

LifeGardTMWG

BIOLOGICAL PLANT ACTIVATOR

Finding A Place for A New Microbial Biopesticide in Crop Protection Programs

CERTIS USA

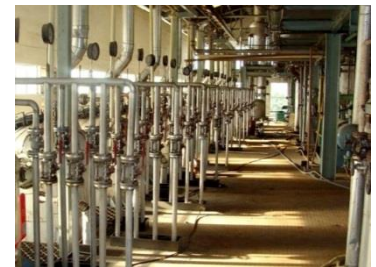
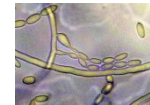
The
Biopesticide
Company

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Certis USA, L.L.C.
Columbia, Maryland

Who is Certis USA?



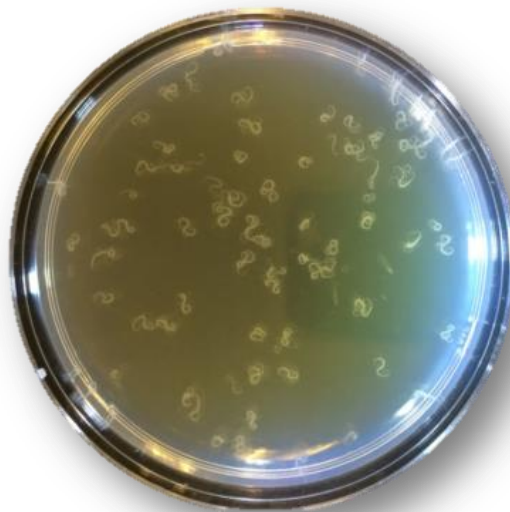
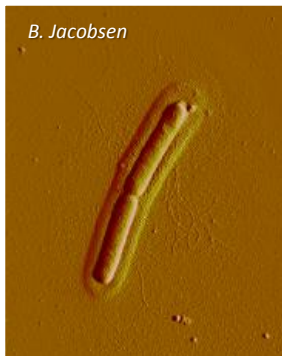
- Biopesticide developer, manufacturer & marketer
- Wholly owned by Mitsui & Co. (Fortune 500)
- Broad product portfolio (~30 active ingredients)
 - Microbials, botanicals, biochemicals, others
 - Agriculture, Ornamentals, Specialty, Home Garden
- Sales in over 50 countries, all continents except Antarctica
- Headquarters and R&D: Columbia, MD
- Manufacturing sites:
 - Wasco, CA (liquid fermentation)
 - Bangalore, India (neem extraction)
 - Butte, MT (solid fermentation)
- Dedicated North America field sales, technical & regulatory team
- More info: www.CertisUSA.com



Active ingredient:

Bacillus mycoides isolate J (BmJ)

- Common species of bacterium in soil and plant samples worldwide.
- “Isolate J” from asymptomatic sugar beet foliage in field with severe *Cercospora* outbreak in Montana (Dr. Barry Jacobsen).
- Patented by Montana State University, licensed to Certis USA.
- Fermentation methods, scale-up and formulation developed by Certis.

