



# Leap™: A New Dual Action Biorational Pesticide for Plant Disease Management and Insect Control

2<sup>nd</sup> Ag Innovation Conference  
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Russ Eldridge



Creative Hybrid Chemistry

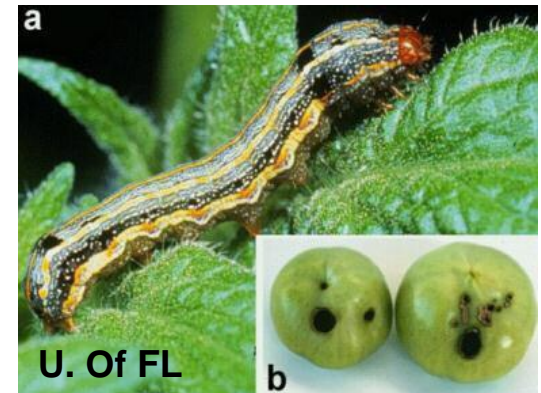
## Value of fruiting vegetable market (U.S.)

- Bell peppers
  - ✓ Approximately 45-50,000 acres planted
  - ✓ Approximate value of \$618 million (2014 NASS)
- Tomato
  - ✓ Approximately 100,000 open field acres planted
  - ✓ Approximate value of >\$2 billion (2016 NASS)



# Caterpillar pests of tomato and pepper

- Tomato hornworm  
(*Manduca quinquemaculata*)
- Southern armyworm  
(*Spodoptera eridania*)
- Tomato fruit worm/corn earworm  
■ (*Helicoverpa zea*)



# Tomato and Pepper Bacterial Diseases

## Disease Activity

*Xanthomonas* spp.

*Pseudomonas* spp.

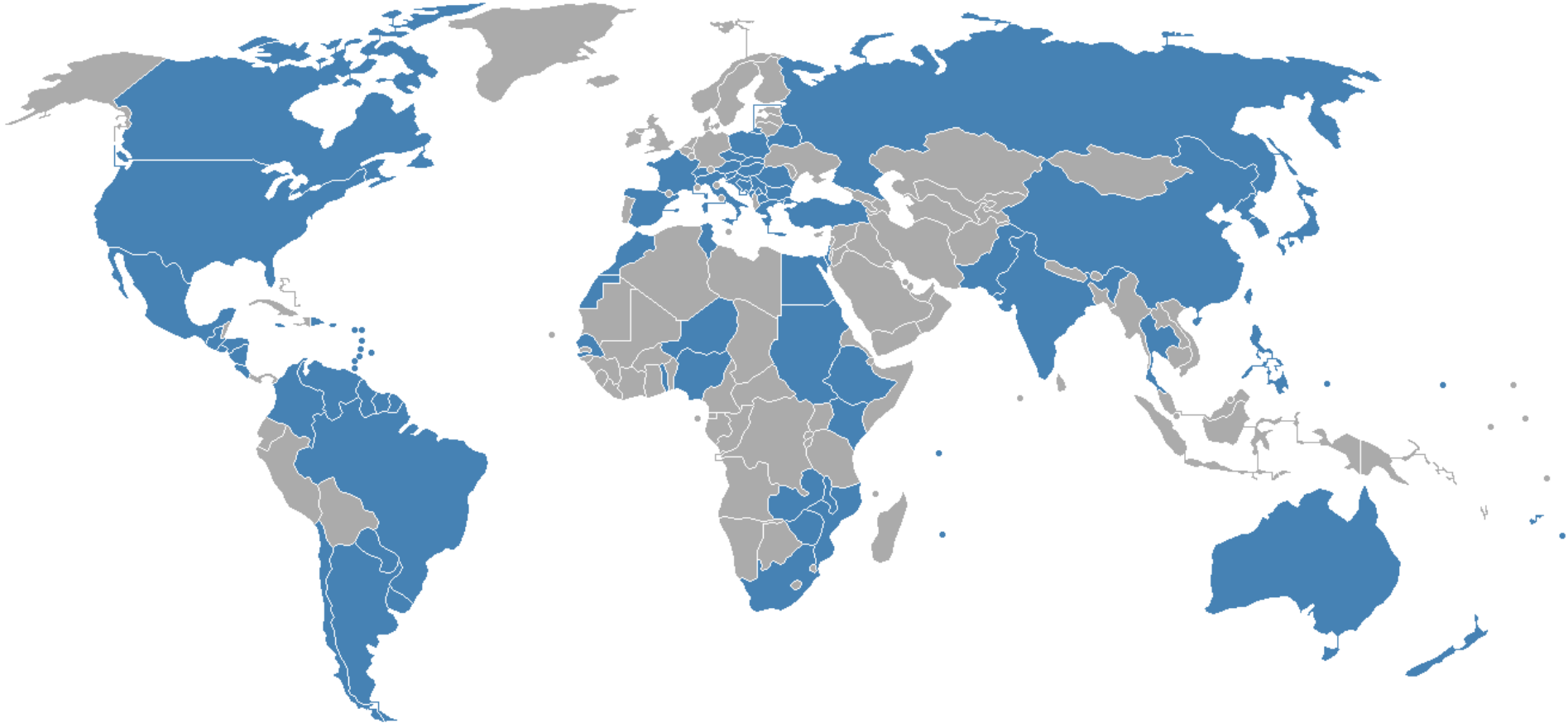


**Bacterial Spot—Peppers**



**Bacterial Spot—Tomatoes**

- **Bacterial spot disease distribution**



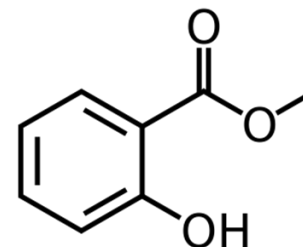
Areas where *Xanthomonas campestris* pv *vesicatoria*

