BASF

We create chemistry

CTGA Product Update

January 27, 2016

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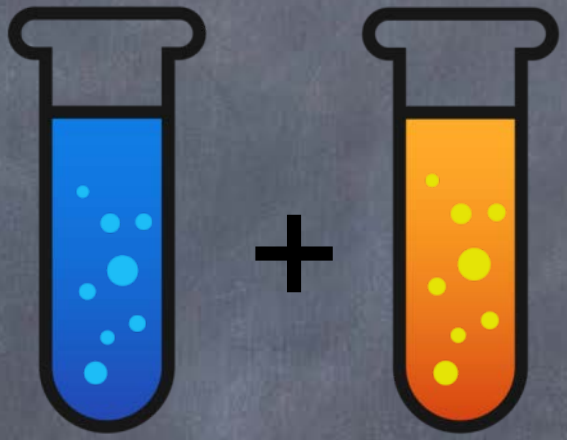
Priaxor Fungicide
Xemium® Brand

BASF
The Chemical Company

F500® Fungicide
the active ingredient in:

Pristine® Fungicide

Cabrio® EG Fungicide



Xemium® Fungicide

	Priaxor® Xemium® Brand Fungicide
Formulation:	2:1 F500 + Xemium
Registered Crops:	Fruiting vegetables, tuberous vegetables, Brassicas

Xemium → fluxapyroxad

- Carboxamide (FRAC 7)

- Unique redistribution of A.I.

- **Broad spectrum**
- **Long residual control**

Priaxor® Fungicide Use
Tomatoes

150 years

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Priaxor® Fungicide Use in Tomatoes			
Use Rates and Diseases	**4-8 oz/A** – Anthracnose, Black mold, Early blight, Septoria leaf spot and Target spot		
	6-8 oz/A – Powdery mildew		
	4-8 oz/A – Suppression of Botrytis, Rhizoctonia stem rot, Sclerotinia stem rot, White mold, Southern blight, Late blight		
PHI	**0 days**	REI	12 hours

Adjuvant Use and Tank Mixing With Priaxor

- ✓ Always consult a BASF representative before tank mixing products with Priaxor
- ✓ Effectiveness and safety of Priaxor in mixes depends on product, growth stage and other factors

Priaxor Fungicide

Tomato, Powdery Mildew, Efficacy

2015 Tom Turini – UCCE Fresno County, CA

150 years

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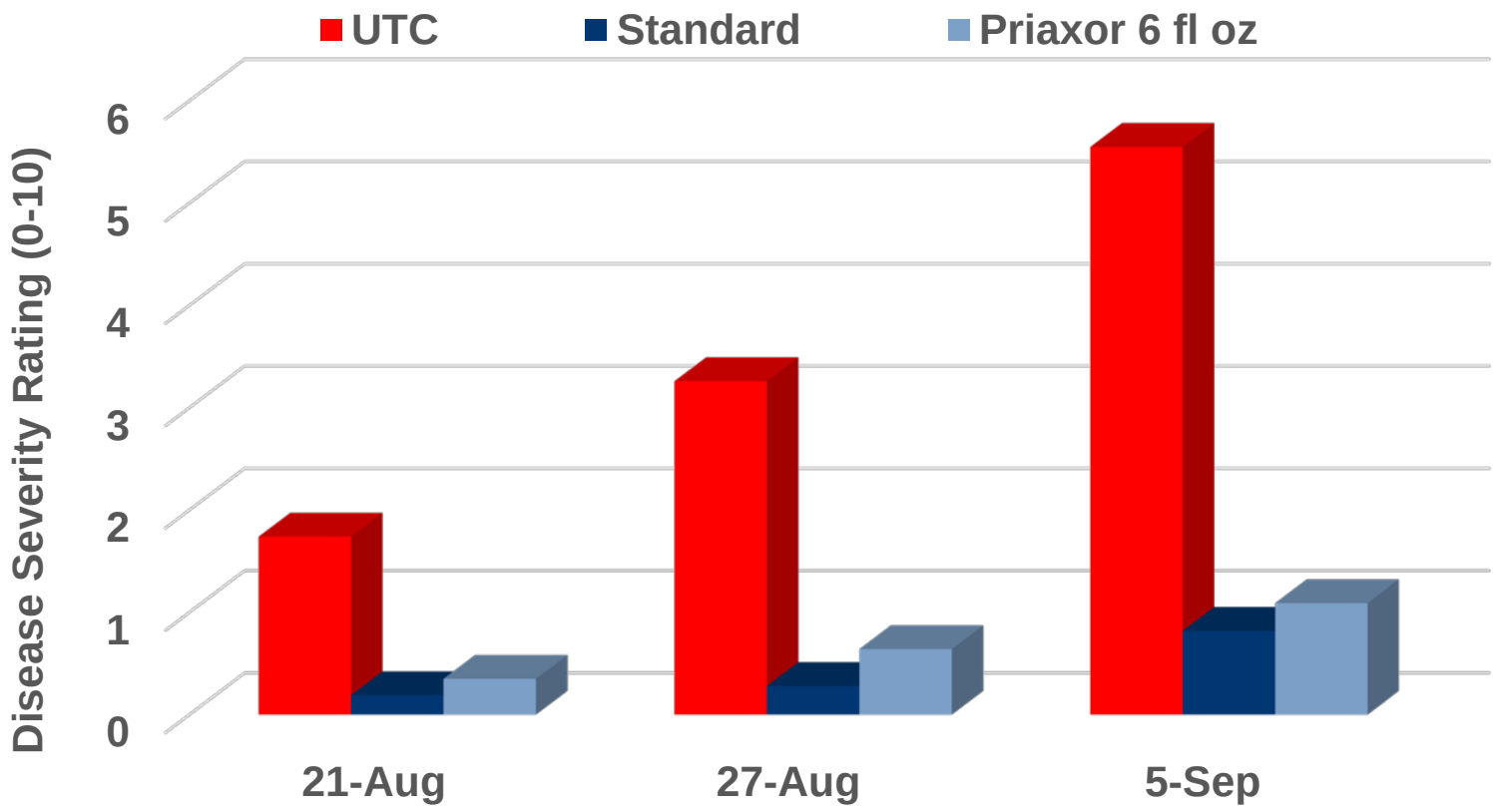