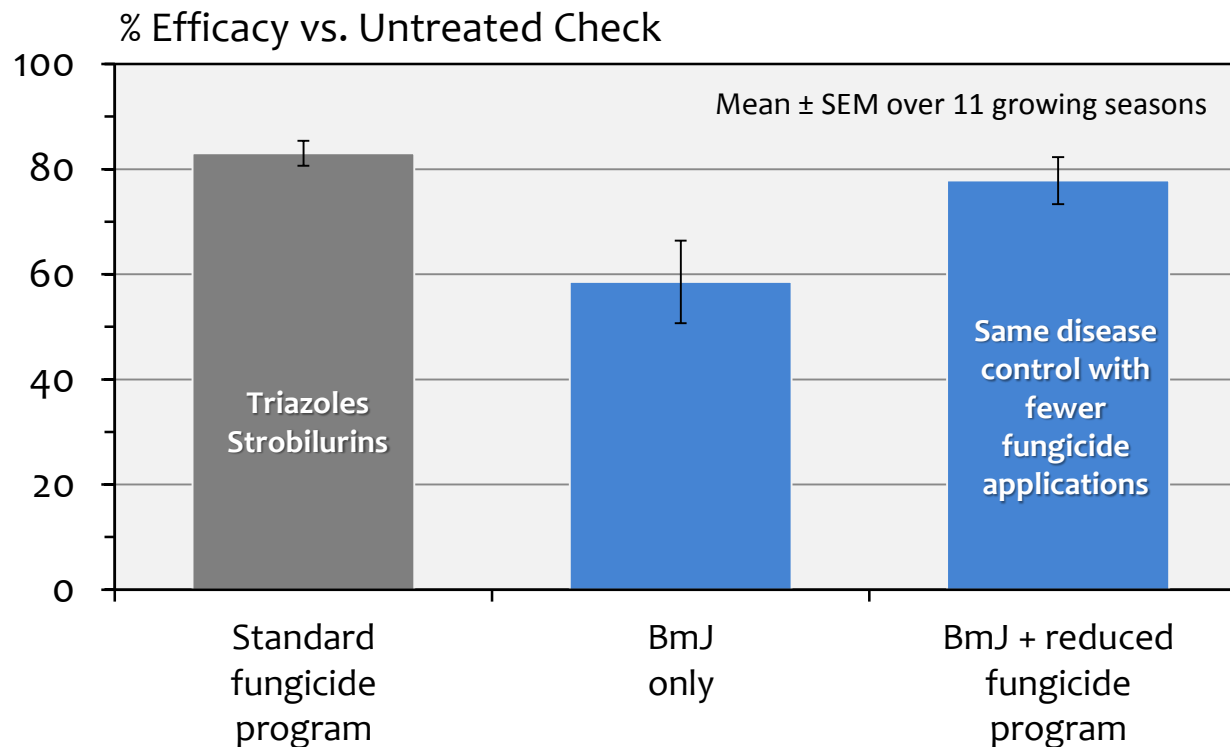


Cercospora leaf spot in sugar beet

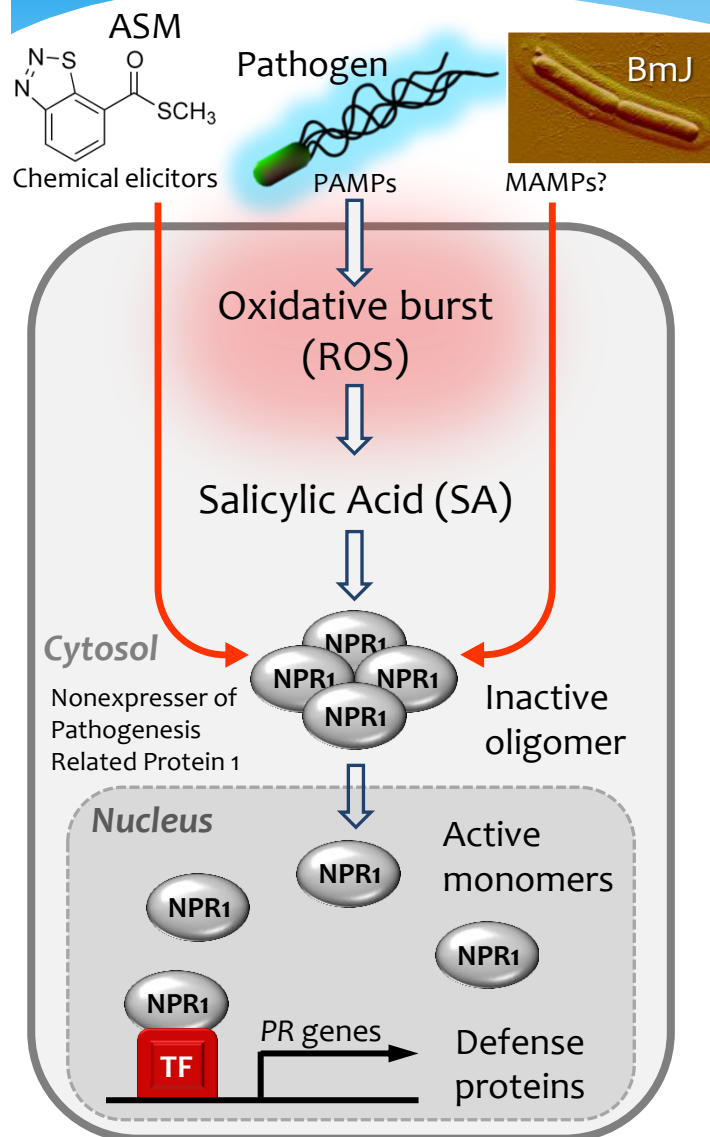
Field trials by B. Jacobsen
(Montana State Univ.) & collaborators, 1996 - 2010.