## WHY ARE BACTERIAL DISEASES IMPORTANT?

- Major disease issue, particularly in tomato, pepper with the main markets in the southeast U.S.
  - In SW Florida, annual yield loss caused by bacterial spot on fresh tomato is estimated at \$3500/acre (Paret, 2013)
- Few control options
- Copper used significantly
  - Resistance developing due to over-use
  - Environmental concerns
- Actigard® (Acibenzolar-S-methyl)
  - Dominant SAR inducer
  - Can cause yield drag on some crops such as pepper



## BTK + MESA OVERVIEW



- Active Ingredients
  - *Bacillus thuringiensis kurstaki*
    - Strain *ABTS-351* (same strain as found in the VBC commercial product DiPel®)
    - Lepidoptera-specific toxins
  - Methyl Salicylate (MeSA)
    - MeSA is oil of wintergreen
    - Triggers plant defense systems (SAR) against pathogen infection and spread
    - Not directly toxic to pathogens

## Leap background

- **Product Concept:** A novel product containing both bacterial disease management and Lepidoptera control, providing a much needed new tool for bacterial disease, while decreasing the disease points of entry made by Lepidoptera pests
- *“Remember that every bite an insect takes from your crop, the greater chance that plant will catch a disease, as a bite is an open wound.” “There are far more insects than ever, so more damage means more entry points for disease.”* From: Brian Hefty, AgPhD newsletter, July, 2016.



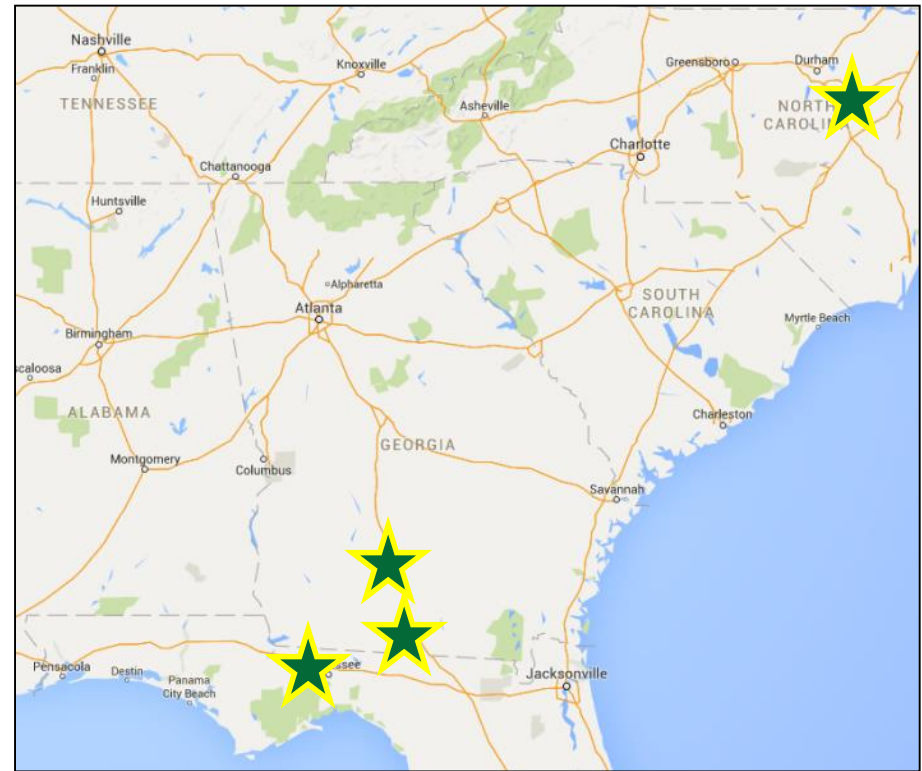
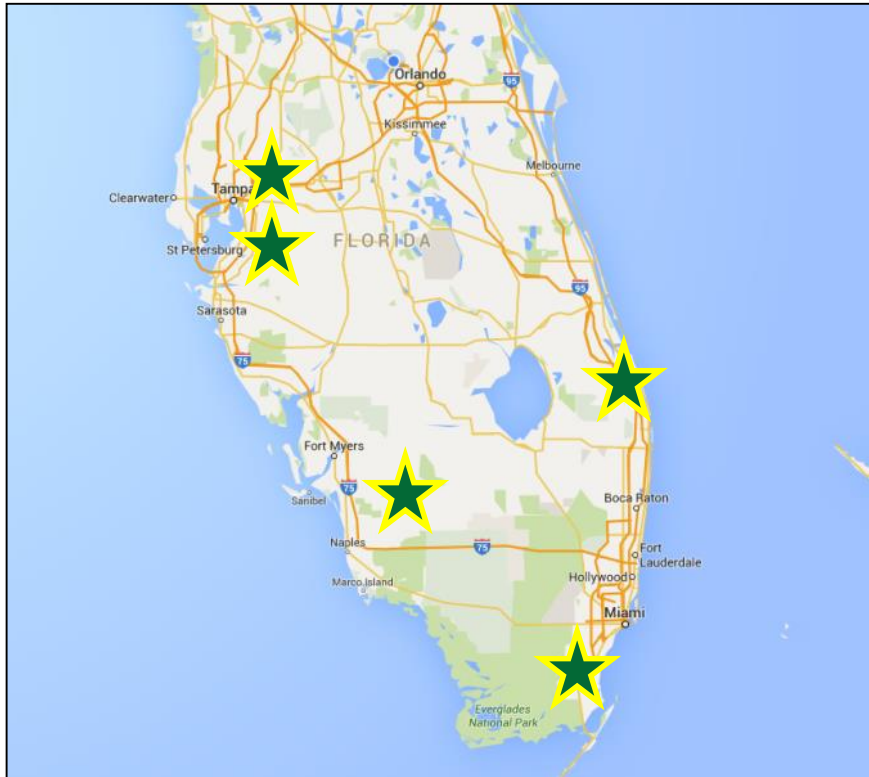


