Science For A Better Life

Luna Fungicides for Control of Economic Diseases in Fruiting Vegetables

Malone Rosemond – Bayer CropScience

Tomato Growers Workshop

Nov 1, 2016

Forward-Looking Statements

This presentation may contain forward-looking statements based on current assumptions and forecasts made by Bayer Group or subgroup management.

Various known and unknown risks, uncertainties and other factors could lead to material differences between the actual future results, financial situation, development or performance of the company and the estimates given here. These factors include those discussed in Bayer's public reports which are available on the Bayer website at www.bayer.com.

The company assumes no liability whatsoever to update these forward-looking statements or to conform them to future events or developments.

Luna Introduction

- The active ingredient Fluopyram is the base for Luna Brand Fungicides.
- Exceptional broad-spectrum **efficacy** on key diseases
- Excellent **crop safety, tank-mix compatibility,** and **pollinator profile**
- Unique systemic properties (leaves, stems, buds, and roots)
- **High yields** - almost always the top yielder or in top statistical tier
- Improves **crop quality** at harvest and in storage

New approved uses

Luna TRANQUILITY

- Fluopyram + Pryimethanil (7/9). Tomato, Potato, Pome Fruit, Cane/Bushberry. Early blight, Septoria Leaf Spot, Botrytis, Black Mold, Scab, Powdery Mildew

Luna SENSATION

- Fluopyram + Trifloxystrobin (7/11). Tomato, Pepper, cucurbits, carrot, leafy vegetables, Brassica, Stone, and Pome. Powdery mildew, Alternaria, Rusts, Brown Rot, Scab, Early Blight, Septoria.

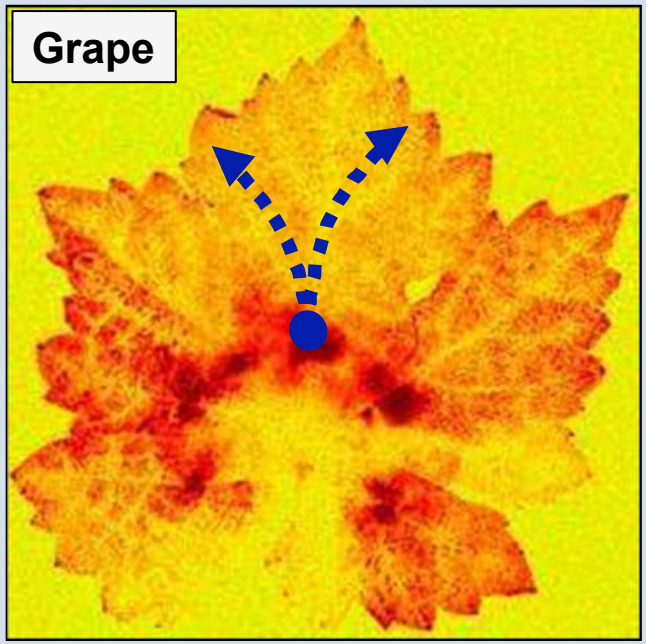
Luna EXPERIENCE

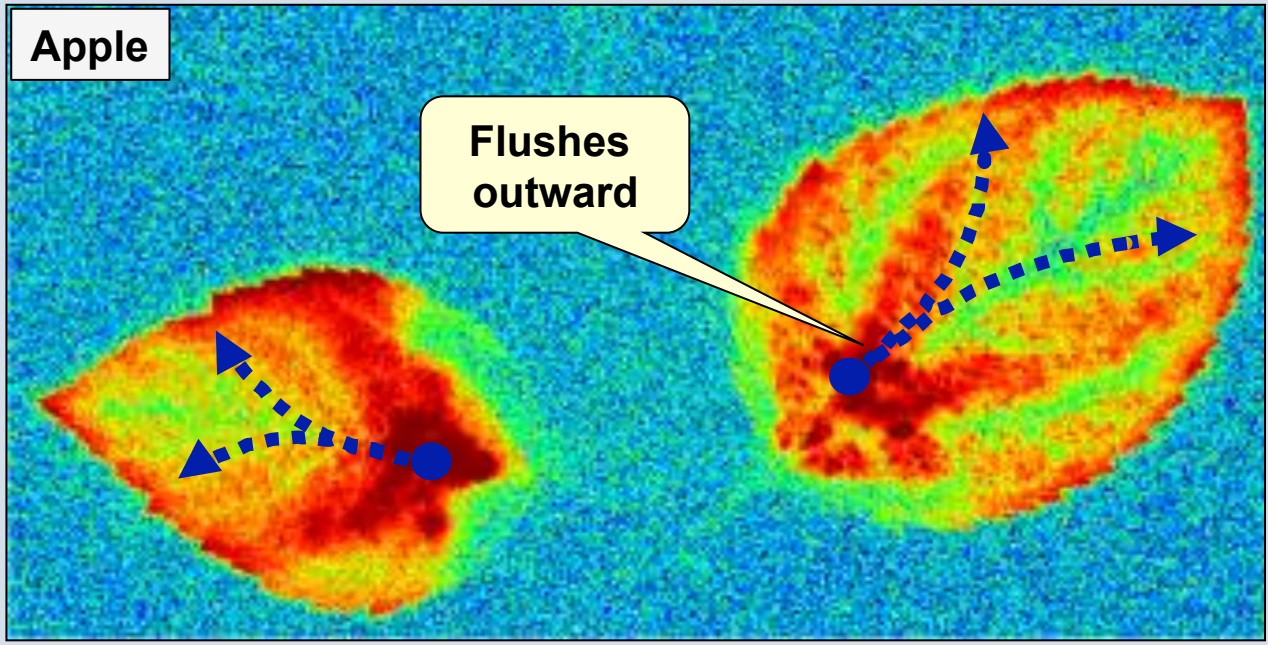
- Fluopyram + Tebuconazole (7/3) Cucurbit Vegetables, : Gummy Stem Blight, Powdery Mildew, Anthracnose.

