Season-long Fire Blight Management in Apples

Kerik D. Cox

NYSAES

Plant Pathology and Plant-Microbe Biology Section
School of Integrative Plant Science
Cornell University

Fire blight becoming increasingly problematic

Fire blight becoming increasingly problematic

- High-density tall/super spindle plantings (1000 – 1200/A) = $high-value acreage
- Young productive trees: protracted bloom & vigorous susceptible shoot tissue
- Resistant rootstocks not always helpful: once fire blight reaches leader > tree = finished
- New popular scion varieties susceptible
- Seasons warmer weather from bloom to terminal bud set

Devastating fire blight epidemics from 2011-2016

- Sudden devastating shoot blight in nursery, new, & young high-density plantings
- Excessive streptomycin & copper used to save acreage & avoid growth regulators

Question

What are the best practices for managing fire blight year round?

Managing fire blight

- Post season: Clean up inoculum to reduce spread within and between trees: Prune out strikes & small cankers

Managing fire blight

- Pre season: clean-up inoculum to reduce spread within and between trees
  - Scout and prune out oozing cankers:
    - Large - depressed discolored cracked bark: main scaffolds can’t prune
    - Small – blossom & shoot infections, summer pruning cuts: numerous & hard to see/find

Managing fire blight

- Pre season
  - Apply full rate of copper at silver/green tip (Warm weather causes cankers to ooze > fire flight inoculum increases greatly)
- Bloom (had or have history of fire blight)
  - Use: consultant, extension alerts, or disease model forecasts for fire blight infection periods (NEWA & MaryBlyt 7.1)

Managing fire blight

- Bloom
  - Models over predict infection risk: shouldn't need more than 3 applications to get to petal fall
  - Need 1 well-timed application
  - Use Model + Common Sense/Consultant

Managing fire blight

- Bloom
  - Since **streptomycin resistance** has **not** been identified in three years, use highest rate of strep (24 oz/A) for each forecast infection
  - Consider an application of Kasumin 2L at the labeled rate (64 fl oz/A) for the 2nd or 3rd forecast infection

Managing fire blight

- Bloom (Organic with susceptible varieties)
  - No antibiotics (Oct 20, 2014), Highest rate of Double Nickel with Cueva, Badge X2 with hydrated lime, Serenade Optimum, or Blossom Protect
  - Run MaryBlyt 7.1 with 60-75% efficiency with forecast data to plan spray interval – use local data

Chemical management of fire blight

- Post-Bloom & Summer: Prohexadione Ca
  - Retards vigorous shoot growth in young trees & is best protection against shoot blight
  - Make two applications: 6-12 oz/100 gal (3-6 oz/100 gal for tree <5 years): 1-3” shoot growth & 14-21 days later
  - “Trickle” program 1-3 oz/100 gal: beginning late bloom every 14-21 days till terminal bud set

Managing fire blight

- Post-Bloom & Summer: Copper (protectant)
  - Can cause fruit russet: not a concern in nursery or during establishment - survival
  - Apply with adequate drying time
  - Protectant: reduces surface bacteria
  - Terminals can outgrow protective residues of copper
  - Low rate fixed copper program: 7-10 day schedule until terminal bud set

Managing fire blight

- Post-Bloom & Summer: Pruning newly developed strikes
  - Remove as soon as noticed on a **cool dry day**
  - Cut into last season's growth - At least 12” into healthy tissue
  - Young trees: if 12” is into the main scaffold > remove/replant
  - “Rescue” program apply Apogee 6-12 oz/100 gal, wait 5 days, prune every two week till TBS

Question

How well do the current chemical management products work?