## LEAP PRODUCT CHARACTERISTICS

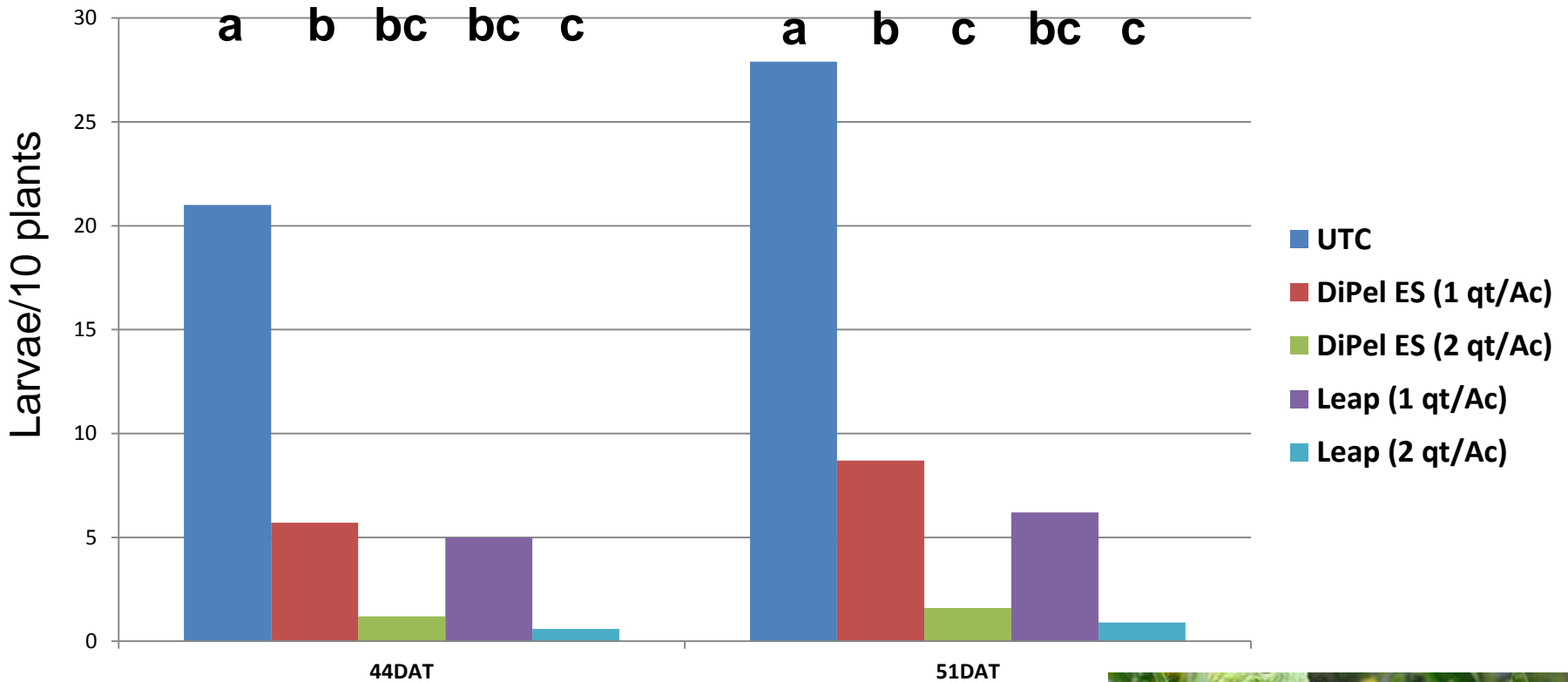
- **ES Formulation**
  - *Bt kurstaki* (64BIU/gal.; 17,600 IU/mg)
  - MeSA (5.9%)
  - Easy to mix
- **Packaging: 2.5 gallon containers**
- **Labeled only on tomato and pepper**
- **Label Use rate: 0.5-2 quarts/acre**
- **Low potential of phytotoxicity at labeled use rates**
  - **Not to be used with adjuvants/surfactants**
- **No residue issues/0 hour PHI**
- **Basic PPE**
- **Leap does not have an organic listing**



