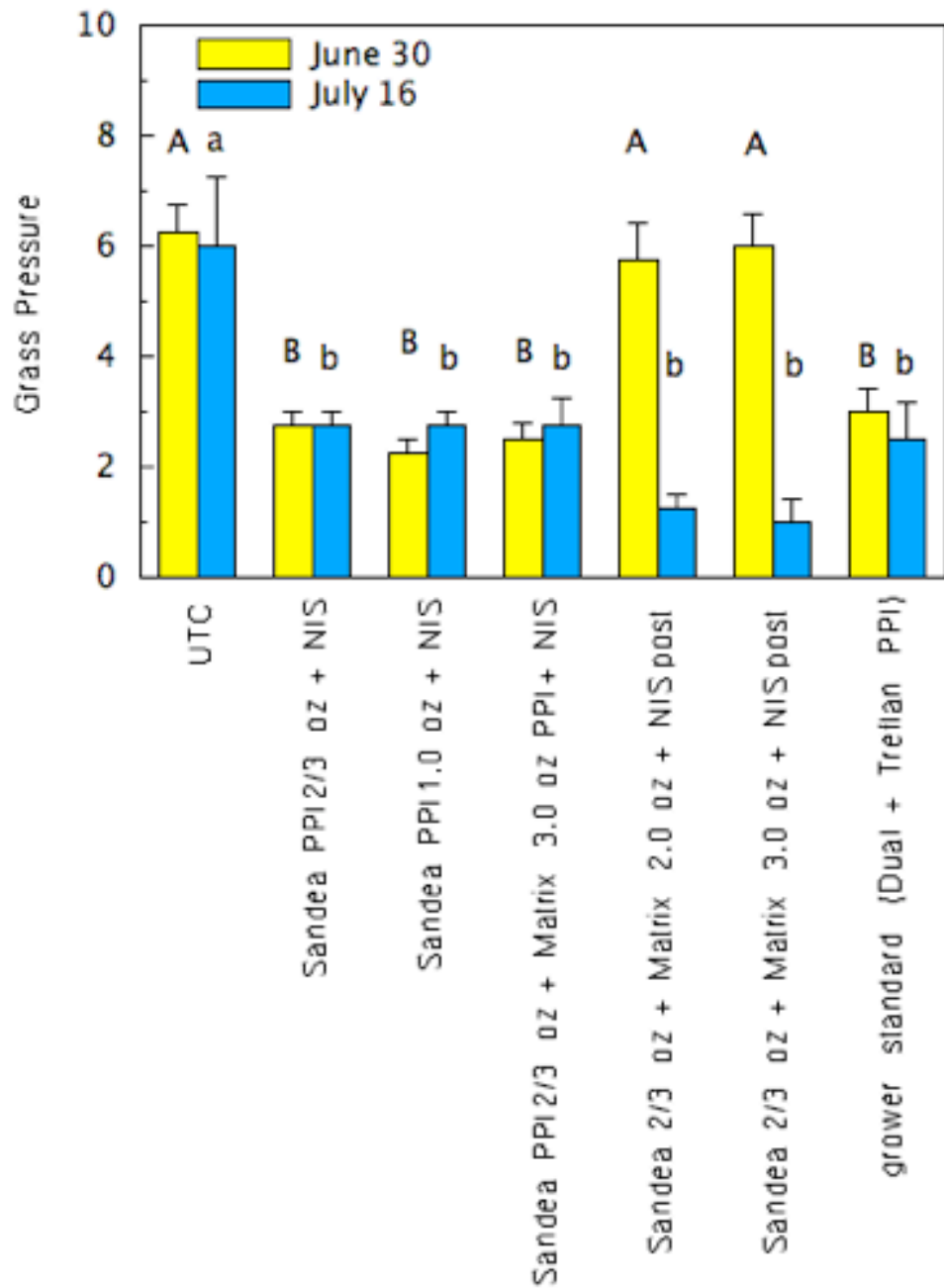
# July 2, 2003



# Conclusions



- Matrix + Dual Magnum provided good control for both spp.
- Matrix + Sandea:
  - Excellent weed control
  - Significant yield increase
  - Better with NIS
- Sandea did not cause crop phytotoxicity in this variety



# Herbicide Trials Le Grand 2008







# TSWV Variety Trial 2009



FM Tomato TSWV Resistant Variety Trial  
Le Grand, CA 2009