Treatments:

1. Best labeled fungicide rotation (4 applications total).
2. BmJ alone (4 applications at 1×10^6 cfu/ml)
3. BmJ + $\frac{1}{2}$ rate fungicide at disease onset, then 3 more BmJ applications.



BmJ Mode of Action



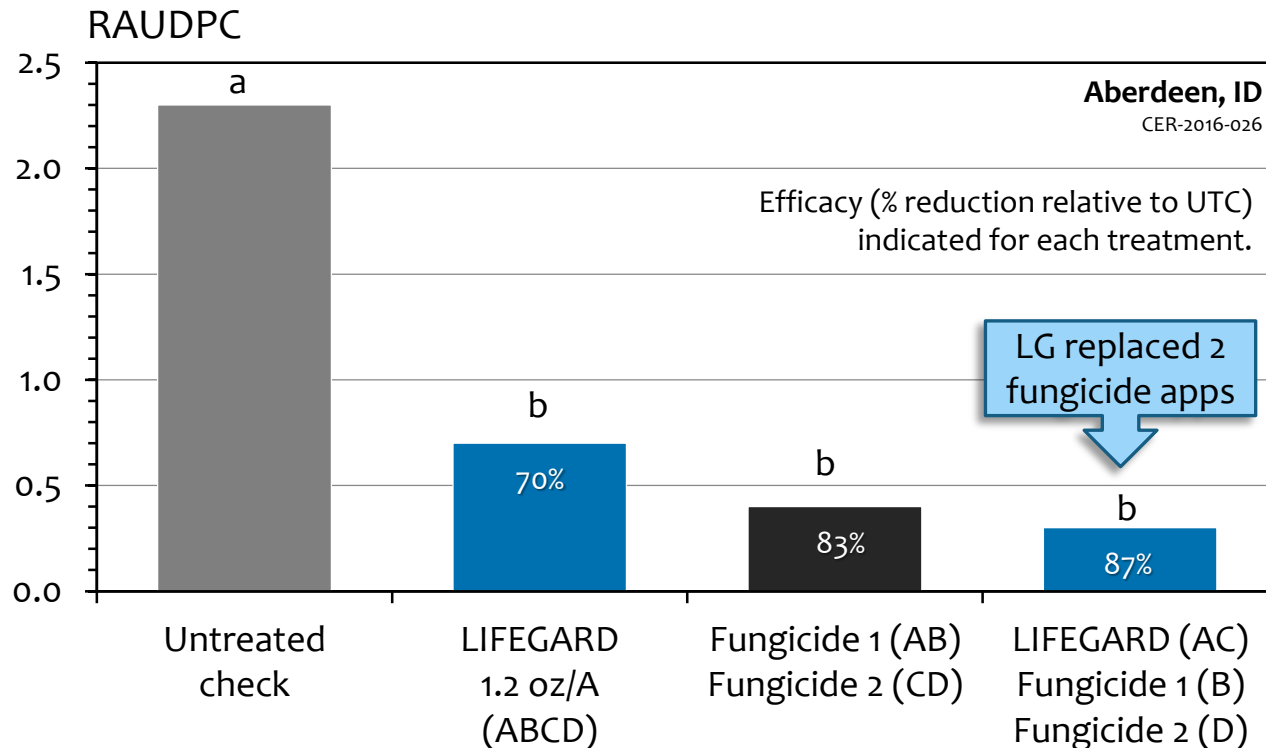
- Little or no direct antagonistic effect on plant pathogens.
- Activates plant's natural defenses against pathogens.
- Genetic and biochemical pathway similar to acibenzolar-S-methyl (Actigard®).
 - NPR1 - dependent
 - SA - independent
- New FRAC group:
 - P6 (microbial inducer of plant resistance).
- Induced resistance response detectable within 3 hours, lasts 18 – 21 days.
- No phytotoxicity in 20+ years of field trials.