Fluopyram
- Systemic movement *through foliage*

Luna™

Continuous **penetration; protection of unsprayed tissues**





• UV stable • Non volatile	• Low-water solubility • Excellent rainfast

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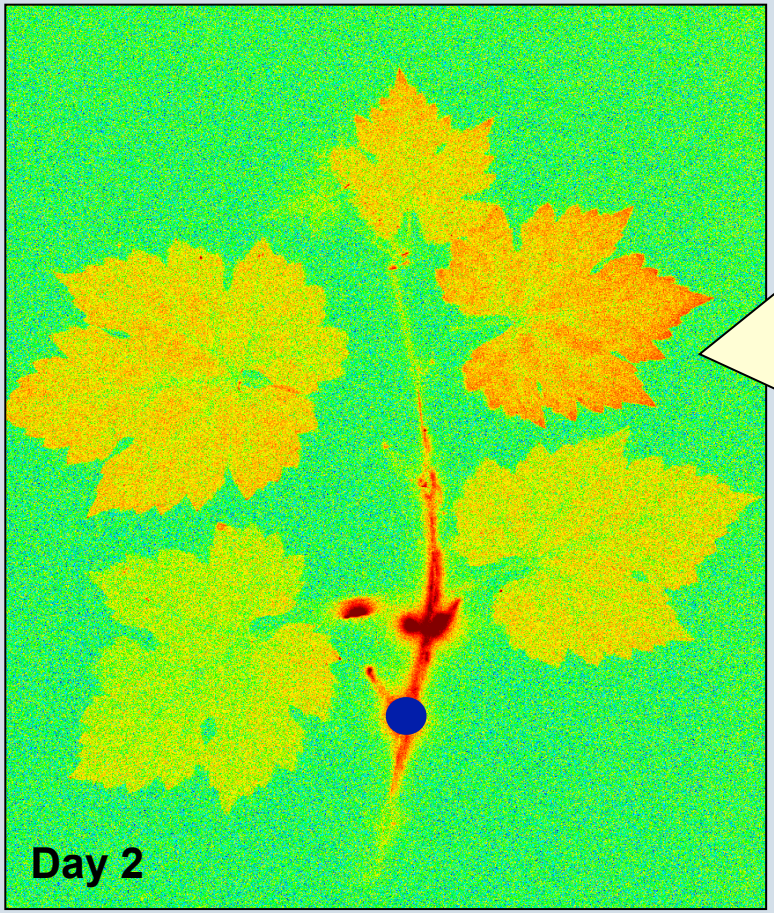
Fluopyram
- Systemic movement *stem to foliage*

Luna™

Continuous **penetration; long term protection of unsprayed tissues**

Stem point application



Stem entry and redistribution to <u>unsprayed leaves</u>

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Bee Safety

Bayer CropScience has proactively evaluated honey bee safety.

Bee safety of Luna was demonstrated in multiple studies that evaluated effects on adult bees and on colony health.

- Did not harm adult bees
- Did not impair the foraging activities of bees
- Did not influence brood development of honey bee colonies

Key Crops and Pathogens

Luna® TRANQUILITY

Southeast

Key Crops and Pathogens		
Tomato	Early blight Target spot Gray leaf spot Powdery mildew Septoria leaf spot Gray mold Black mold	11.2 oz/A

Label - Details

- **Signal word:** Caution
- **Applications:** Ground, Air, and Chemigation, Greenhouse
- **REI:** 12 hours. **PHI:** 1 Day
- **PPE:** coveralls over long-sleeved shirt and long pants, socks and shoes, and chemical-resistant gloves made of any waterproof material such as natural rubber > 14 mils.
- **Active Ingredients (MOA):**
  Fluopyram (SDHI, 7)
  Pyrimethanil (AP, 9)
- **Resistance management:** Two sequential applications, but then alternate to other modes of action.

2 x 2.5 gallon case
(use rate = 11.2 fl oz/A)