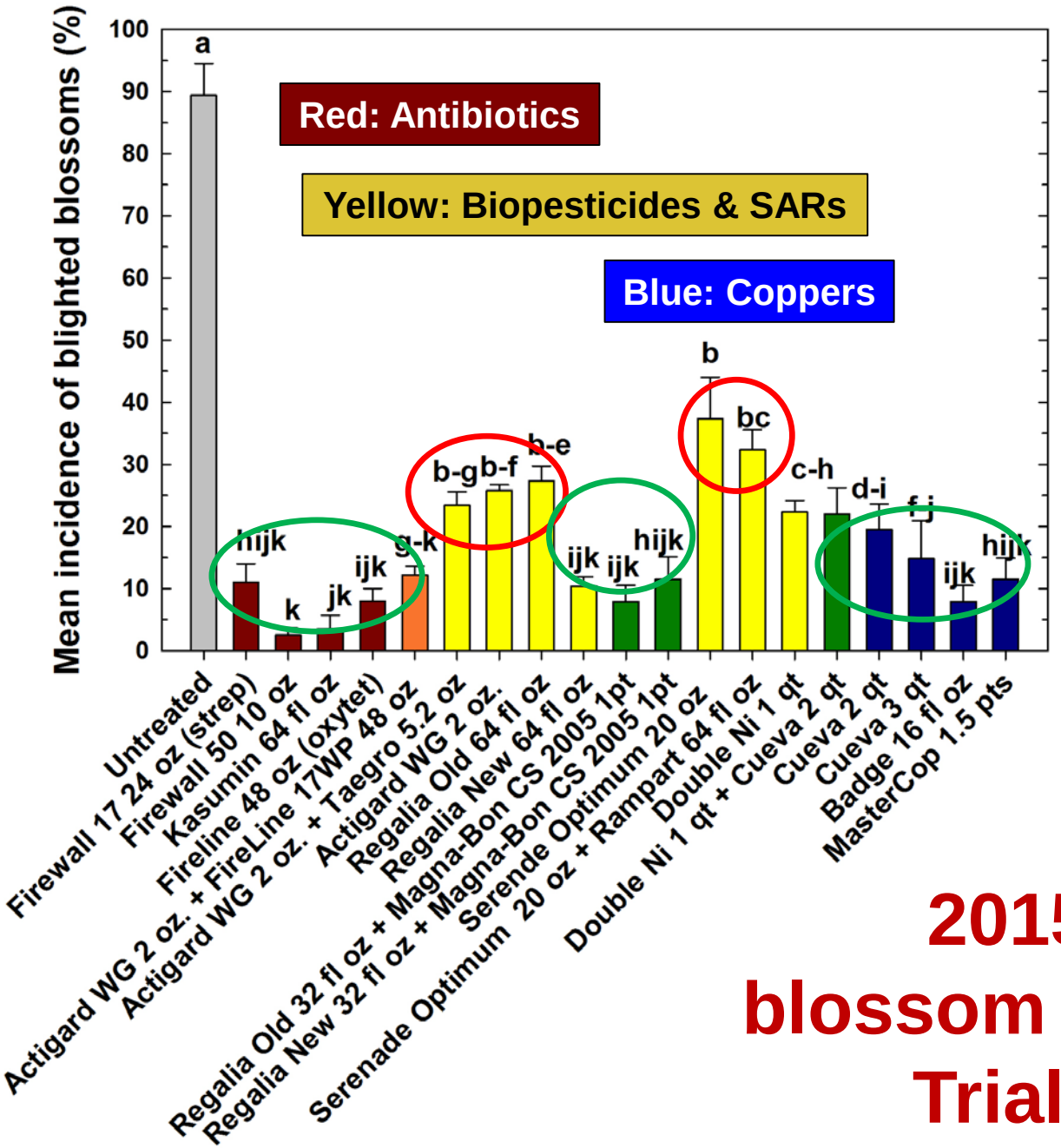
Fire Blight Trials

- Orchard site

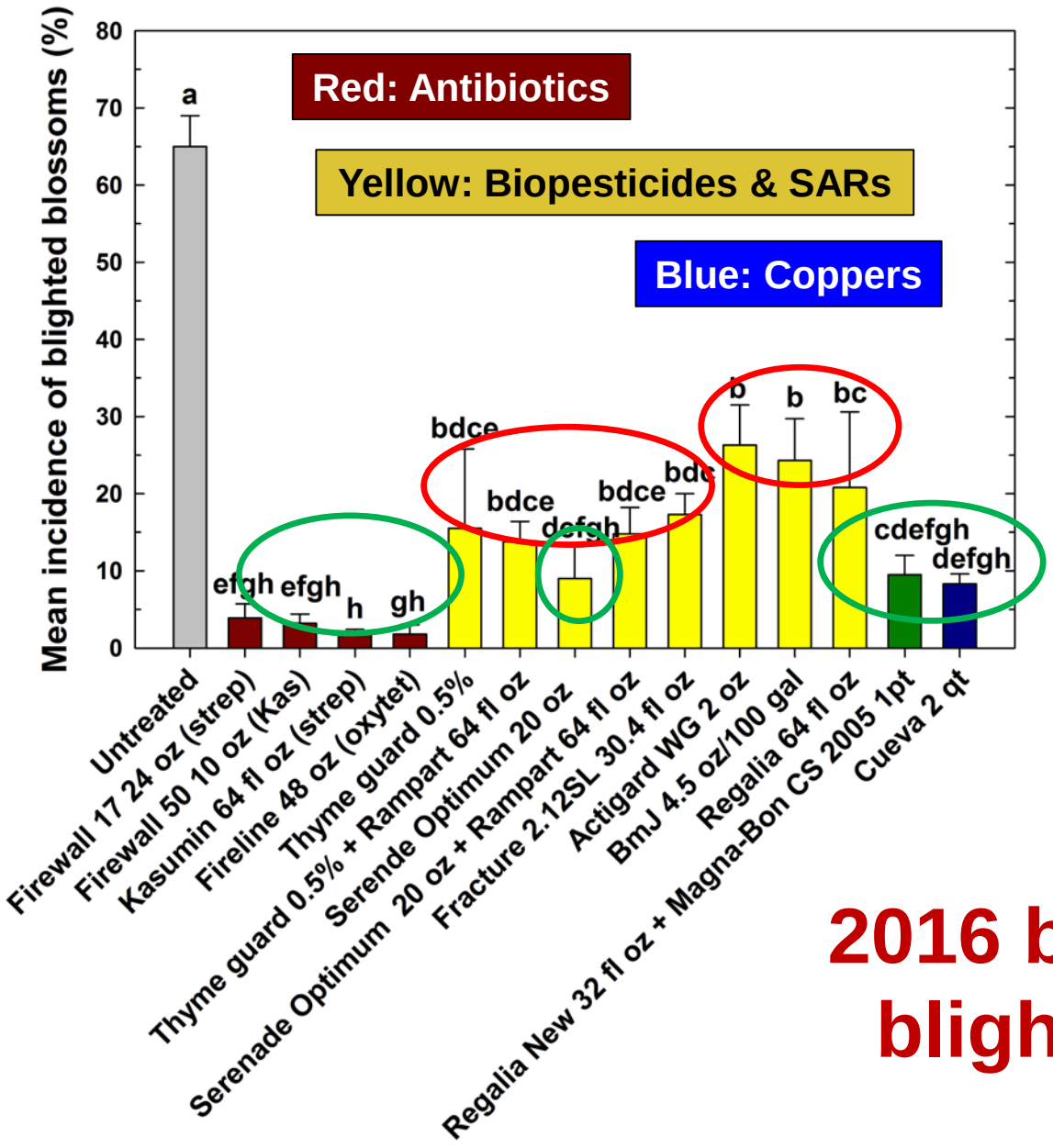
  - 16-year-old ‘Gala’ trees on B.9
- Artificial inoculum: hand-pump sprayer for blossom blight & scissor dip for SB

Fire Blight Trials

- Blossom blight application timing
  - Pre-bloom timings for biopesticides
  - All antibiotics & biopesticides @ 80% bloom
  - 10% (9 May) to 80% (10 may) 80ºF
  - (Ea 273 at $1x10^6$ $CFUml^{-1}$)
- Blossom blight incidence: percentage of blighted blossoms (5 reps)