2015 Tom Turini – Univ. of California West side Ag Research, Five Points, CA. RCBD. Disease was rated on a 0 to 10 scale, where 0 = no visible symptoms and 10 was completely covered with powdery mildew or obvious symptoms. Applications made on 7, 19 and 31 Aug at 50 gallons per A with a CO_2-pressurized backpack sprayer at 32 psi. Processing tomato variety: Sun 6366

Vivando® Fungicide
New Crop Use for Tomato

150 years

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- **CA supplemental label for fruiting vegetables in 2015**
- Active ingredient = metrafenone
- Highly specific fungicidal activity – only powdery mildew fungi
- Totally unique chemistry and mode of action
  - FRAC MoA Group Code U8

Vivando®
Fungicide

Vivando™ Fungicide

Affects Many Life Stages of Powdery Mildew

150 years

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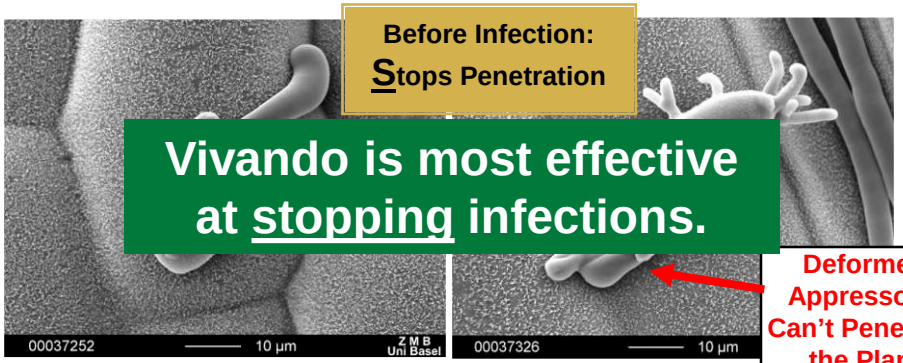
Before Infection:
Stops Penetration

Vivando is most effective at stopping infections.



Deformed Appressoria Can't Penetrate the Plant

Untreated — Vivando fungicide

After Infection:
Limits Sporulation

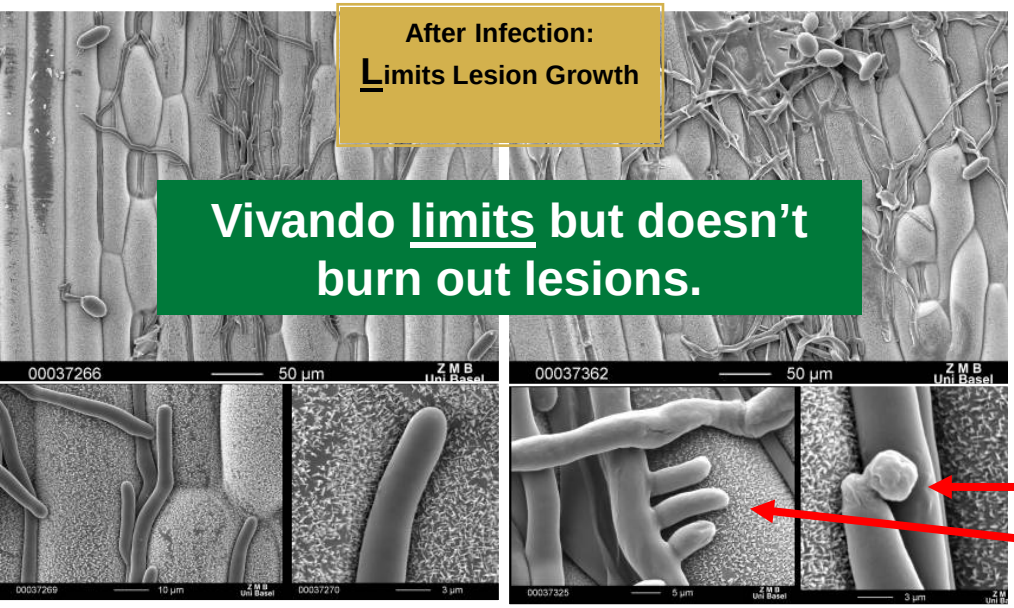
Vivando limits but doesn't burn out lesions.

ores to Drive the Epidemic

Untreated — Vivando fungicide

After Infection:
Limits Lesion Growth

Vivando limits but doesn't burn out lesions.