Tomato only

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Luna®

Luna Performance – Tomato

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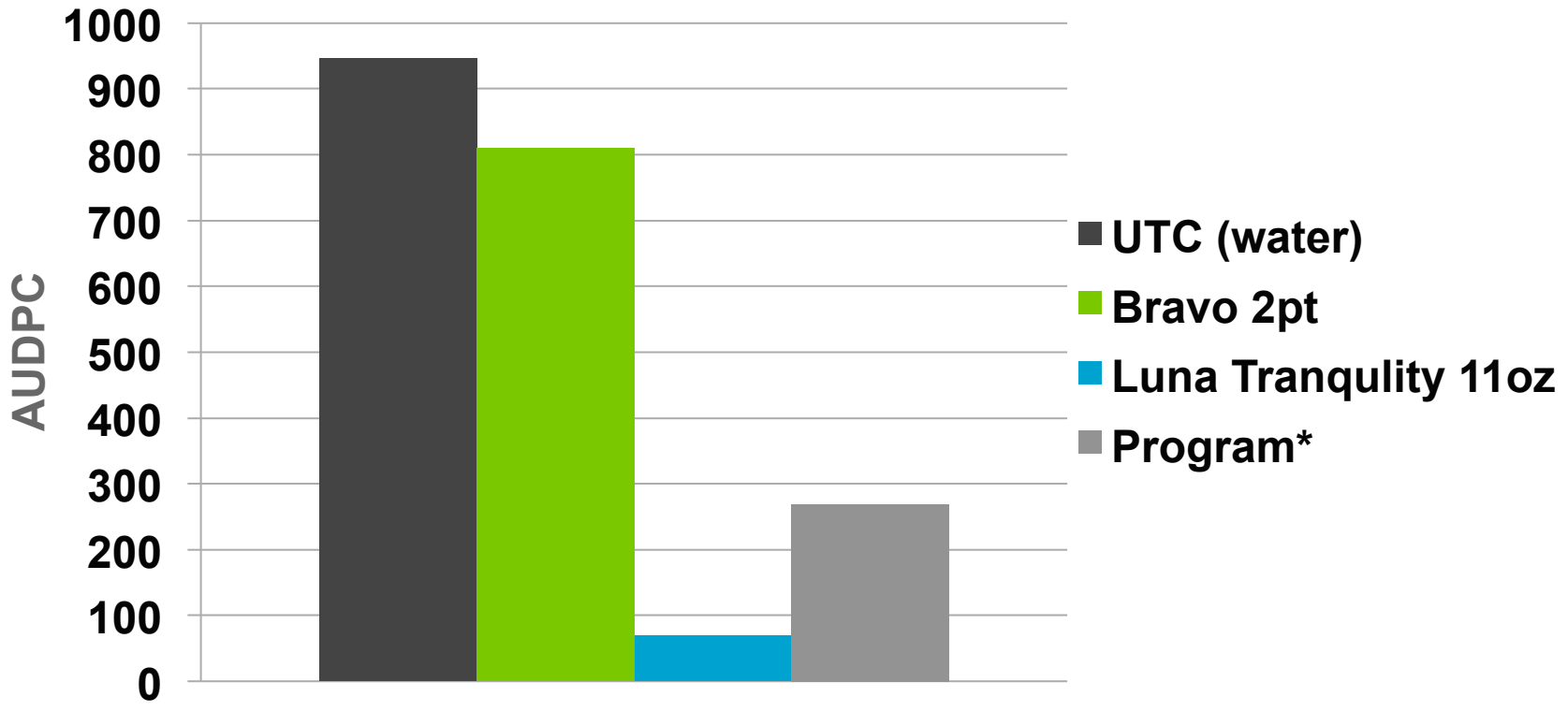
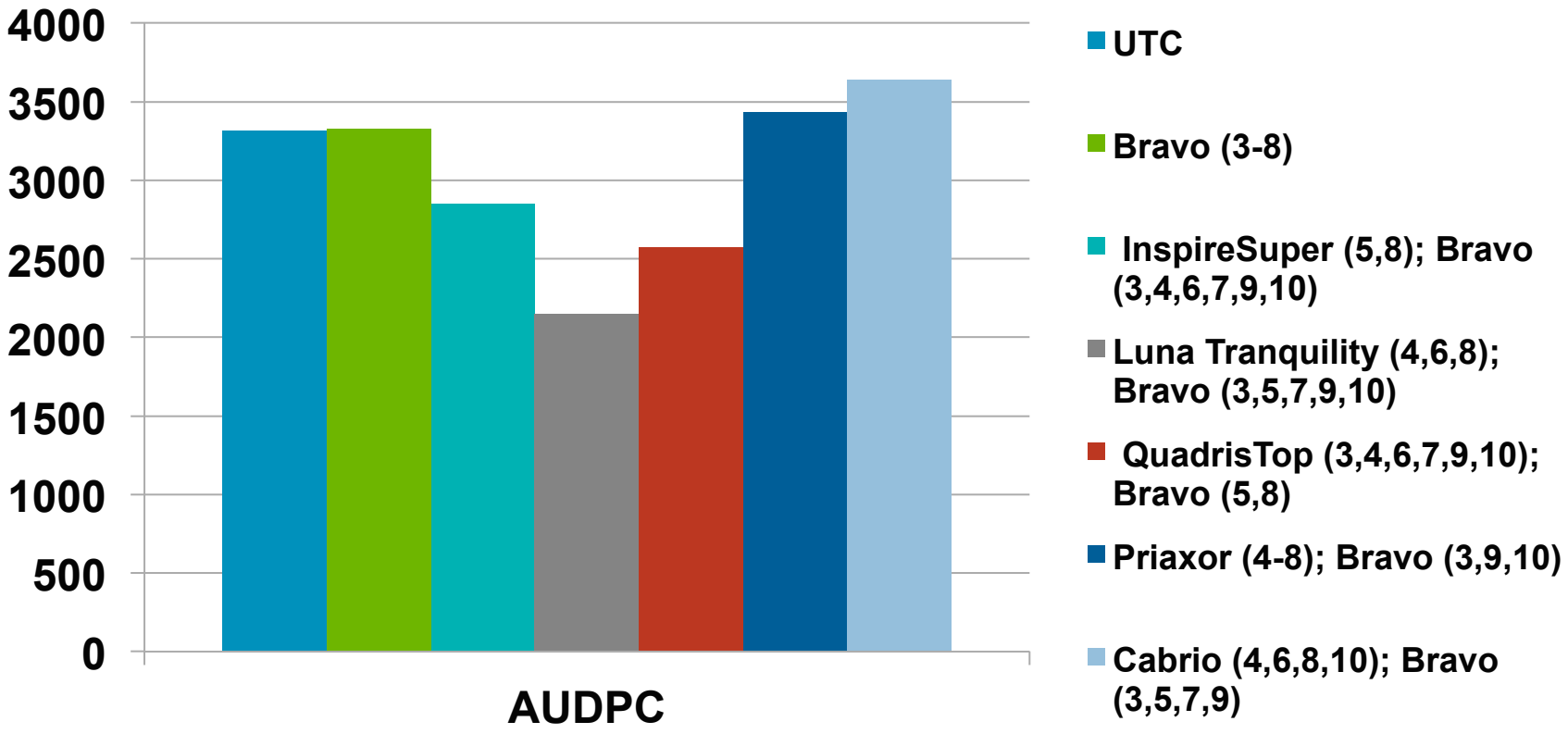
2009 Fall Fungicides for Early Blight and Target Spot of Tomato
Dr. Gary Vallad, Wimauma, FL