# LEAP™ TRIAL LOCATIONS SOUTHEAST



# LEAP™ HAS ACTIVITY ON TOMATO HORNWORM



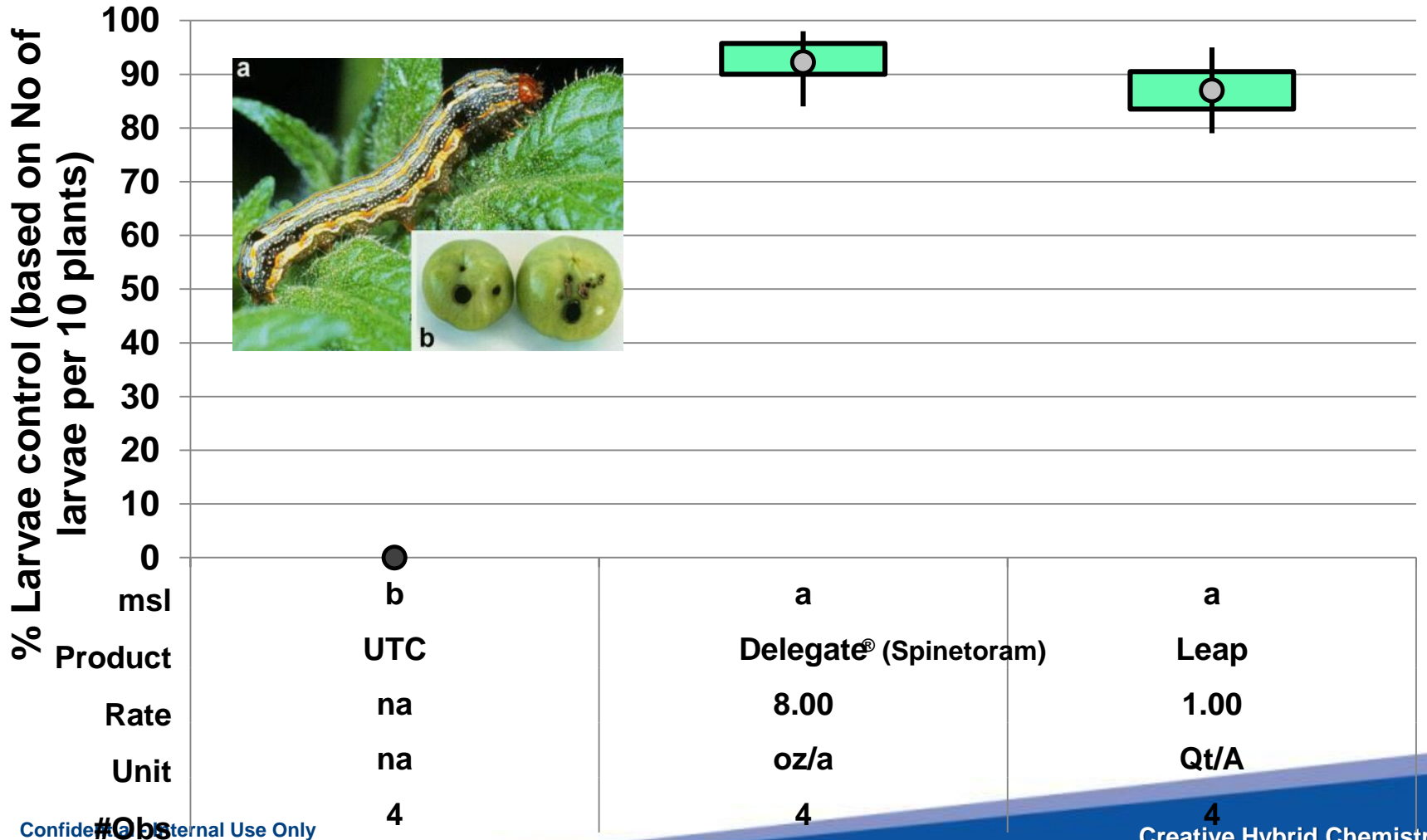
Cooperator: Gary Cloud Consulting  
Pest: *Manduca quinquemaculata*