Hyphal Tips Burst
Irregular Branching
Development Interrupted

Untreated — Vivando fungicide

Vivando Always Recommended as Preventive Application

Vivando is NOT curative

Vivando® Fungicide

Vivando Fungicide

Tomato, Powdery Mildew, Efficacy

2015 Scott Stoddard – UCCE Merced County, CA

150 years

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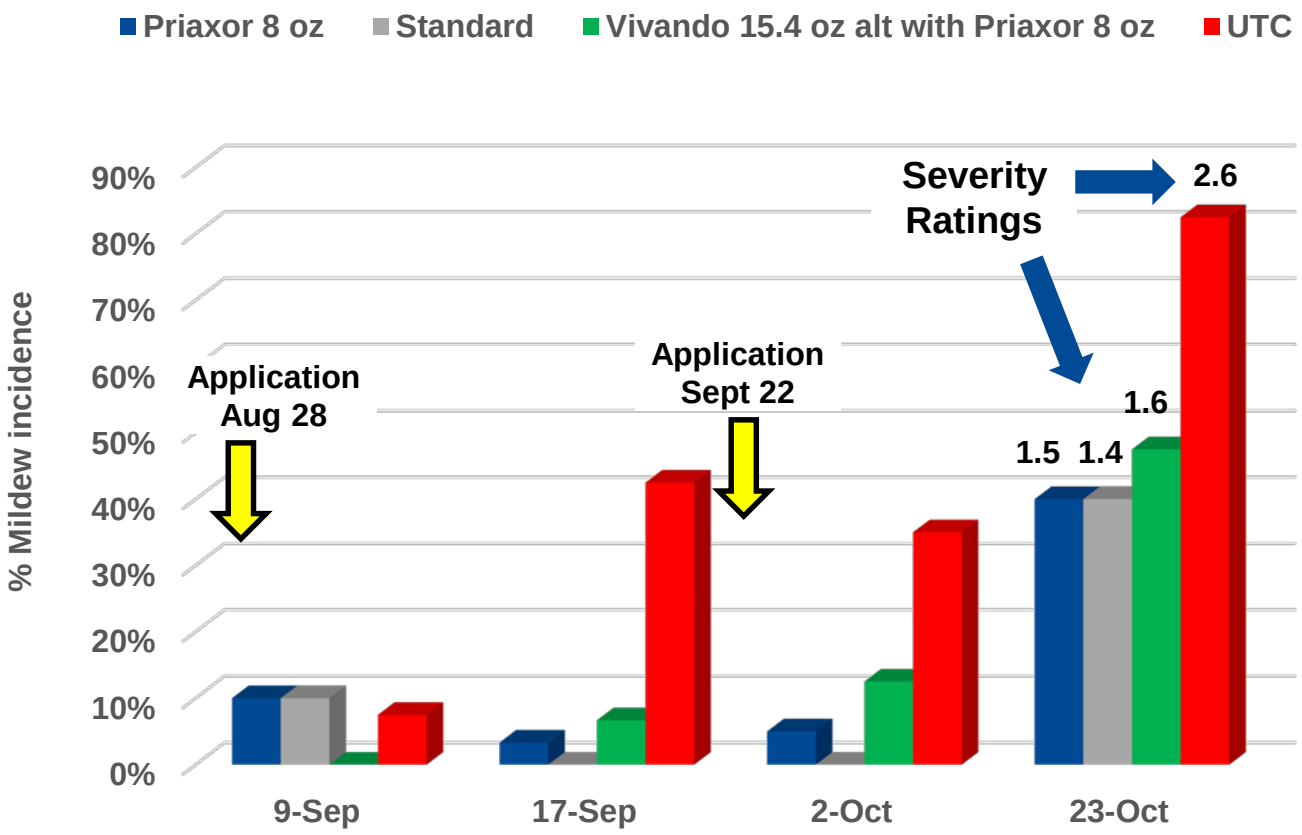

2015 Scott Stoddard – location: Merced College, Merced, CA. RCBD. Severity scores based on a 1 - 5 scale: 0 = no visible colonies, 1 = <10% leaf infected, 2 = 25%, 3 = 50%, 4 = 75%, 5 = > 90% leaf infected. Incidence based on 10 random leaves per plot. Applications made on Aug 28 and Sept 22 at 80 gallons per A with a CO_2-pressurized backpack sprayer at 35 psi. Processing tomato variety: QualiT-27

Vivando® Fungicide
Directions for Use in Fruiting Vegetables

150 years

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- **Suggested use: at bloom, rotation with Priaxor, or tank mix partner (Rally)**
- **Single Use Rate: 15.4 fl oz/Acre**
- **Application Timing**
  - Apply preventively for best performance
  - 0-day PHI
  - ≤ 2 sequential sprays then change MoA
- **Adjuvants**
  - Organo-silicone adjuvants recommended
  - DO NOT mix with horticultural oils

California Tomato Growers Assocaltion

Annual Meeting. Modesto. 1-27-2016

The Bayer Portfolio:

Serenade Soil ®

Admire Pro ®

Belt®

Oberon®

Sivanto®

Luna Sensation®

Velum Prime®

SERENADE® ASO
Soil Mode of Action

Bacillus subtilis is known to have many positive interactions with plants as part of a natural system benefiting both sides. However, the strain within Serenade, *Bacillus subtilis* QST713, is unique in several ways.

Plant Microbe interactions

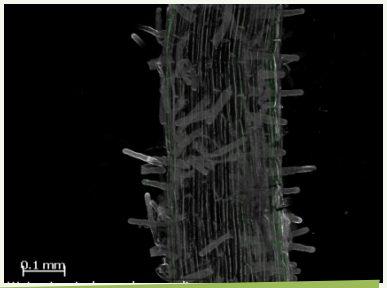
- **Root Colonization:**

Serenade is an excellent root colonizer. When used as a soil treatment, it can be a pre-emptive colonizer of the plant's rhizome, forming a protective barrier to protect against soil diseases. Soil applications of Serenade result in colonization of the plant roots which can continue as the roots grow. Serenade can improve plant health by producing auxins, such as 2,3-butanediol and indole acetic acid to speed early season growth. In the laboratory in *Arabidopsis*, Serenade has been shown to trigger the sucrose pathway inside the plant showing a mutualistic relationship where the plant is supporting the colonization.

- **Nutrient Solubilization:**

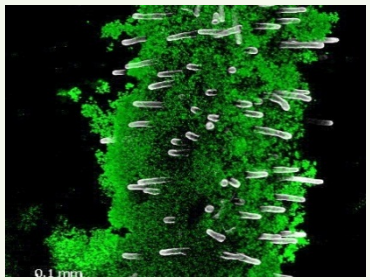
Serenade produces a siderophore, bacillibactin, which complexes iron to benefit the plant. Serenade also produces the enzymes endoglucanase and endoxylanase which hydrolize cellulose and xylan, breaking down organic material in the soil to forms which are more easily taken up by plant roots

Untreated control



Digital Microscopy

Fluorescence Microscopy



SERENADE™

The Reasons for ADMIRE® PRO SYSTEMIC PROTECTANT

Increased dispersion & suspension

Reduced foam formulation

Concentrated formulation (42.8% ai)