Applications: 9/17, 9/25, 10/2, 10/9, 10/15, 10/23, 10/30, 11/6, 11/20; 60-120GPA at 200PSI
Inoculated: 10/5& 10/13 with *Alternaria solani & Corynespora. Cassiicola*
*Program Actigard, 0.33 oz(1-6); Revus Top, 7 oz (1,3,5,7); Quadris FL, 6.2 oz (1,3,5,7); Bravo Weatherstik, 2pt (4,6,8); Penncozeb 75DF, 2 lb (9); Coprofix Ultra 40D, 3 lb (9).

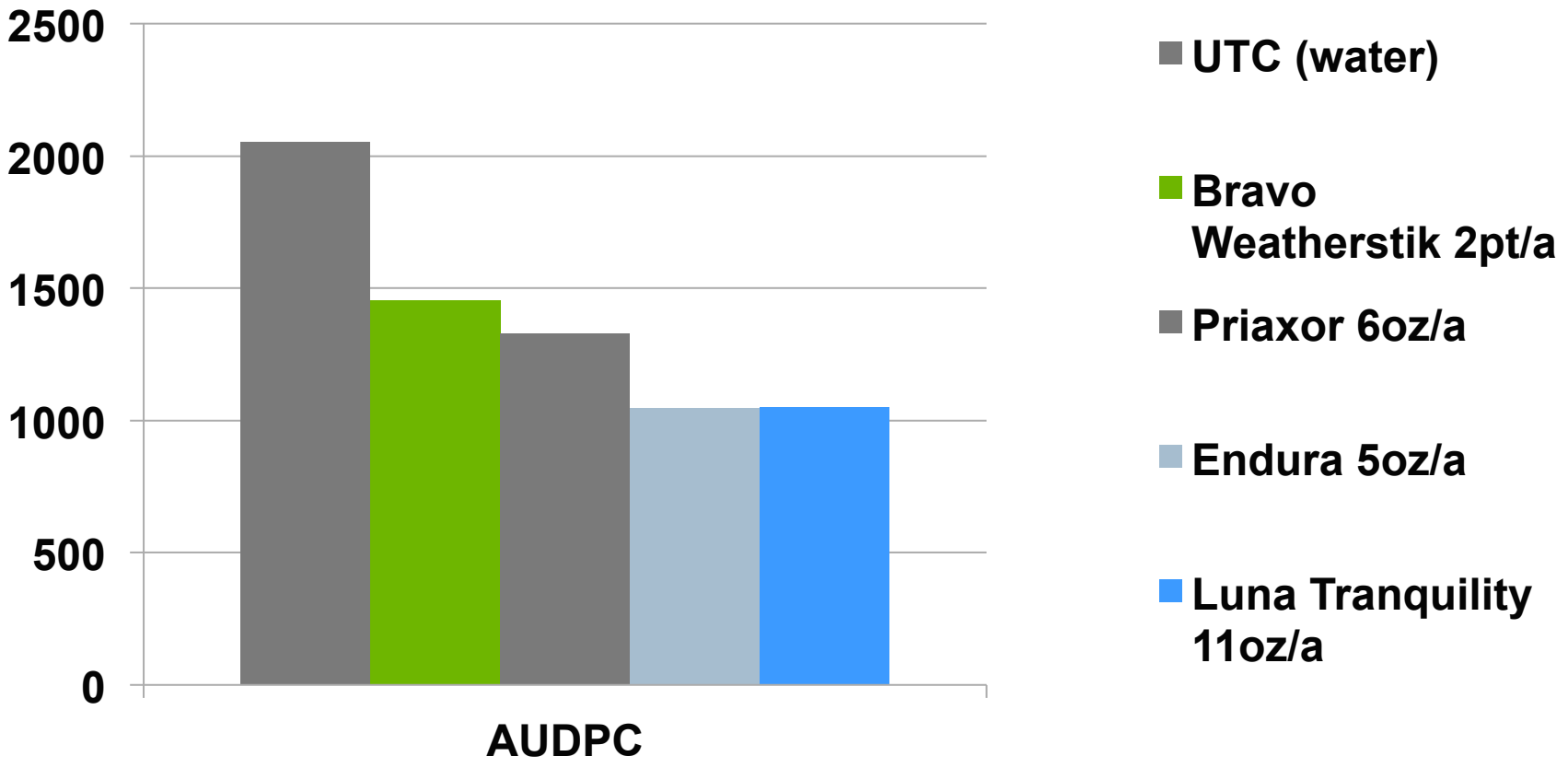
2013 Spring Fungicides for Early Blight, Target Spot, and Gray Leaf Spot of Tomato