Crop: Tomato

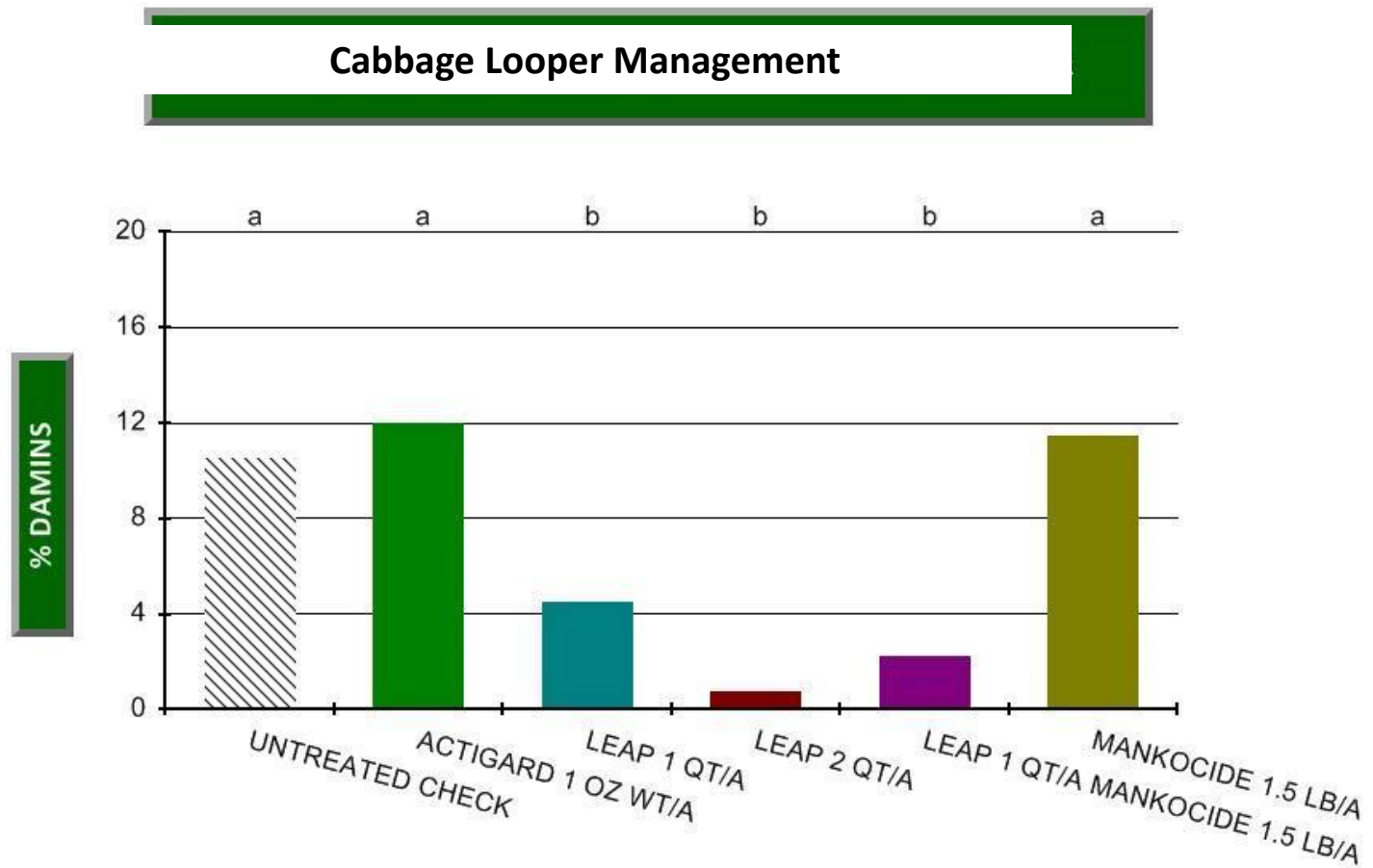
Site: Georgia



# LEAP PROGRAMS –LEPIDOPTERA CONTROL (SOUTHERN ARMYWORM *SPODOPTERA ERIDINA*)



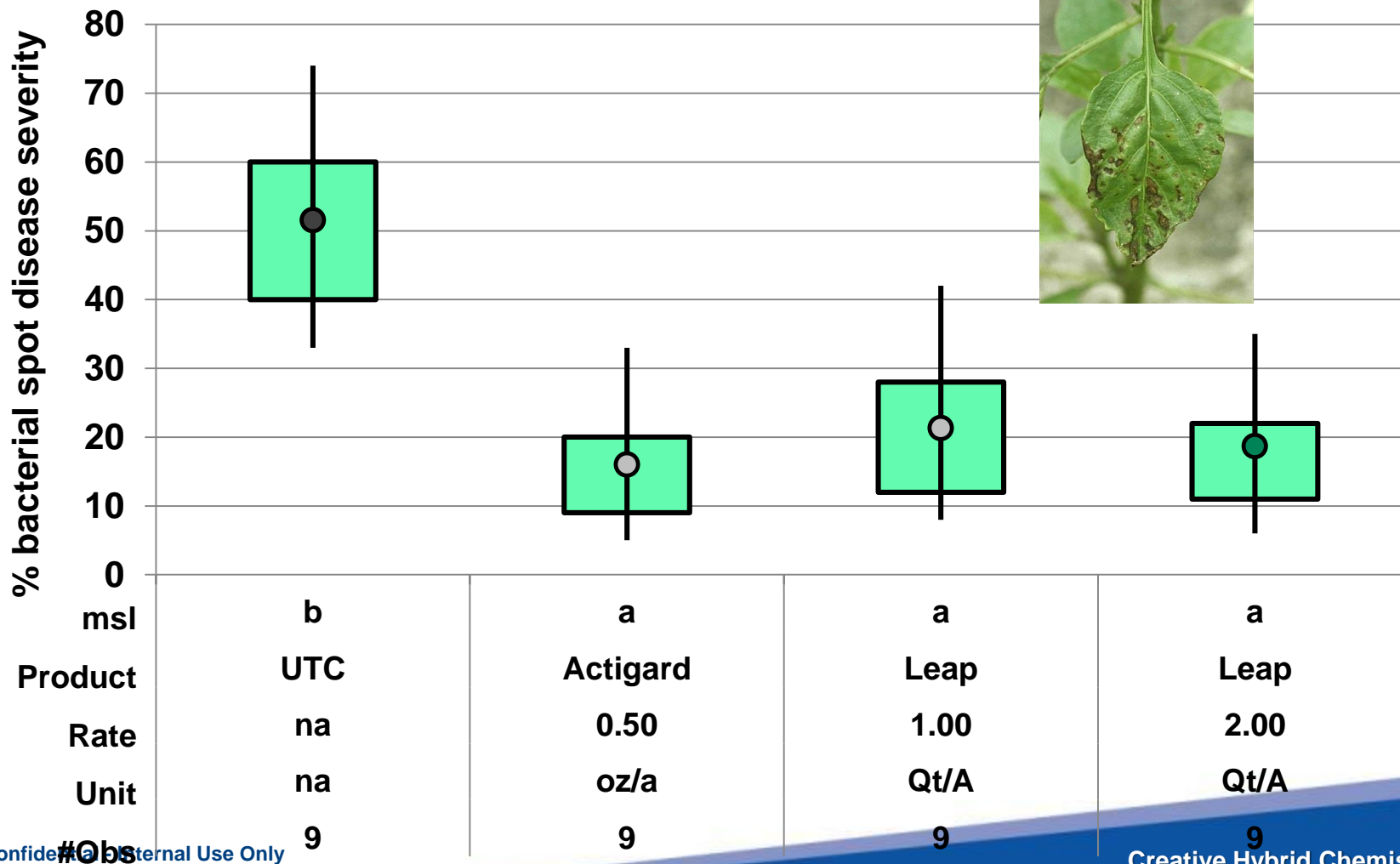
# Cabbage looper (*Trichoplusia ni*) control