Almond	<i>Alternaria</i> leaf spot
Citrus	Citrus canker
Cole crops	Downy mildew
Cucurbits	Anthrachnose Powdery mildew Downy mildew Gummy stem blight
Tomato, peppers - all types (field & greenhouse)	Bacterial leaf spot Bacterial speck Early blight Late blight Gray mold
Grapes	Downy mildew
Lettuce	Downy mildew Powdery mildew
Legume veg	White mold
Pecan	Pecan scab
Pome fruit	Fire blight
Potatoes	Early blight Late blight White mold Potato virus Y (seed)
Spinach (field & greenhouse)	Downy mildew Leaf spots
Sugar beet	<i>Cercospora</i> leaf spot

Registration/Labeling:

- EPA & PMRA approved late 2016
 - ✓ OMRI listed (USA)
 - ✓ ECOCERT (Canada)
 - ✓ Exempt from residue tolerance - no PHI or MRL
- Water-dispersible granule (WG)
 - 40% active ingredient
 - Minimum 30 billion viable spores per gram
- Application rate:
 - 1.0 - 4.5 ounces/Acre
 - Target concentration: 4.5 oz/100 gal
(= 10^7 spores/ml)
- Application methods
 - Ground sprayer
 - Aerial application (USA)
 - Stationary overhead sprinkler chemigation