Dr. Gary Vallad, Wimauma, FL



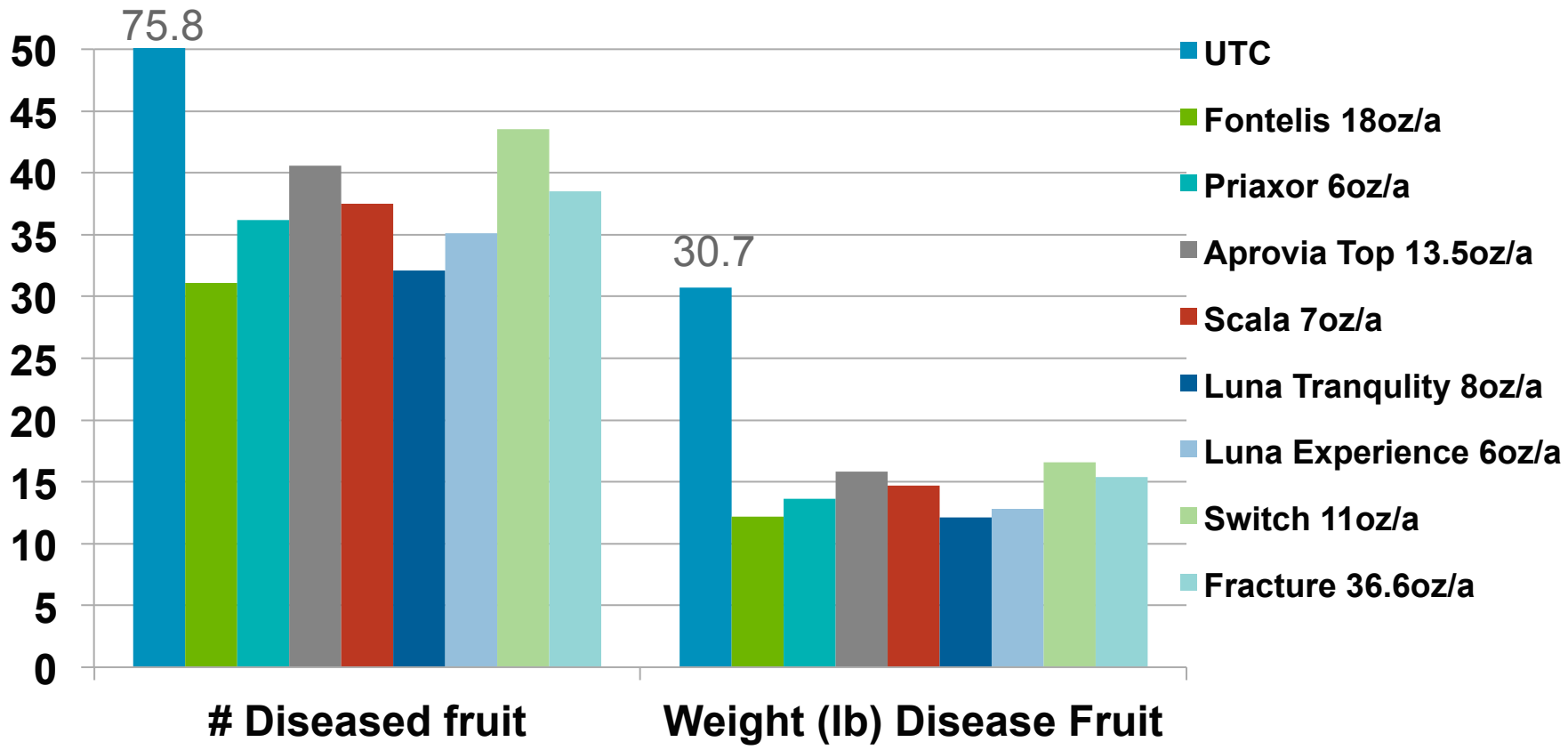
Applications: 3/25, 4/1, 4/9, 4/16, 4/23, 4/30, 5/7, 5/14, 5/21, 5/28; 60-120GPA at 210PSI
Inoculated: 3/15 with *Alternaria tomatophila & Corynespora. cassiicola*
Rates: Bravo Weatherstik 2pt/a; Luna Tranquility 11oz/a; QuadrisTop 8oz/a; Cabrio 16oz/a; Priaxor 8oz/a InspireSuper 20oz/a
Gray leaf spot naturally occurred in May and was included in ratings of disease foliage

2014 Spring Fungicides for Target Spot of Tomato
Dr. Gary Vallad, Wimauma, FL. PDMR 9:V072



Applications: 3/20, 3/27, 4/2, 4/11, 4/17, 4/24, 5/1, 5/8; 60-120GPA at 210PSI
Inoculated: 3/25 with *Alternaria tomatophila & Corynespora. cassiicola*
All fungicide sprayed at timings 3-10

2015 Fall Fungicides for Target Spot of Tomato
Dr. Gary Vallad, Wimauma, FL. Trial 15-10



Applications: 10/15, 10/29, 11/12, 11/19, 11/25, 11/30, 12/11; 75-100GPA at 120PSI
Inoculated: 10/9 with *Corynespora. cassiicola*
All fungicide programs started with Bravo Weatherstik 2pt/a and alternated with premium fungicides

Summary

- Luna Tranquility provides excellent control of early blight, gray leaf sport and target spot on tomatoes. Other diseases controlled include powdery mildew, Septoria leaf spot.
- Excellent resistance management properties with 2 different class active ingredients.
- Apply 11.2 oz/A with good coverage. Apply before disease starts with a good rotation program
- Apply no more than 2 sequential applications without rotating to a different chemical group.
- 1 day PHI

Key Crops and Pathogens

Luna™

West

Key Crops and Pathogens		
Tomato	Powdery mildew Black mold Anthracnose Septoria leaf spot Gray mold Early blight Target spot Gray leaf spot	5.0 to 7.6 oz/A Luna® SENSATION

Label - Details

- **Signal word:** Caution
- **Applications:** Ground, Air, and Chemigation
- **REI:** 12 hours.
- **PHI:** 28 days
- **PPE:** coveralls over long-sleeved shirt and long pants, socks and shoes, and chemical-resistant gloves made of any waterproof material such as natural rubber > 14 mils.
- **Active Ingredients (MOA):**
  Fluopyram (SDHI, 7)
  Trifloxystrobin (QoI,11)
- **Resistance management:** Two sequential applications, but then alternate to other modes of action.