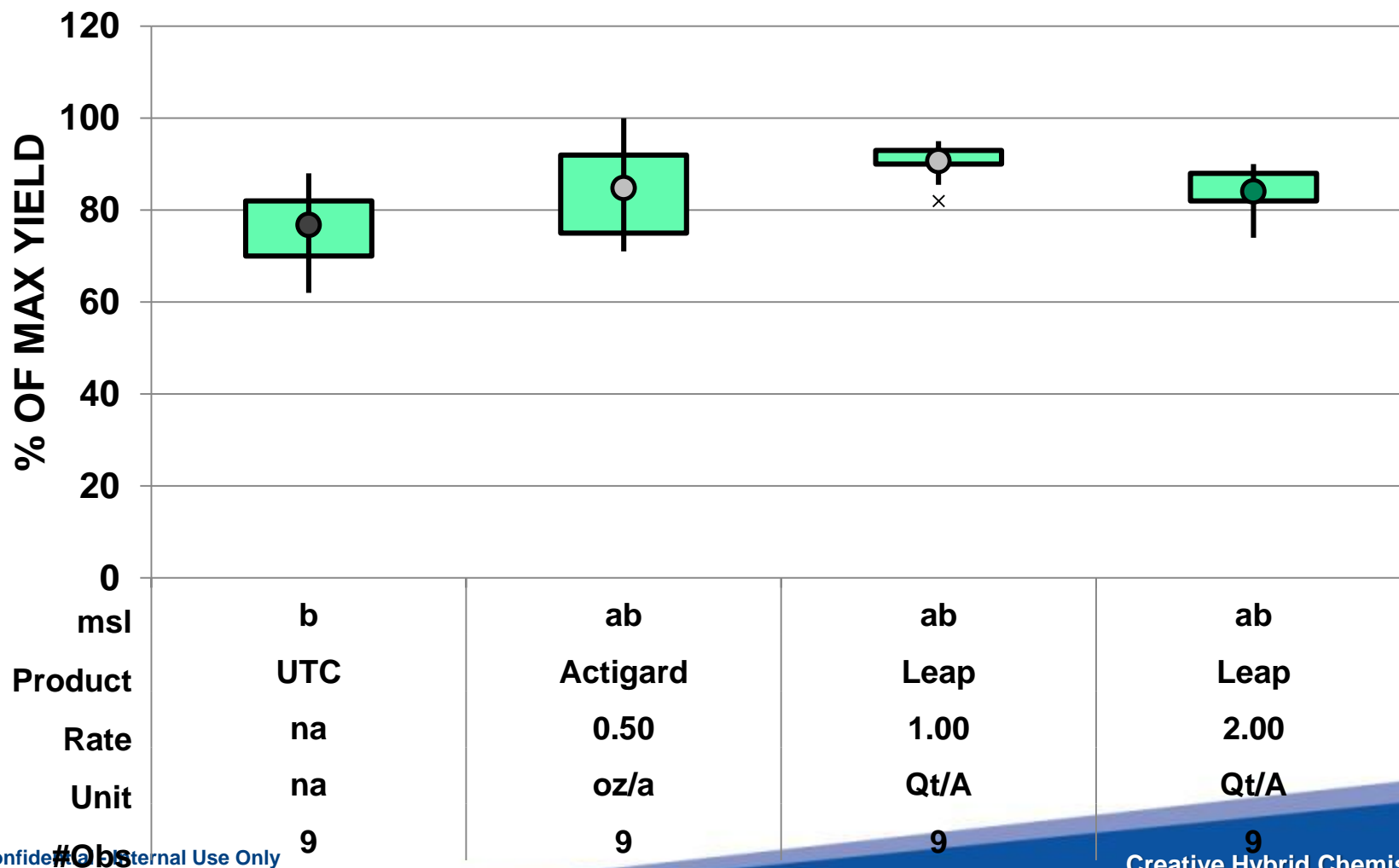
GRIS Trial ID: VUSA2015CCAM2014

ManKocide= Mancozeb

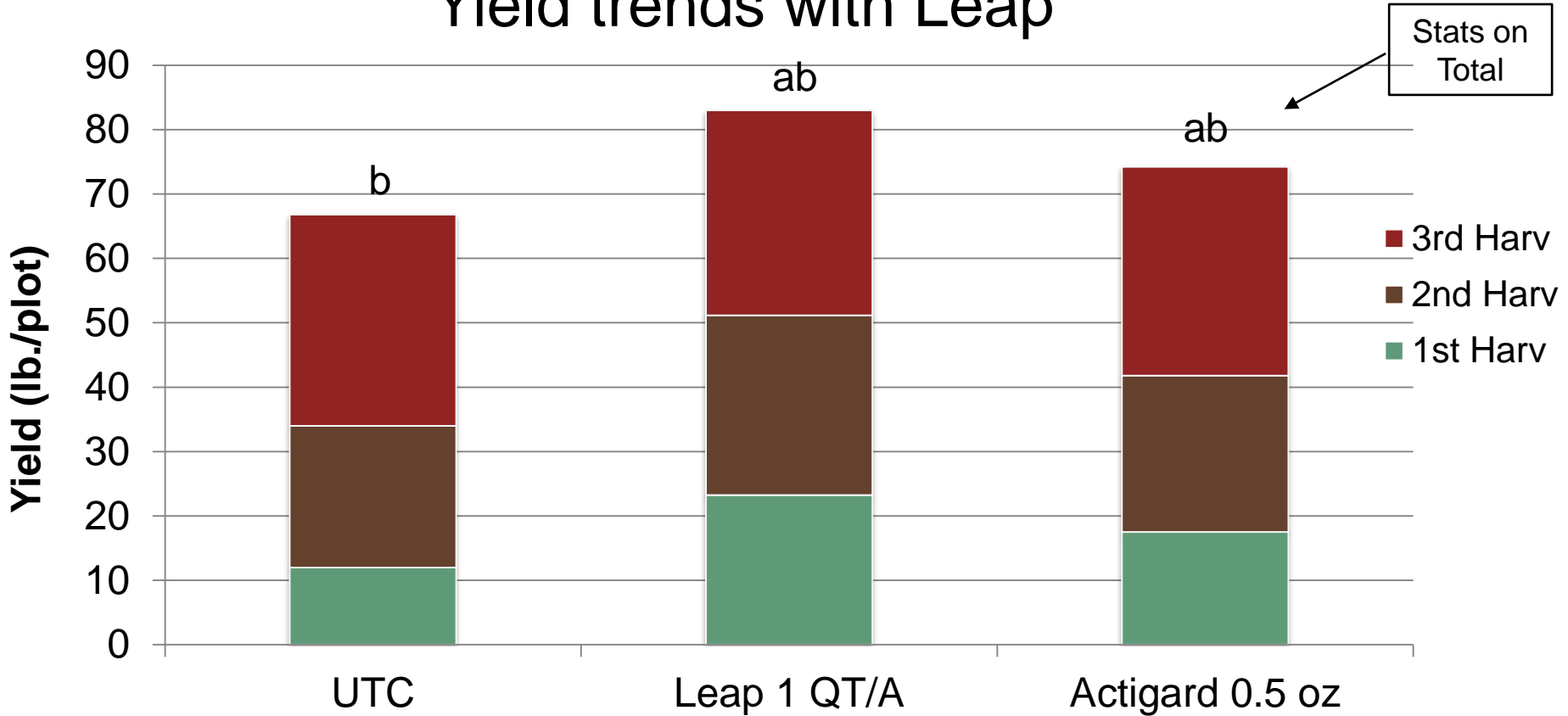
# LEAP PROGRAM WITH SEQUENTIAL APPLICATIONS (LEAP FB LEAP....) ON TOMATOES



# LEAP PROGRAM WITH SEQUENTIAL APPLICATIONS (LEAP FB LEAP....) ON TOMATOES



## Yield trends with Leap



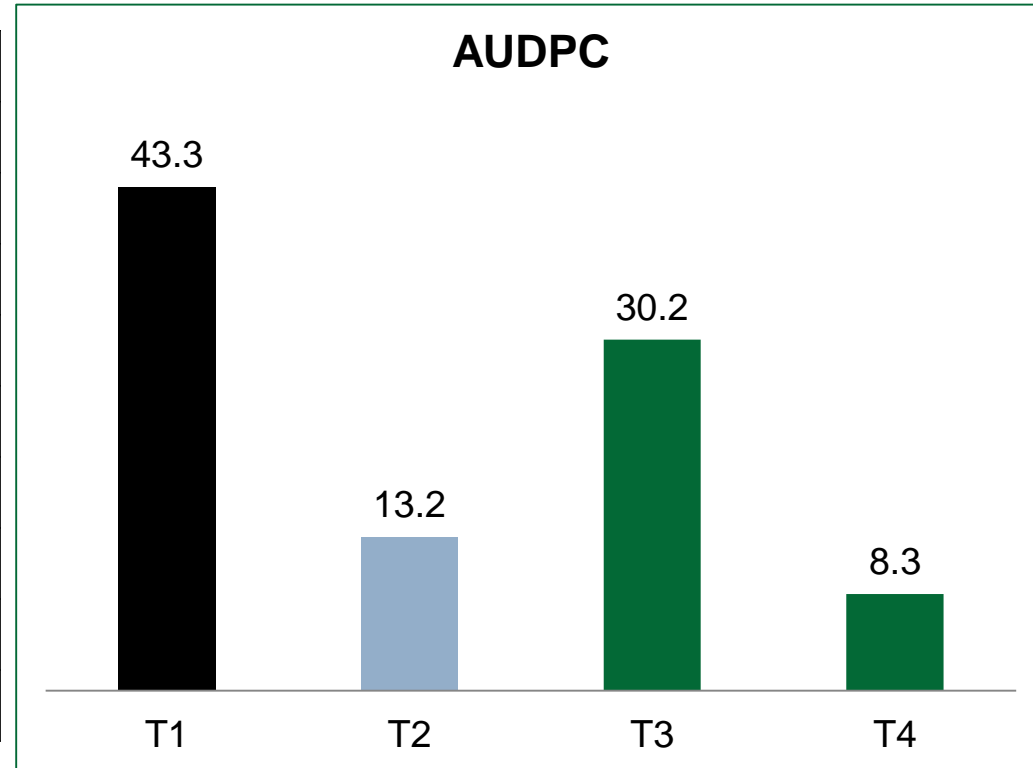
Crop: Tomato  
Pest: Bacterial spot; *Xanthomonas euvesicatoria*  
Application: Leap and Actigard alternated weekly with ManKocide (3 lb/A); 4 apps of each;