Unique “blue” color

- Easy to see
- Cleans without leaving residues

Early season control of aphids and thrips

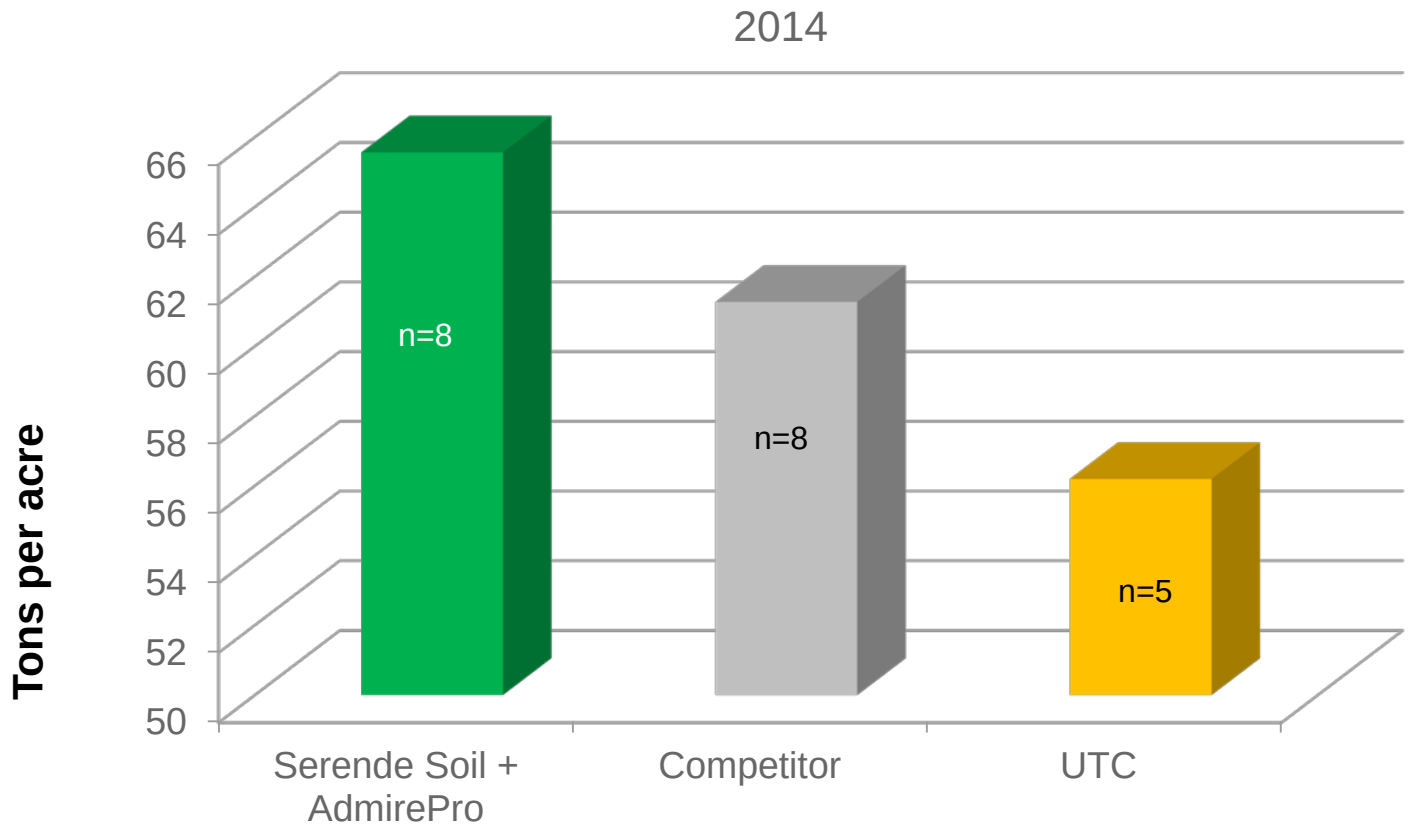
Use Pattern:

Soil application via chemigation, post- plant drench or directed spray in-furrow below seed

- 14 oz/acre
- One application per season
- 21day PHI

SERENADE SOIL on Tomatoes

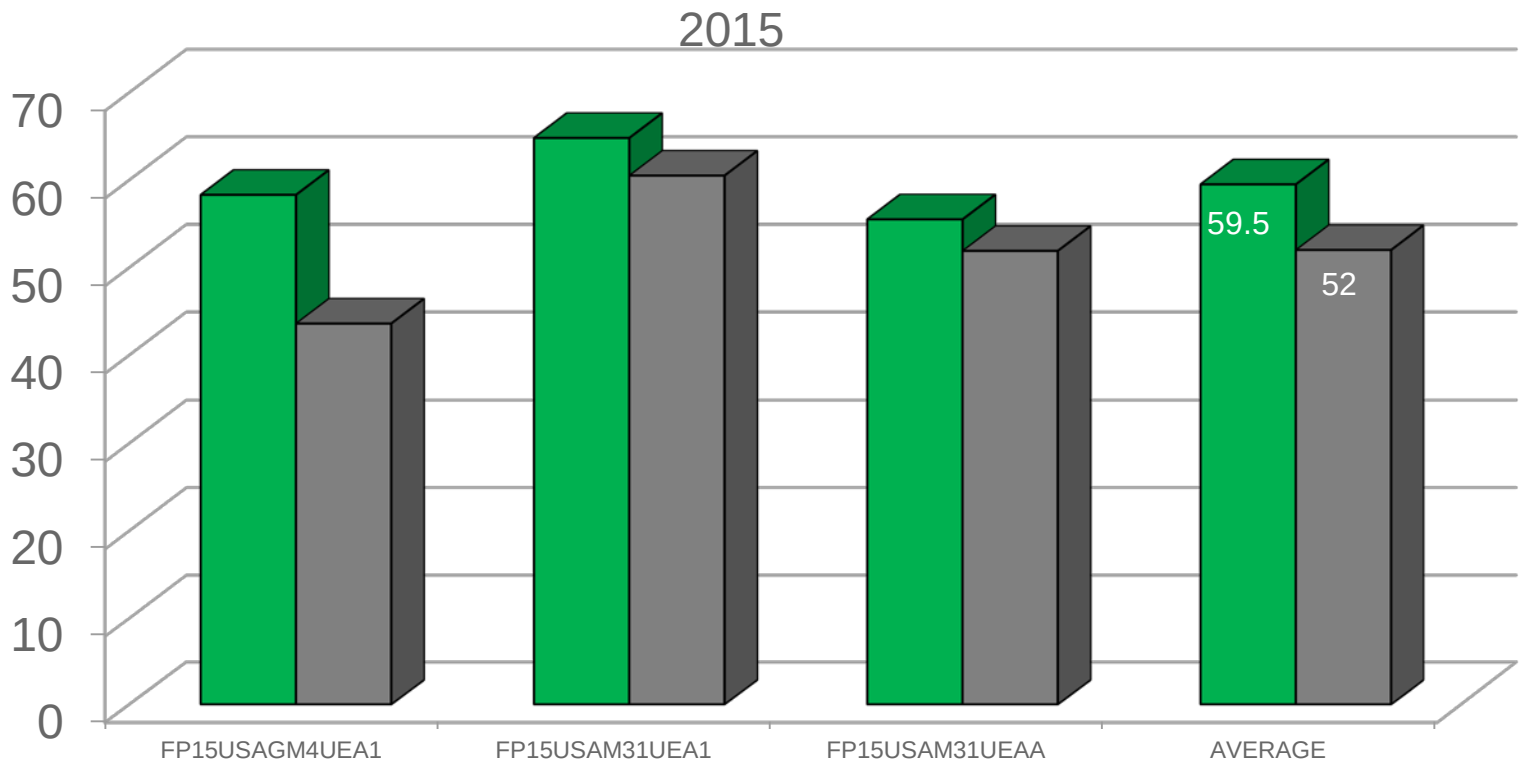
Yields – Drip apps followed by foliar apps