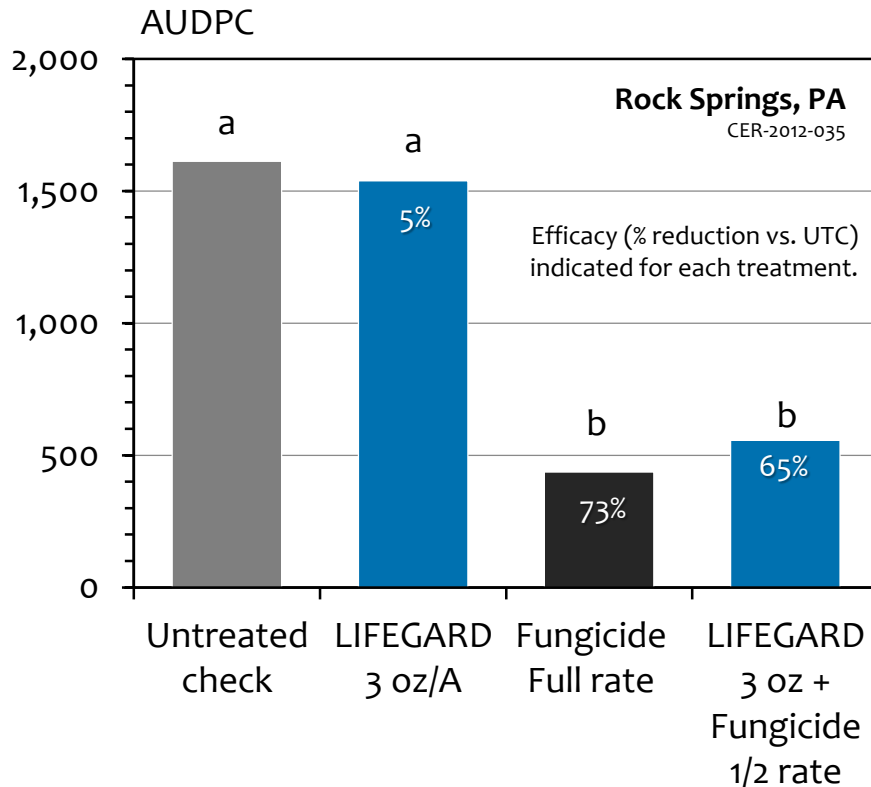
Potato Early Blight



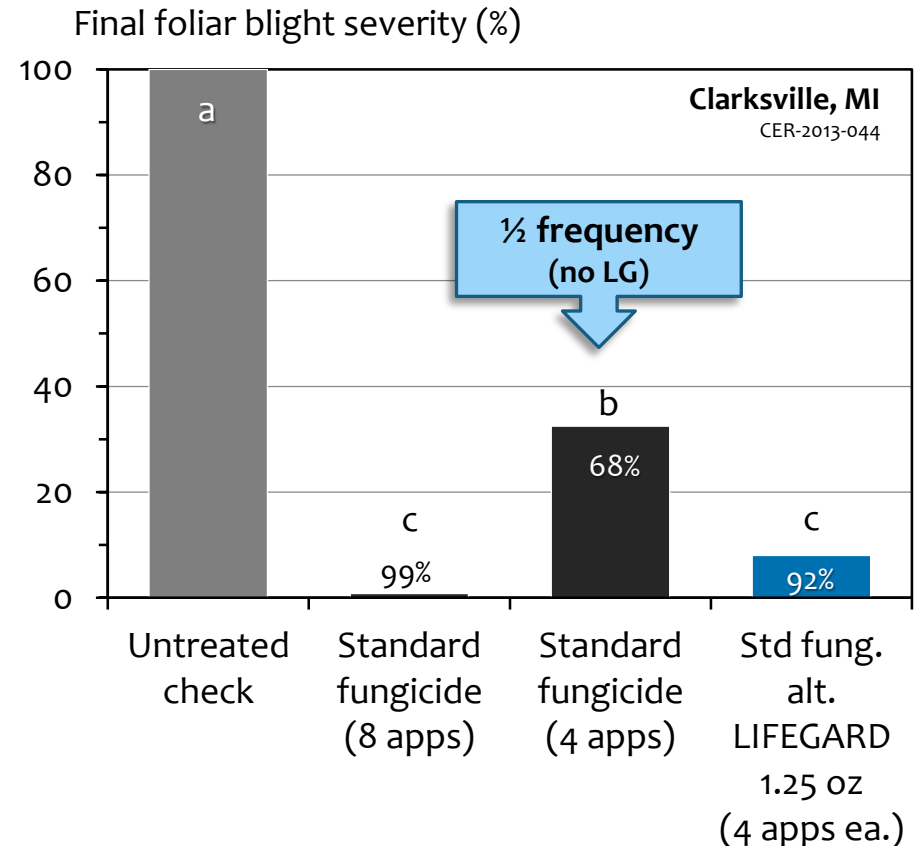
Four applications on a 14-day interval by ATV-mounted R&D spray boom delivering 25 GPA at 30 psi through 2 nozzles/row.

RAUDPC = Relative Area Under the Disease Progress Curve.