Harvest Date: 6/3, 10, 17  
Site: Quitman, GA  
Country: USA



## Tomato Bacterial Spot Disease Efficacy

TRT	Desc	App Code	Rate
1	UTC	NA	NA
2	Leap	AE	1 qt/a
2	Actgrd	BF	0.75 oz/a
2	Actinovate	CG	8 oz/a
2	ManKocide	DH	3 lb/a
3	Leap	A-H	1 qt/a
4	Leap	ACEG	1 qt/a
4	Actinovate	ACEG	8 oz/a
4	ManKocide	BDFH	3 lb/a



Actigard® = Acibenzolar-S-methyl

Actinovate® = *Streptomyces lydicus*

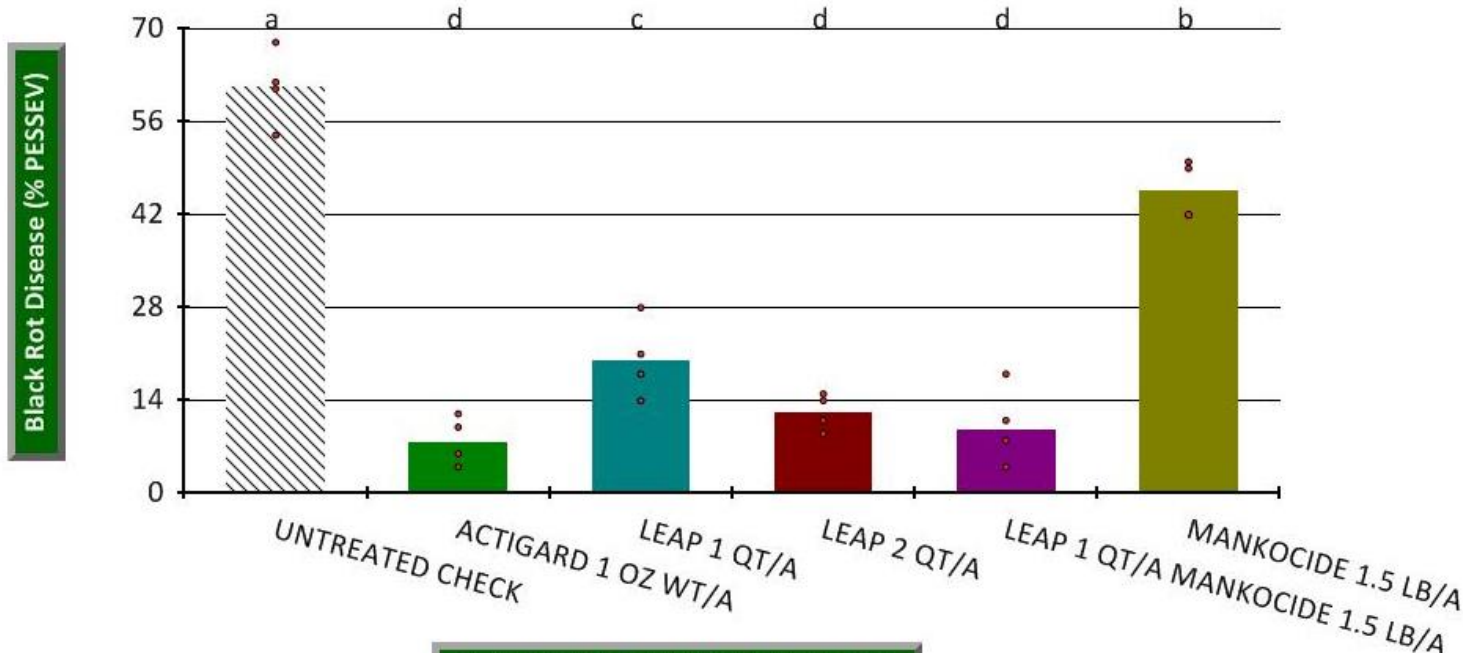
ManKocide® = Mancozeb

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# LEAP FOR BLACK ROT DISEASE (*XANTHOMONAS CAMPESTRIS*) MANAGEMENT

*Final evaluation 48 days after planting*

**Leap and Actigard Comparison for Management of Cabbage Black Rot**



GRIS Trial ID: VUSA2015CCAM2014

ManKocide= Mancozeb

## SUMMARY

- New product for bacterial disease and Lepidoptera pest control in tomato and pepper
- Two way protection based on methyl salicylate (disease) and *Bt kurstaki* (insecticide) active ingredients
- Proven results as stand-alone or in a rotation program
- Biorational pesticide
  - Non-restricted use
  - No residue issues
  - Easy on beneficial insects



## Listed Products

Leap™ is a trademark of Valent BioSciences LLC

DiPel® is a registered trademark of Valent BioSciences LLC

Actigard® is a registered trademark of Syngenta Crop Protection LLC

Delegate® is a registered trademark of Dow Chemical Company

ManKocide® is a registered trademark of Kocide LLC

Actinovate® is a registered trademark of Novozymes BioAg Inc.

*Thank You!*