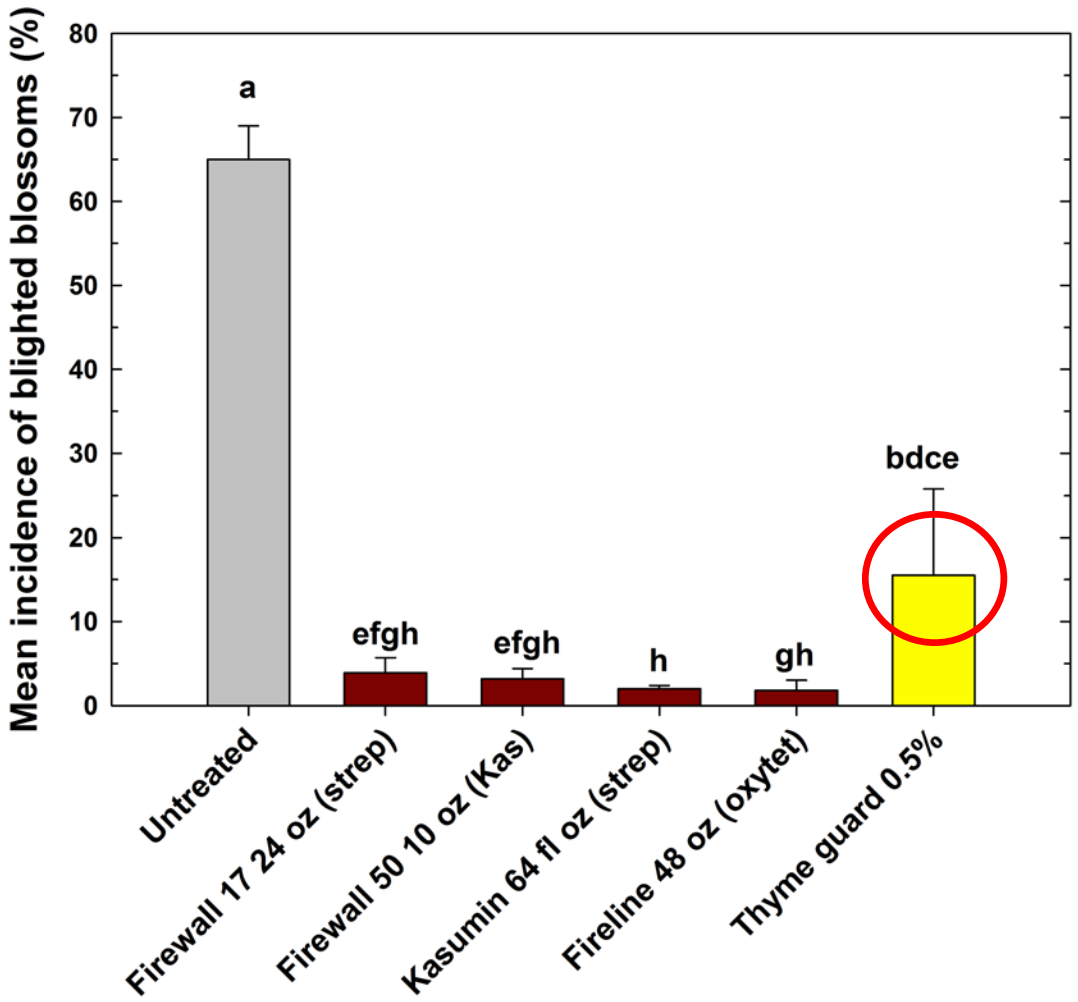


2015 blossom Blight Trials

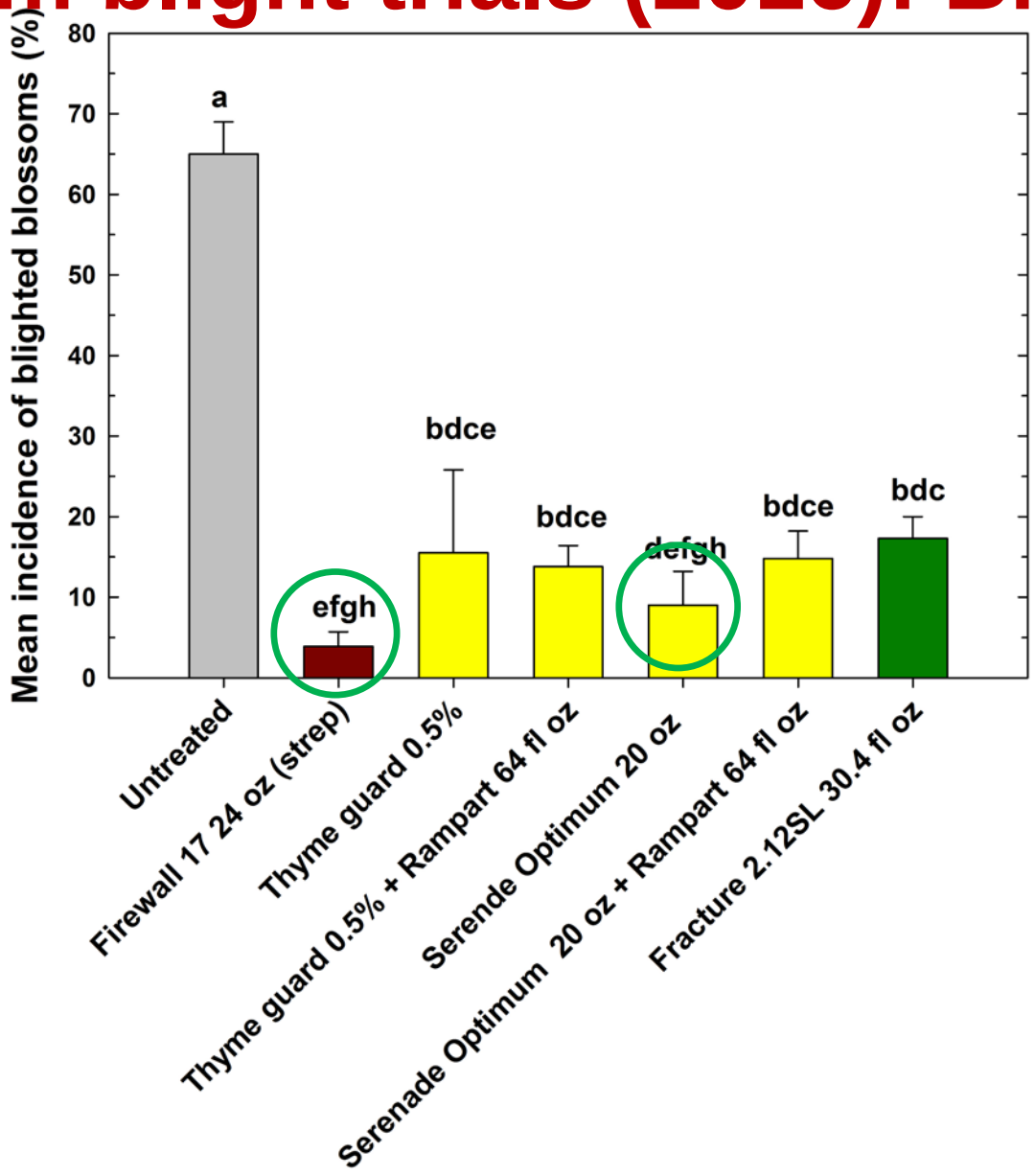


2016 blossom blight trials

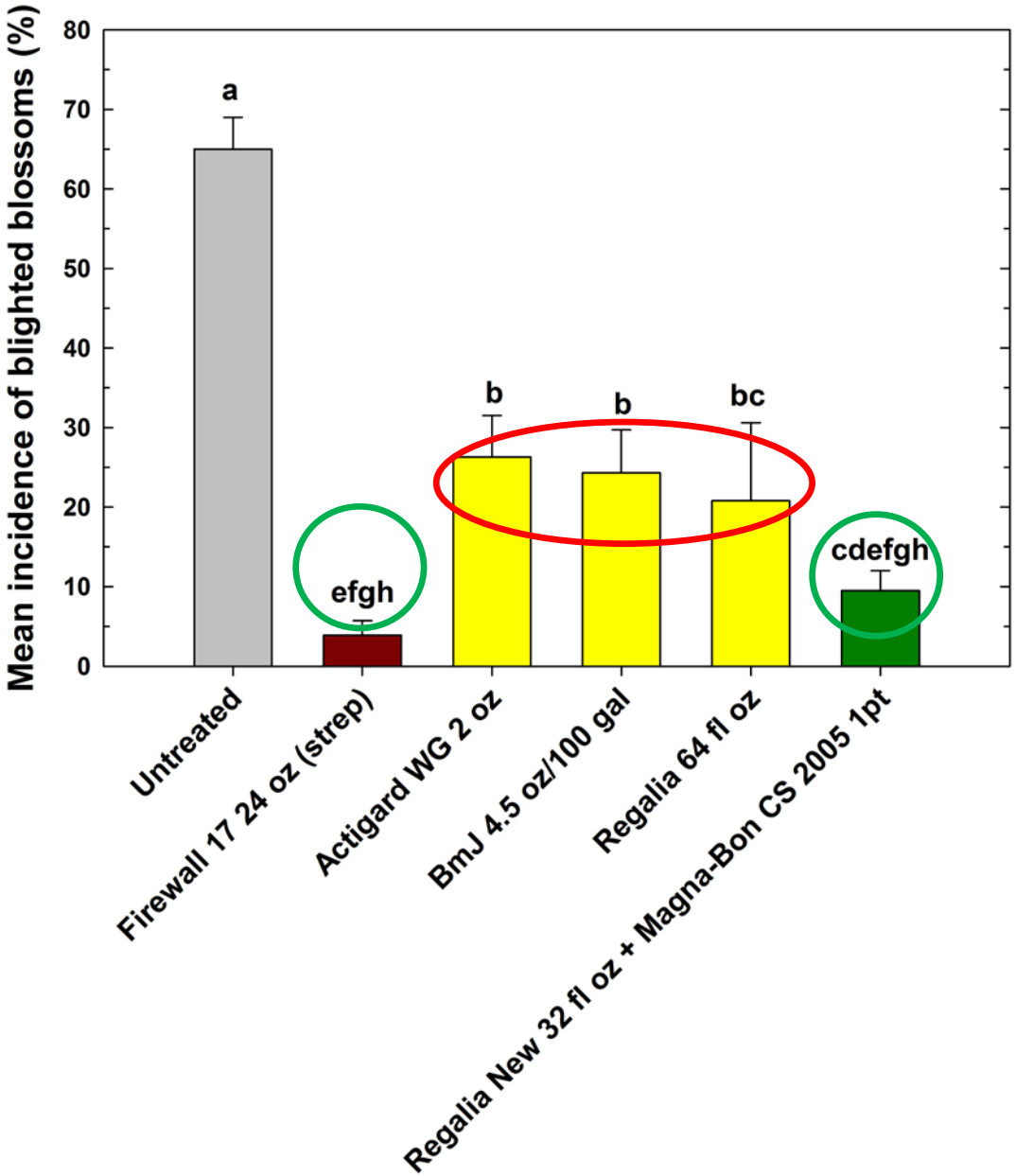
Blossom blight trials (2016): Antibiotics



Blossom blight trials (2016): Biologicals



Blossom blight trials (2016): SARS



Blossom blight trials: Trends & considerations

- Antibiotics:
  - Firewall 50WP most effective antibiotic (Section 18 for citrus canker)
  - Kasumin 2L: most effective of registered antibiotics for fire blight
  - Fireline 17WP: worked well this year (protectant – static)
- Coppers: Badge, MasterCop, CS2005, & Cueva (3qt rate) on par with weaker antibiotics **No phyto!**