8 X 32 oz case
(use rate = 5 to 7.6 oz)

Tomato -
Powdery Mildew and Black Mold

Luna® SENSATION

BCS WFTS, 2009
7- to 9-day spray interval

Powdery Mildew

Black Mold

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Tomato -
Powdery mildew and Black Mold

Luna® SENSATION

BCS WFTS, 2009
7- to 9-day spray interval

Luna Sensation 7.6 oz/A + adjuvant

Untreated

10/19/2009 (14 days after the last application)

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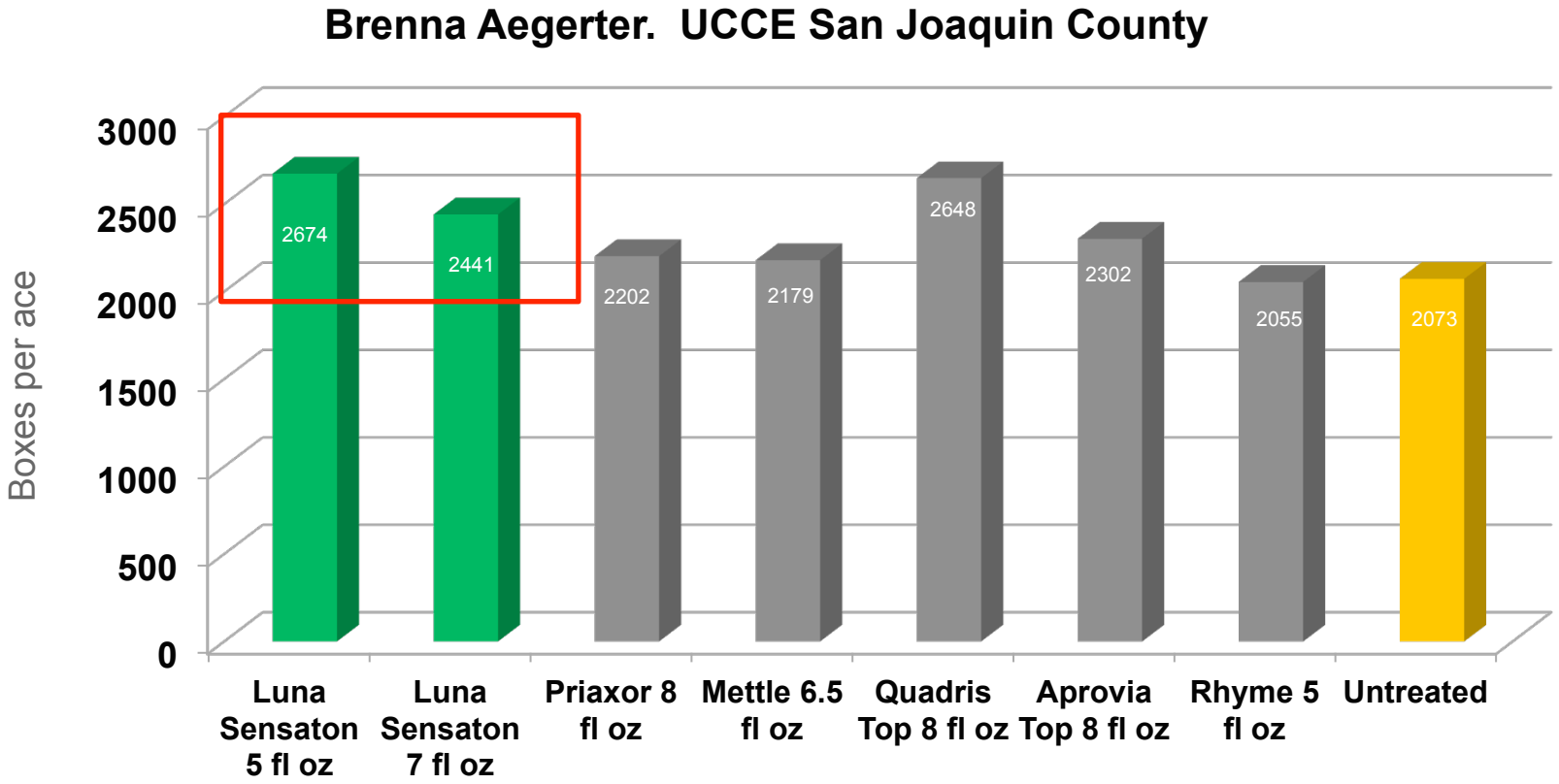
LUNA SENSATION
Powdery Mildew* in Tomatoes