Potato Late Blight

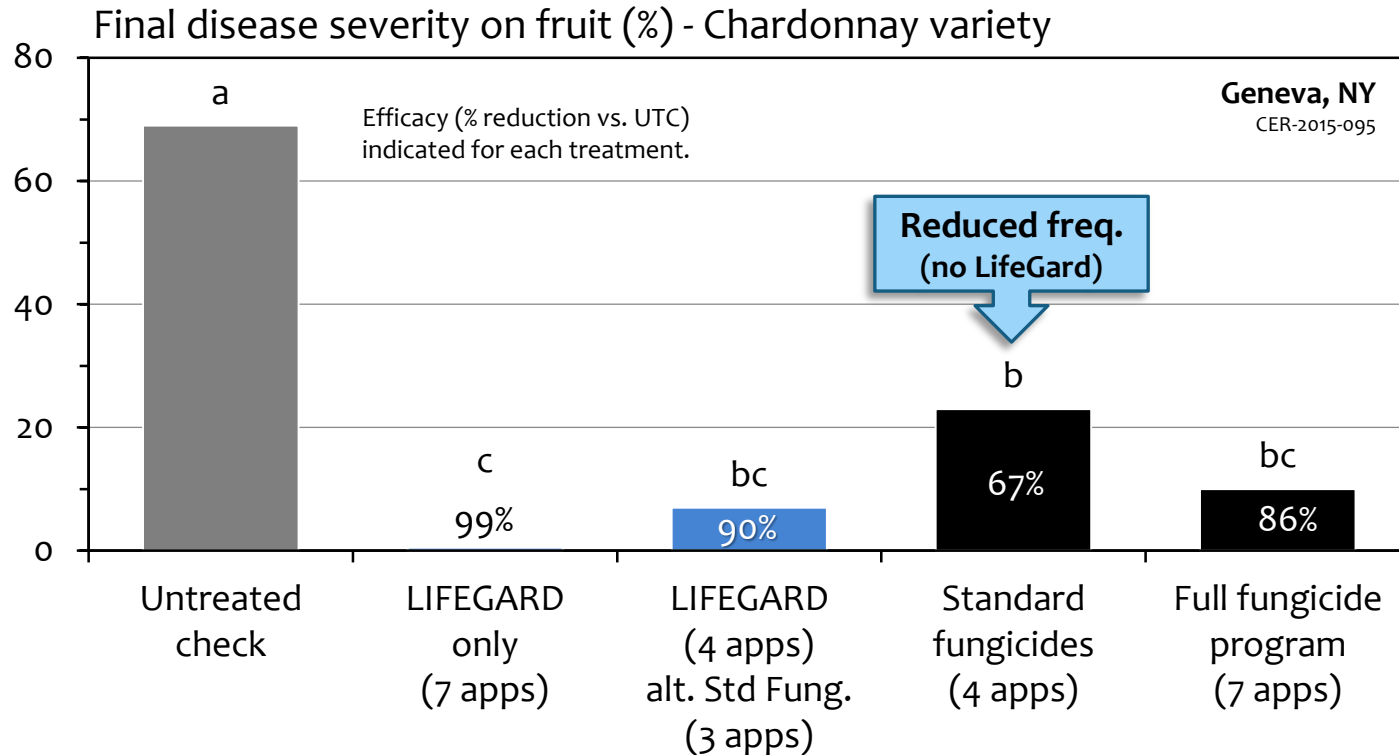


- 5 weekly applications by tractor-mounted side boom sprayer (45 GPA at 30 psi, 3 nozzles/row).
- Natural infection augmented by artificial inoculation with *P. infestans* (US-23).
- Although not effective alone, LifeGard replaced half of total fungicide when used in tank mix, without loss of efficacy.



- Weekly applications by ATV-mounted spray boom (25 GPA at 80 psi, 3 nozzles/row).
- Artificially inoculated with *P. infestans* (US-22).
- LifeGard alt. std. fungicide was as effective as full fungicide program. Reduced fungicide program w/o LifeGard was not.