Soil materials applied at full flower and fruit set via underground drip irrigation.

FP14USAM31UEA2

SERENADE
Yield Improvement in processing tomatoes



Large block grower demonstration field trials. Serenade ASO applied twice at 2 qts/acre each time..

The first application was time d for 10-14 days after transplanting or first flower. The second application was timed for full flowering. All fields lacked significant soil diseases. The grey bars are untreated areas..

BELT

Technical Features

❖SUPERIOR CROP PROTECTION:

- ❖ Rapid feeding cessation
- ❖ Extended residual activity
- ❖ Broad spectrum control of all important lepidopteran pests
- ❖ Excellent translaminar action and rainastness
- ❖ Safe to bees
- ❖ Outstanding crop safety
- ❖ Excellent tankmix compatibility
- ❖ USE:
  - ❖ 1.5 oz/acre
  - ❖ Limit 3 applications per season
  - ❖ 12hr REI
  - ❖ 1day PHI

o·b·e·r·o·n®

BAYER

APPLICATIONS FOR TOMATOES:

- Low toxicity to bees and other beneficial insects
- Control russet mites, whiteflies and more
- Slightly delayed onset of activity
- Long residual activity
- Applications
  - 7.0 – 8.5 oz/acre
  - Maximum of 25.5 oz/acre/season
  - PHI 1 day

Science For A Better Life

Product Introduction

In California

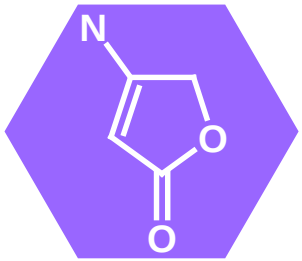
SIVANTO™

Foliar and soil applied insecticide

Mode of Action – Sivanto is not a neonic

IRAC MoA Classification v 7.3 February 2014		
4 **Nicotinic acetylcholine receptor (nAChR) agonists** Nerve action	**4A** Neonicotinoids	Acetamiprid, Clothianidin, Dinotefuran, Imidacloprid, Nitenpyram, Thiacloprid, Thiamethoxam
	4B Nicotine	Nicotine
	4C Sulfoxaflor	Sulfoxaflor
	4D Butenolides	Flupyradifurone

CNI chemistry



butenolide chemistry

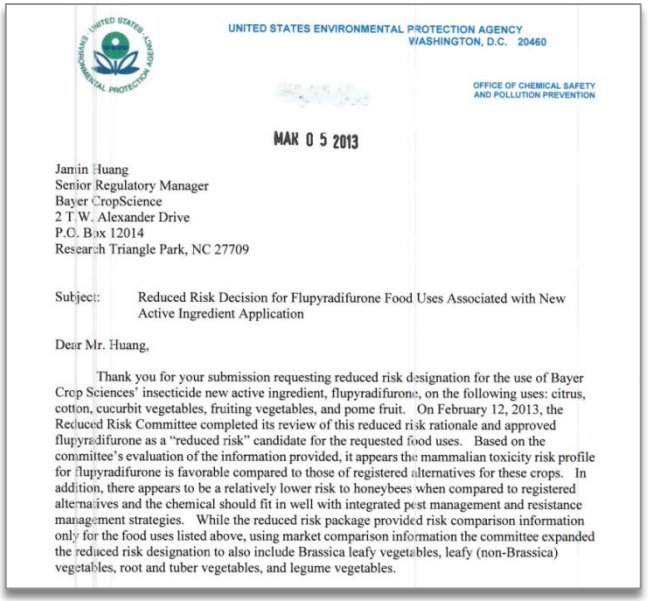
Biological Characteristics

- Activity via ingestion and contact
- Adult knockdown, immature control
- Rapid and strong feeding cessation effect
- Xylem mobile & translaminar movement; whole-plant protection from soil applications; moves from tops to undersides of leaves and from points of contact to tips of leaves from foliar applications
- Excellent residual control
- Excellent honey bee and bumble bee safety profile
- Reduced risk to many beneficial arthropods

Excellent Safety Profile

Human safety

Favorable mammalian toxicity risk profile supported Reduced Risk designation across multiple crops**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY AND POLLUTION PREVENTION

MAR 0 5 2013

Jamin Huang
Senior Regulatory Manager
Bayer CropScience
2 T.W. Alexander Drive
P.O. Box 12014
Research Triangle Park, NC 27709

Subject: Reduced Risk Decision for Flupyradifurone Food Uses Associated with New Active Ingredient Application

Dear Mr. Huang,

Thank you for your submission requesting reduced risk designation for the use of Bayer Crop Sciences' insecticide new active ingredient, flupyradifurone, on the following uses: citrus, cotton, cucurbit vegetables, fruiting vegetables, and pome fruit. On February 12, 2013, the Reduced Risk Committee completed its review of this reduced risk rationale and approved flupyradifurone as a "reduced risk" candidate for the requested food uses. Based on the committee's evaluation of the information provided, it appears the mammalian toxicity risk profile for flupyradifurone is favorable compared to those of registered alternatives for these crops. In addition, there appears to be a relatively lower risk to honeybees when compared to registered alternatives and the chemical should fit in well with integrated pest management and resistance management strategies. While the reduced risk package provided risk comparison information only for the food uses listed above, using market comparison information the committee expanded the reduced risk designation to also include Brassica leafy vegetables, leafy (non-Brassica) vegetables, root and tuber vegetables, and legume vegetables.