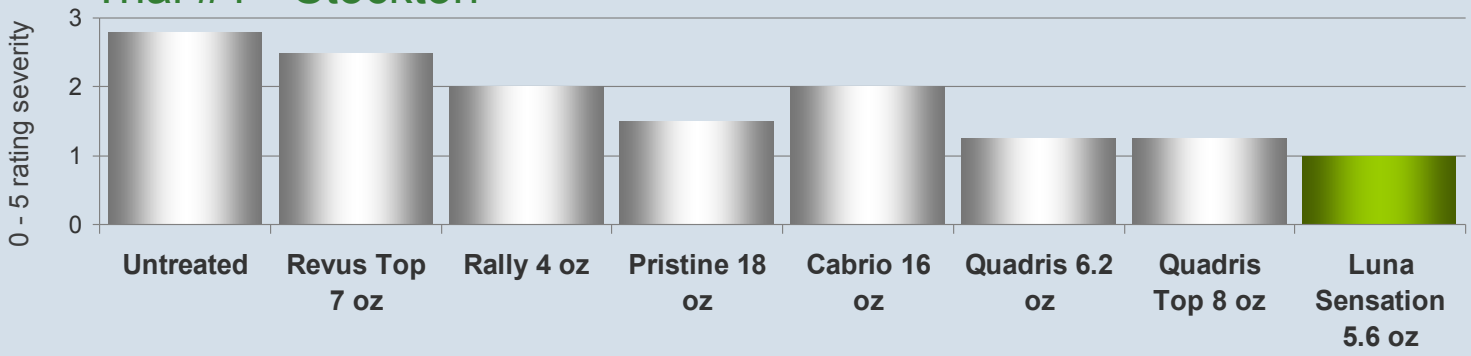


**Oidium spp*. Fresh market variety roma-type cv "Galilea. RCB design wit h reps. All materials were applied with a CO2 sprayer with hollow cone nozzles operating at 50 GPA and 34 psi. Applications were made on 8/24, 9/4 and 9/18. All treatments were applied with Latron B-1956 at 0.25% v/v. Disease severity was evaluated on 9/12 and 9/28. Plots were harvested on 10/6&7.. Location: 5 mi SE of Stockton.

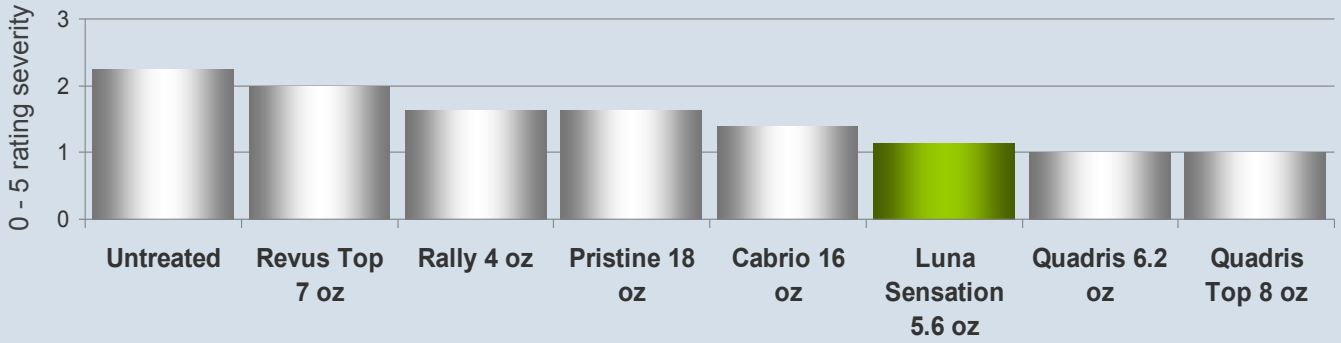
Tomato - Powdery mildew

Tomato P. mildew, *Leveillula taurica (Oidiopsis)*
Severity, 0 to 5 scale, *0 = no disease,* B. Aegenter, 2008, Stockton, CA, 4 applications

Trial #1 - Stockton



Trial #2 - Tracy



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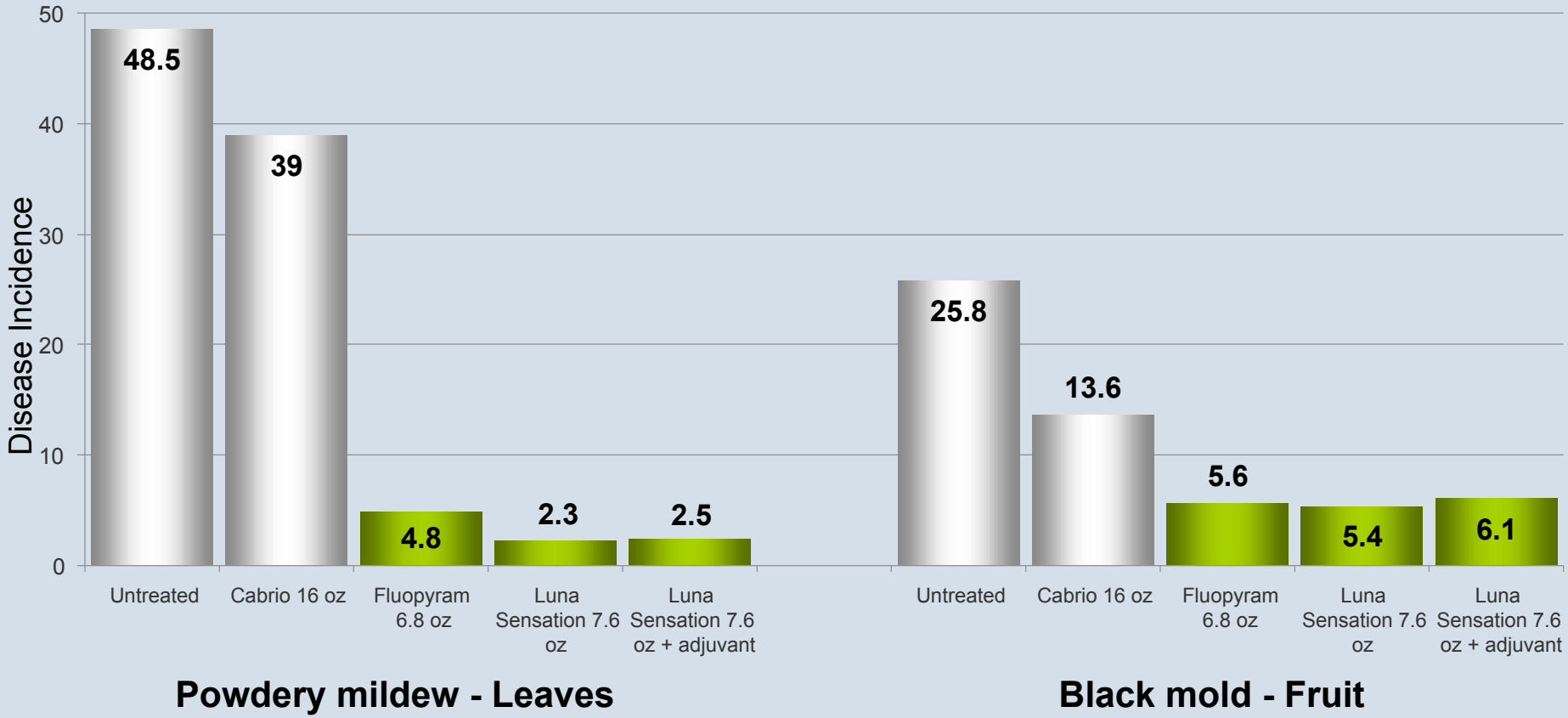
Tomato