Blossom blight trials: Trends & considerations

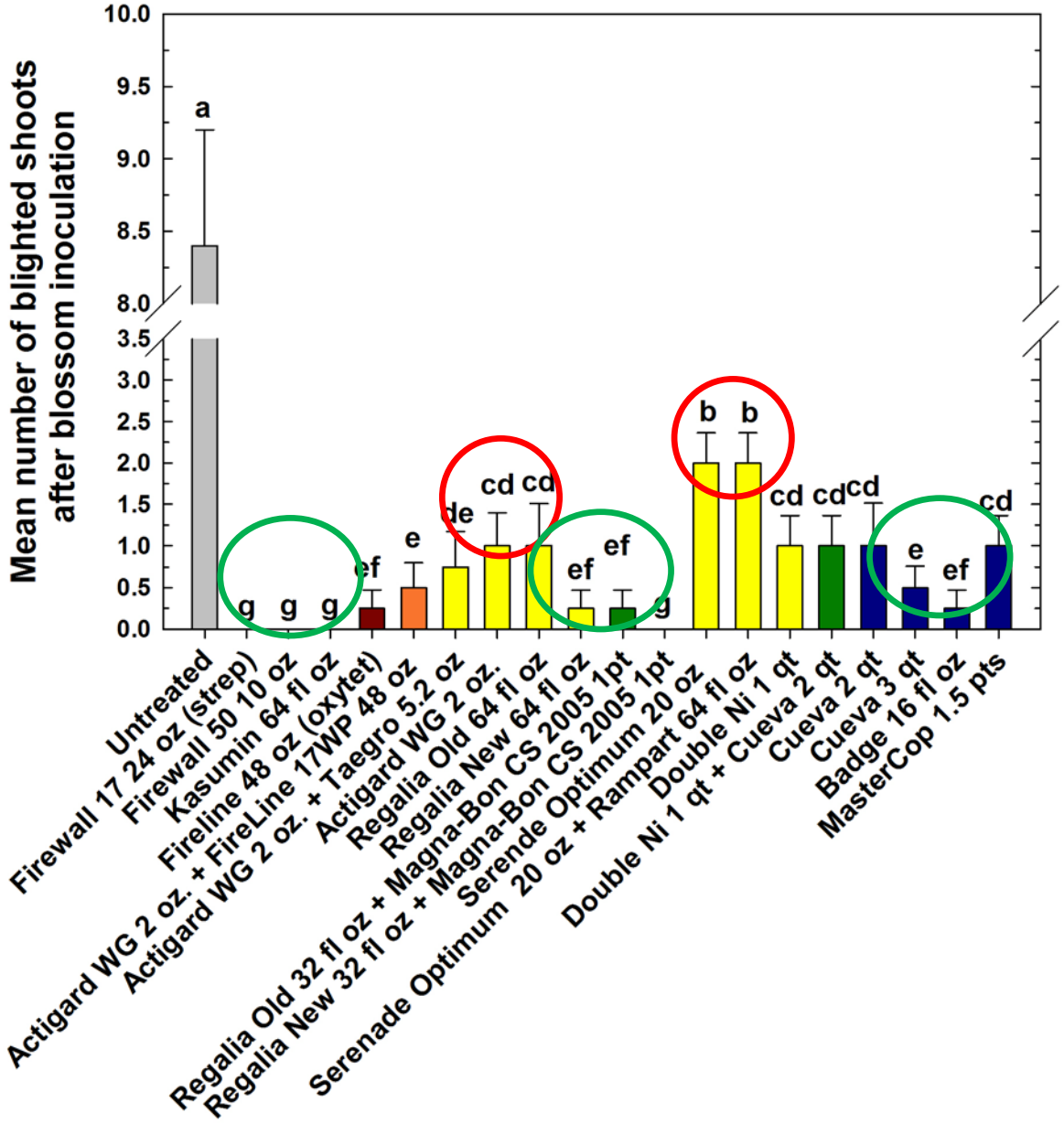
- Biologicals: Double Nickel LC, Serenade, Thyme guard
  - Work fairly well – good in light pressure situations and organic

- SARS: Actigard, Regalia, & BMJ > 50% control alone
  - Adding Magna-Bon CS2005 to 32 fl oz Regalia > improved control & cost-effectiveness