Pollinator safety

Honey- and bumble bee-friendly profile supports flexible application timings

Environmental safety

Fits well with integrated pest management (IPM) systems

Sivanto received Reduced Risk designation by the U.S. EPA*

* U.S. EPA = U.S. Environmental Protection Agency.
** Citrus, cotton, cucurbit vegetables, fruiting vegetables, pome fruit.

Luna Label Expansion – CA/AZ
Crops by Brand

Expansion Label

Luna SENSATION	Luna EXPERIENCE	Luna TRANQUILITY
Strawberry*	All Grapes*	Bulb Veg*
Fruiting Veg*	Cucurbit*	Strawberry*
Leafy Veg*		Pome*
Brassica*		Berries*
Cucurbit*		
Carrot*		
Stone*		
Pome*		
Citrus*		

Current Label

Tree Nuts		Wine Grape	Tree Nuts	
Cherry	Apple	Watermelon	Potato	Apple

Federal registration for expanded label anticipated Fall 2015, State labels to follow.

***Luna is not yet registered for sale or use on these crops in the United States.**
Always read and follow label directions.

LUNA SENSATION

Key Crops and Pathogens in Fruiting Vegetables

Key Crops and Pathogens		
Fruiting Vegetables	Early blight Target spot Anthracnose Powdery mildew Septoria leaf spot Gray mold Gray leaf spot Black mold	

Tomato – Powdery mildew

Four applications at 7.6 oz on 7/22, 7/31, 8/12 and 8/21
Evaluated 9/1

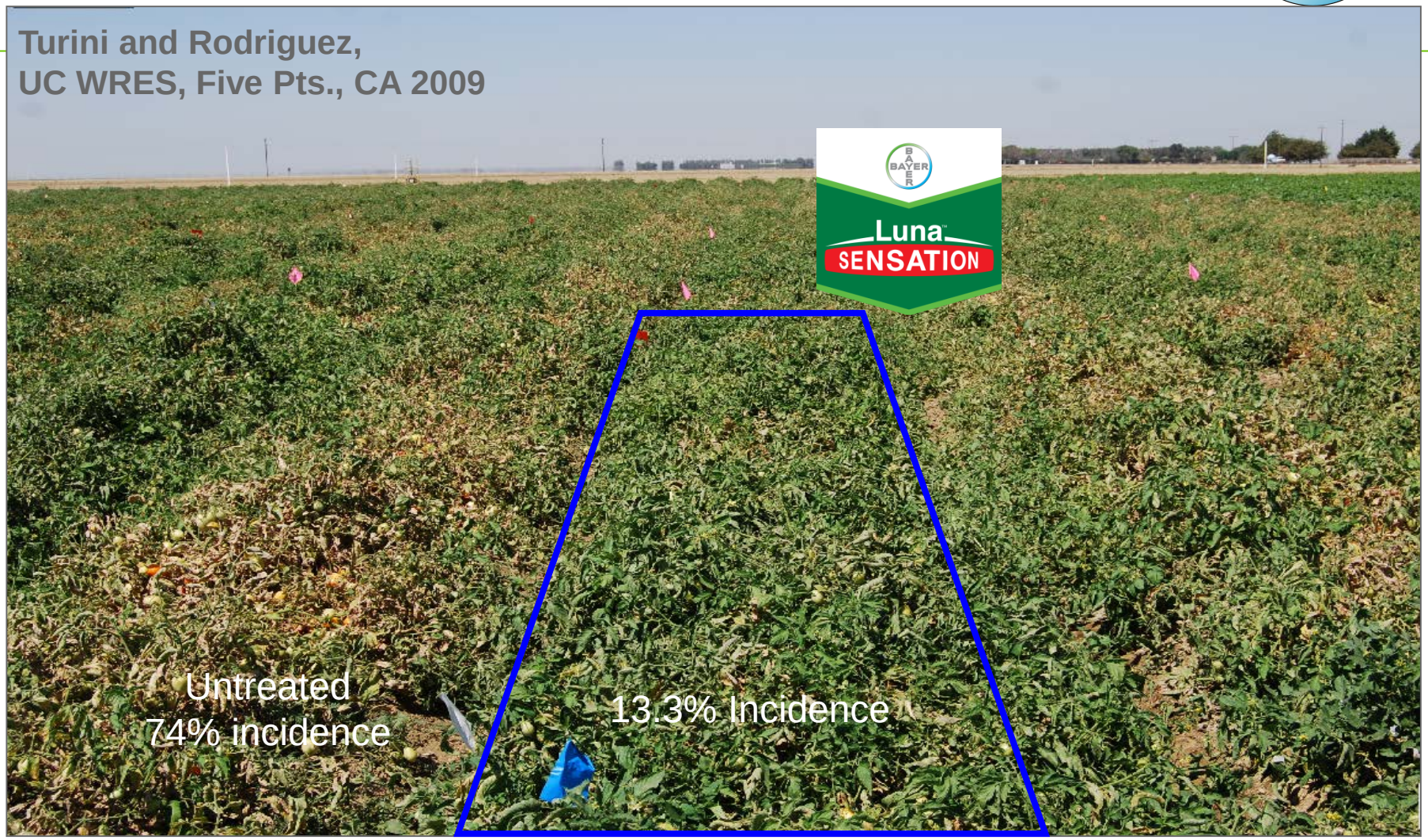
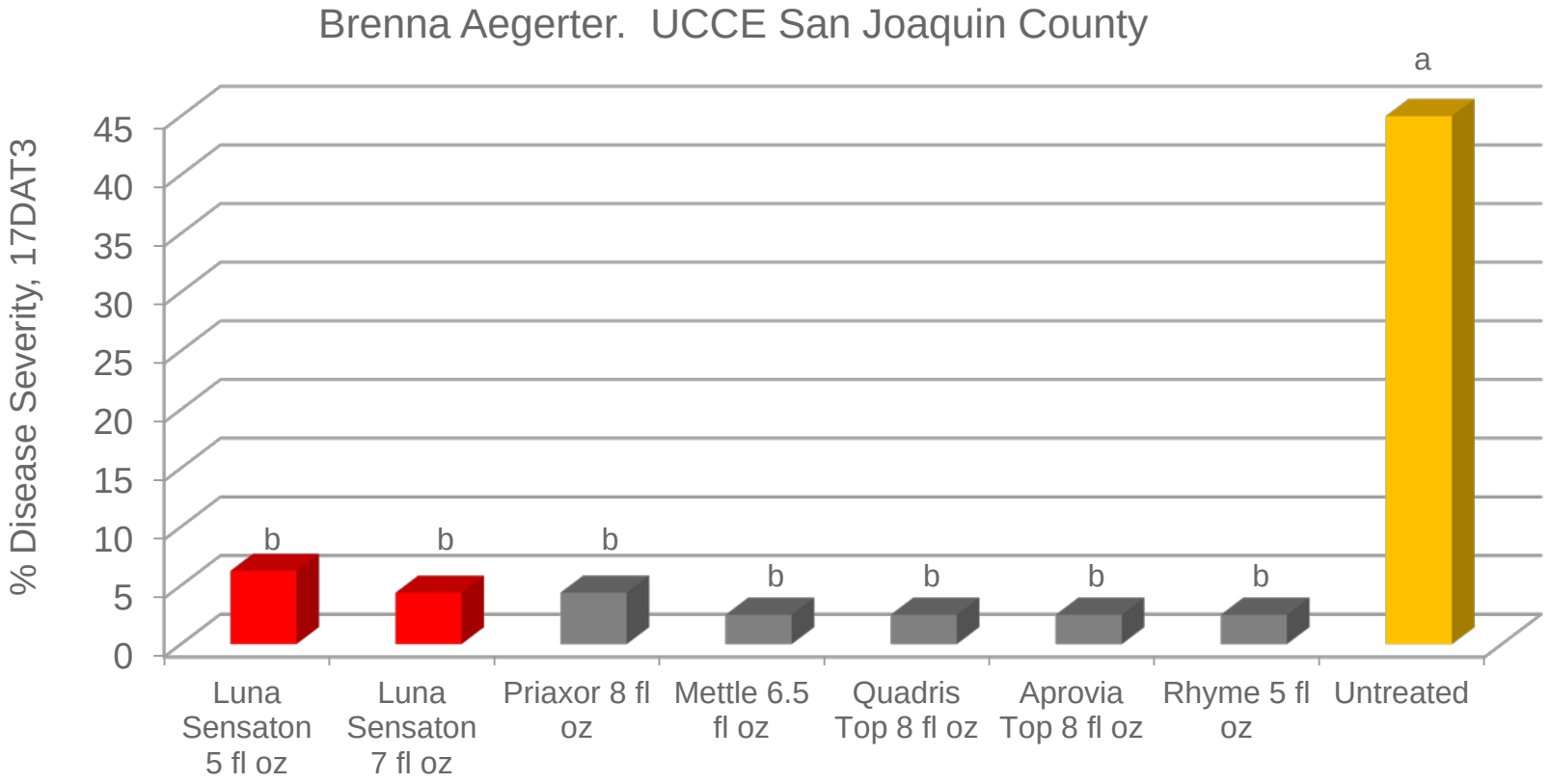