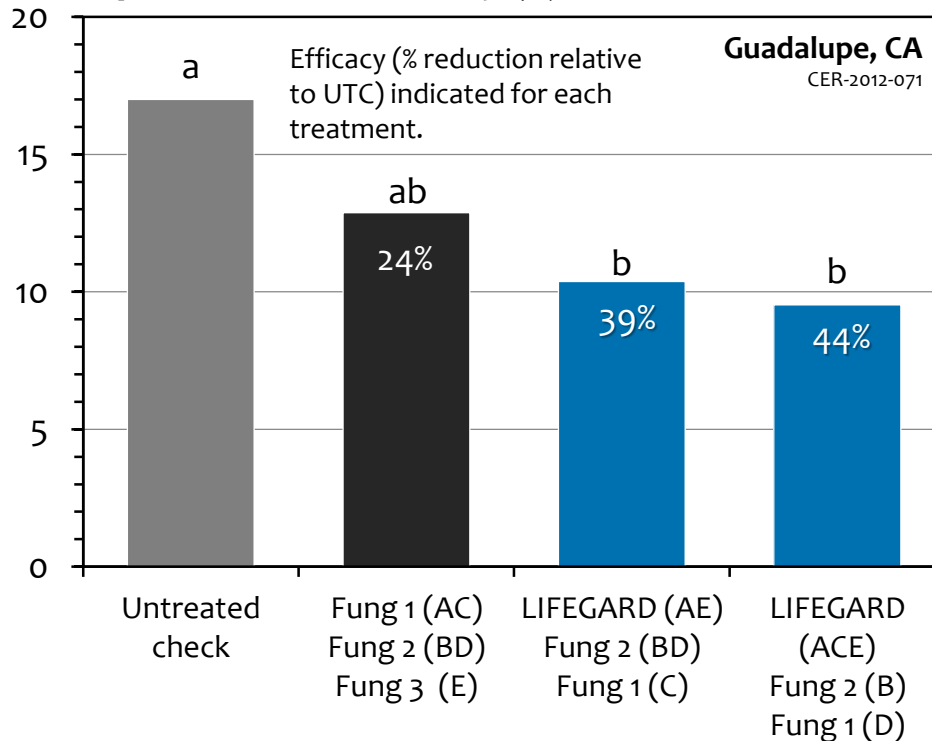
Grape Downy Mildew



- 7 applications at 14d intervals with hooded boom sprayer (50 GPA pre- & 100 GPA post-bloom).
- LifeGard applied at 4.5 oz/100 gal (10^7 cfu/ml).
- Disease severity evaluated on 20 fruit clusters at harvest.
- LifeGard was as efficacious in stand-alone applications as a grower's standard fungicide program.
- Reducing frequency of fungicide application by alternating with LifeGard resulted in the same efficacy as the full fungicide program. Reducing fungicide frequency without LifeGard resulted in more disease.