- Powdery Mildew and Black Mold

Luna™

L Fought. 11 applications on a 7- to 9-day spray interval



Luna is highly effective on Black mold and Powdery mildew

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TOMATO – Black mold (*Alternaria alternata*)

Stoddard, UCCE Merced Co. 2013

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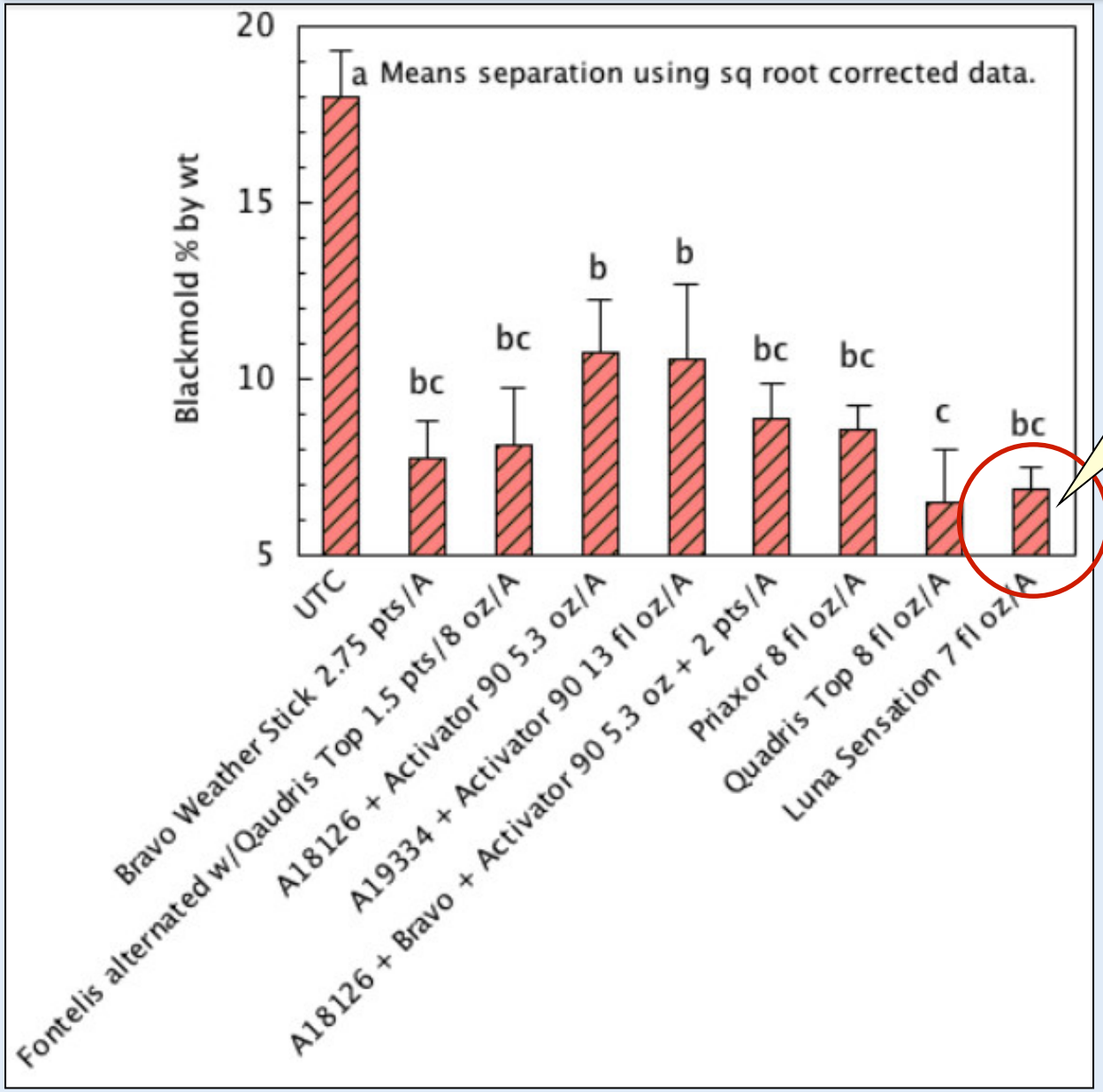

Luna is highly effective on Black mold

Summary

- Luna Sensation provides excellent control of powdery mildew and black mold on tomatoes. Other diseases controlled include early blight, gray leaf sport and target spot.
- Excellent resistance management properties with 2 different class active ingredients.
- Apply 5-7.6 oz/A with good coverage. Apply before disease starts with a good rotation program
- Apply no more than 2 sequential applications without rotating to a different chemical group.
- 28 day PHI