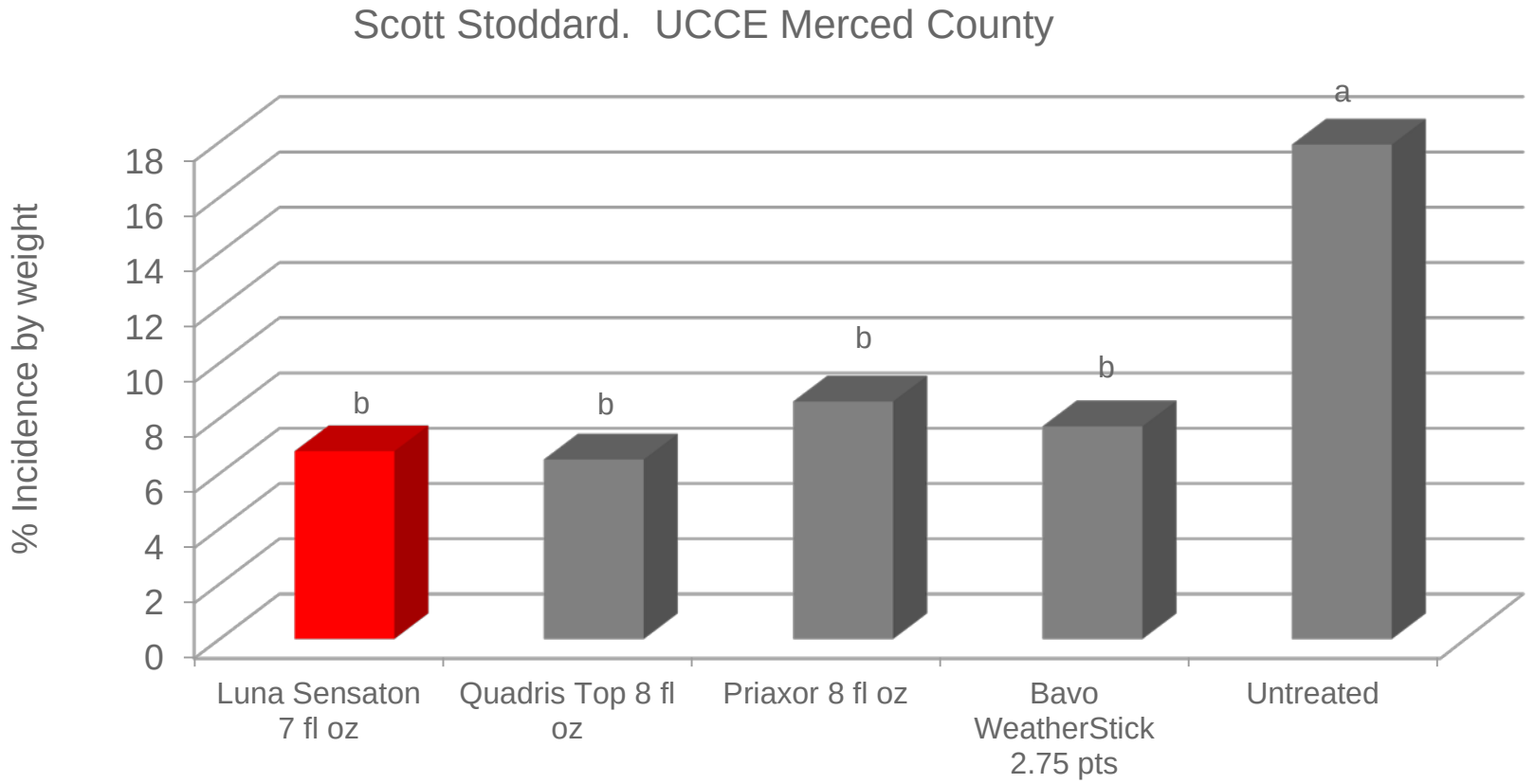
Photo: M. Jimenez

LUNA SENSATION
Powdery Mildew* in Tomatoes



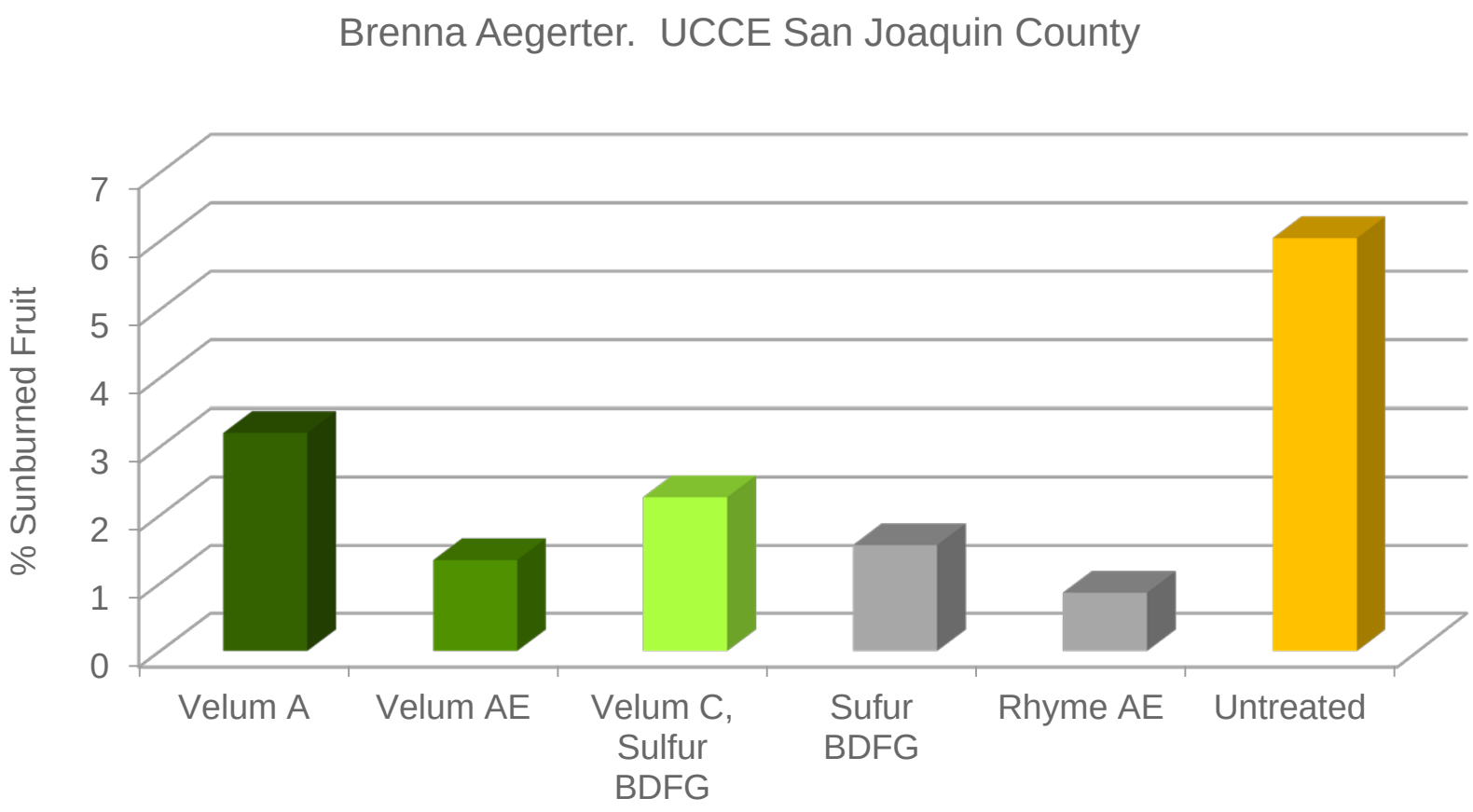
**Oidium spp*. Fresh market variety roma-type cv "Galilea. RCB design wit h reps. All materials were applied with a CO2 sprayer with hollow cone nozzles operating at 50 GPA and 34 psi. Applications were made on 8/24, 9/4 and 9/18. All treatments were applied with Latron B-1956 at 0.25% v/v. Disease severity was evaluated on 9/12 and 9/28. This chart exhibits the 9/28 evaluation. Location: 5 mi SE of Stockton. FP15USAGMDUEA1

LUNA SENSATION
Blackmold* in Tomatoes



**Alternaria alternata*. This trial was established near Dos Palos in Merced County. It was set up in a RCB design with 5 replicates. Materials were applied on 8/12, 8/26 and 9/12. Luna Sensation missed the first application and was applied on 8/19. Applications were with CO2 powered backpack sprayer operating at 76 GPA. Disease incidence was evaluate d by assessing 100 randomly selected fruit from each plot. Bars with the same letter are NSD at P=0.05.

VELUM
Powdery Mildew* in Tomatoes



**Leveillula taurica and Oidiium spp* Applications A, C and E are through sub-surface drip Irrigation (9" deep drip tape) with 30-45 minute injection times followed by3-4 hours of irrigation. Applications B, D, F and G are sulfur dust with a hand crank duster. Poor growth and yield due to high salinity. NSD among treatments FD15USAGM4UEA2

Science For A Better Life

The Bayer Portfolio for Tomatoes

Paul Walgenbach

Crop Science, a division of Bayer

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