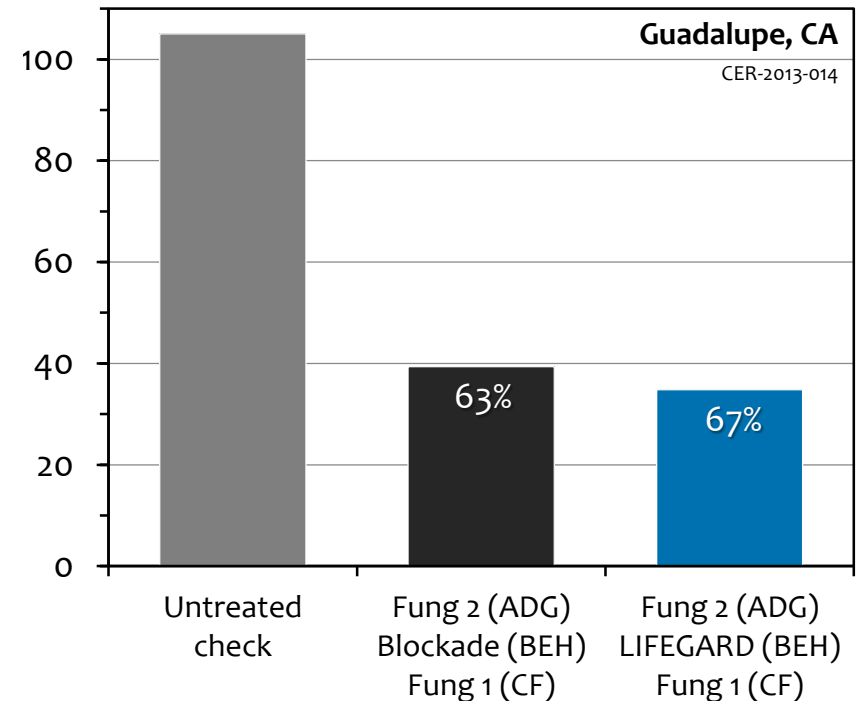
Downy Mildew in Leafy Veg

Spinach - Final severity (%) 12 DAA5

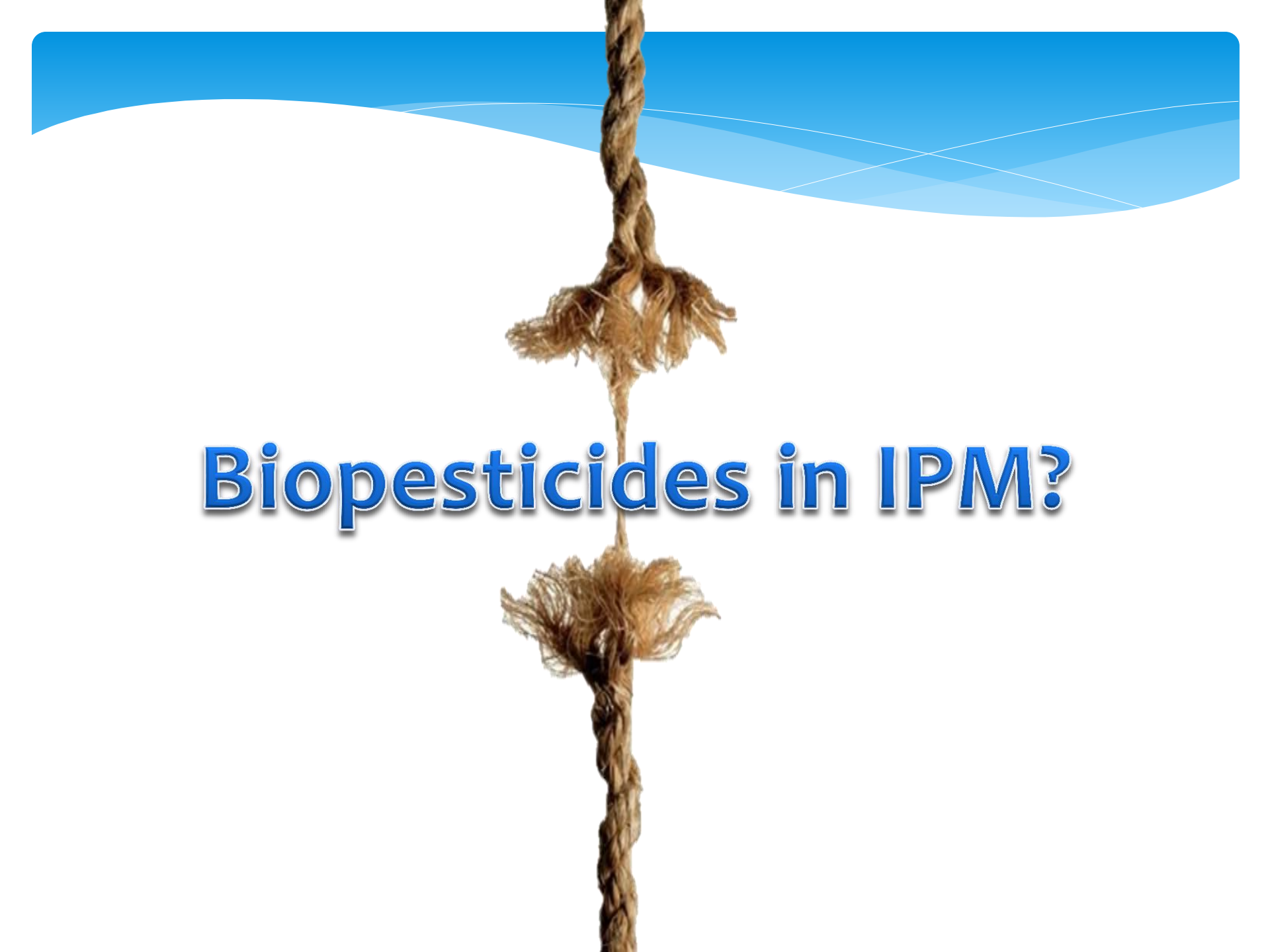


- Weekly appl. by CO₂ backpack (40 - 50 GPA, 3 nozzles).
- Inclusion of LifeGard in rotation with standard fungicides resulted in improved disease control with fewer total fungicide applications.

Head Lettuce - AUDPC



- Weekly appl. by CO₂ backpack (40 - 50 GPA, 3 nozzles).
- Products and rates per acre:
LifeGard (BmJ): 2.25 oz (10⁷ cfu/ml)
Blockade* (acibenzolar-S-methyl): 0.75 oz
- LifeGard performed similar to Blockade in a rotation with standard fungicides.



Biopesticides in IPM?

Biopesticides in IPM!