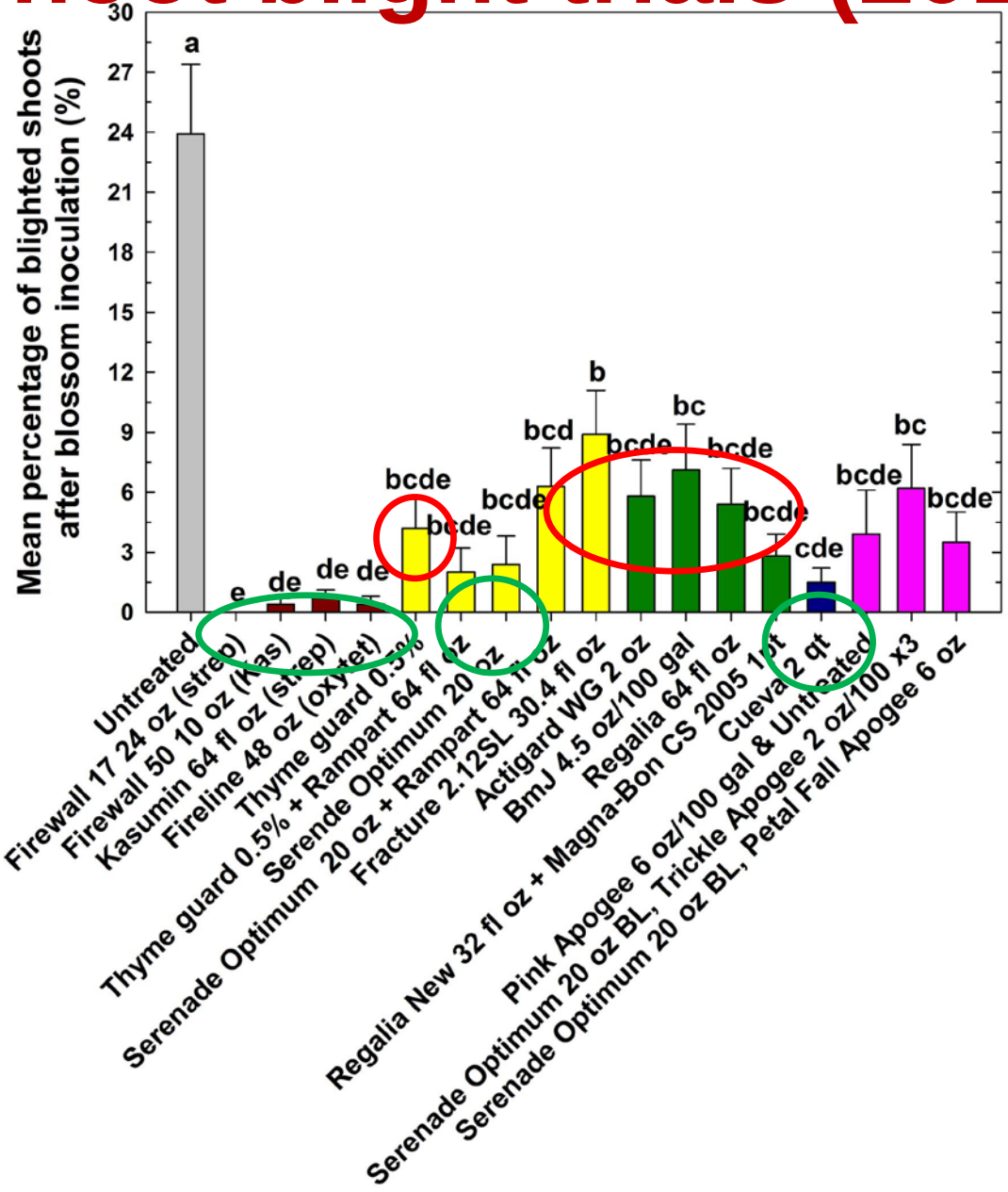
Shoot blight trials

- Shoot blight application timing
  - Natural infection from blossom blight infections
  - Apogee (PF/1-2”) & SARs (Actigard, BMJ, Regalia)(5-days prior)
  - Shoot blight weather in June ~68ºF 0.2”
- Shoot blight: progression of canker of 20 shoots (5 reps)

Shoot blight trials (2015):



Shoot blight trials (2016):



Shoot blight trials: Trends & considerations

- Blossom inoculated shoot blight (small trees)
  - Trends mirror the blossom blight trends with antibiotics and coppers > best
  - Inoculum reduction > secondary shoot blight
  - Regalia + Magna-Bon comparable to other copper alternatives & even strep
  - Low rates of apogee prohexadione Ca (apogee) > effective when paired with effective blossom blight programs

Acknowledgements

- Program research funded by:
  - Apple Research and Development Program
  - New York State IPM
  - New York State Department of Agriculture & Markets - Specialty Crop Block Grant Program
  - North American agrichemical industry: Syngenta, BASF, Bayer, Dow, & Dupont

Questions