

Managing Pecan Scab in a Very Wet Year

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To Restate the Obvious

Situation – frequent rains and cloudy weather much of the season, then a drier fall

Result – extremely high disease pressure* due to frequent infection periods, difficulty of timely spraying, fungicide washoff, etc.

resulted in reduced yields and quality (not just related to diseases). Even had a little scab on some highly resistant cultivars like Excel. By mid July some fungicides were sold out!

*Mainly scab but also had downy spot, anthracnose, etc.

It was a Tough Year

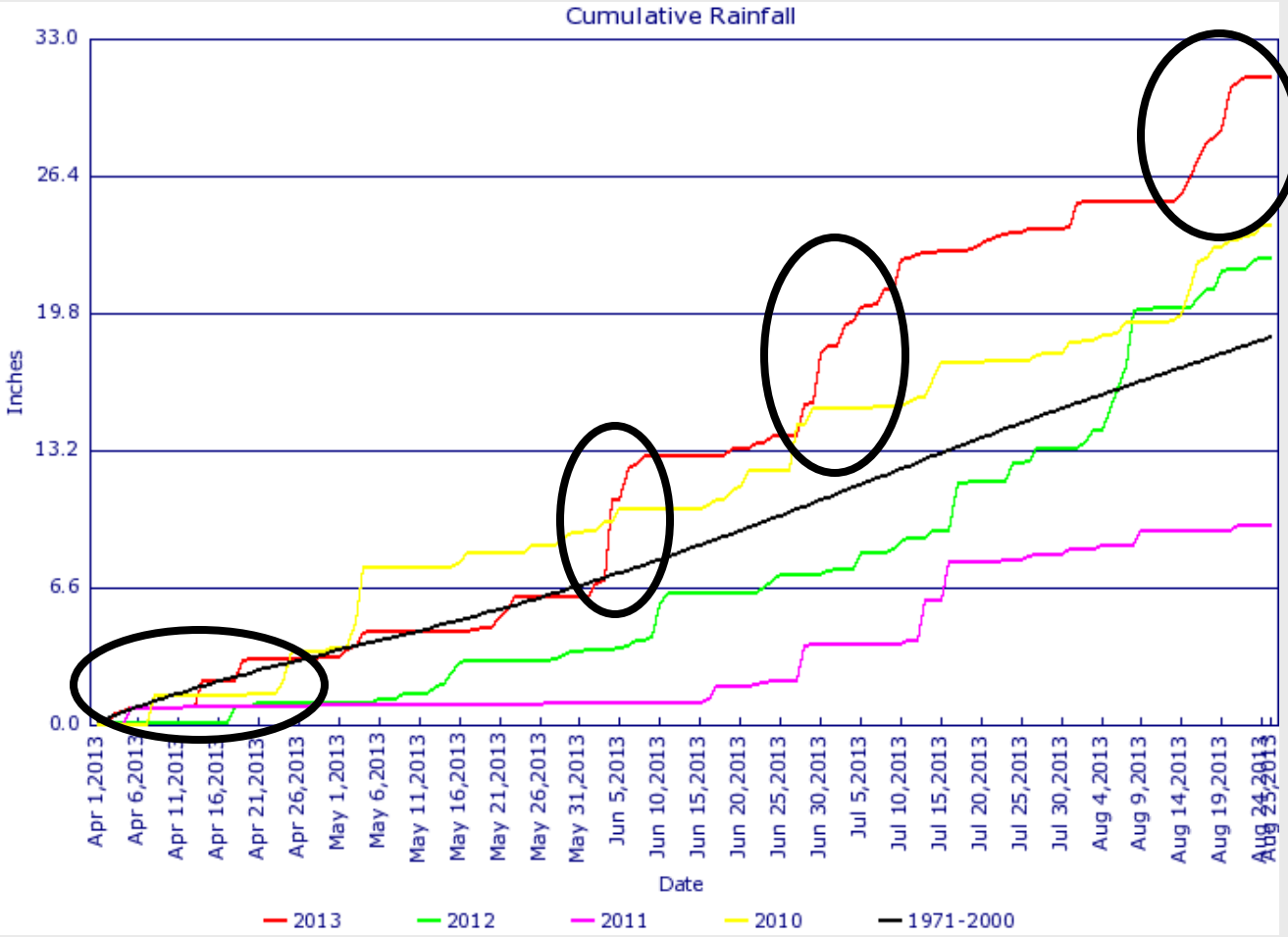
By September the only people I saw smiling were the fungicide salesmen!



"Being a pecan grower in 2013 was like being a jackass in a hailstorm. There was nothing to do but stand there and take it."

Cumulative Rainfall

(Ty Ty, GA (April – Aug))



No Silver Bullets or Magic Voodoo Juice for Scab!

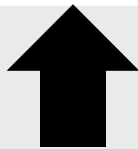
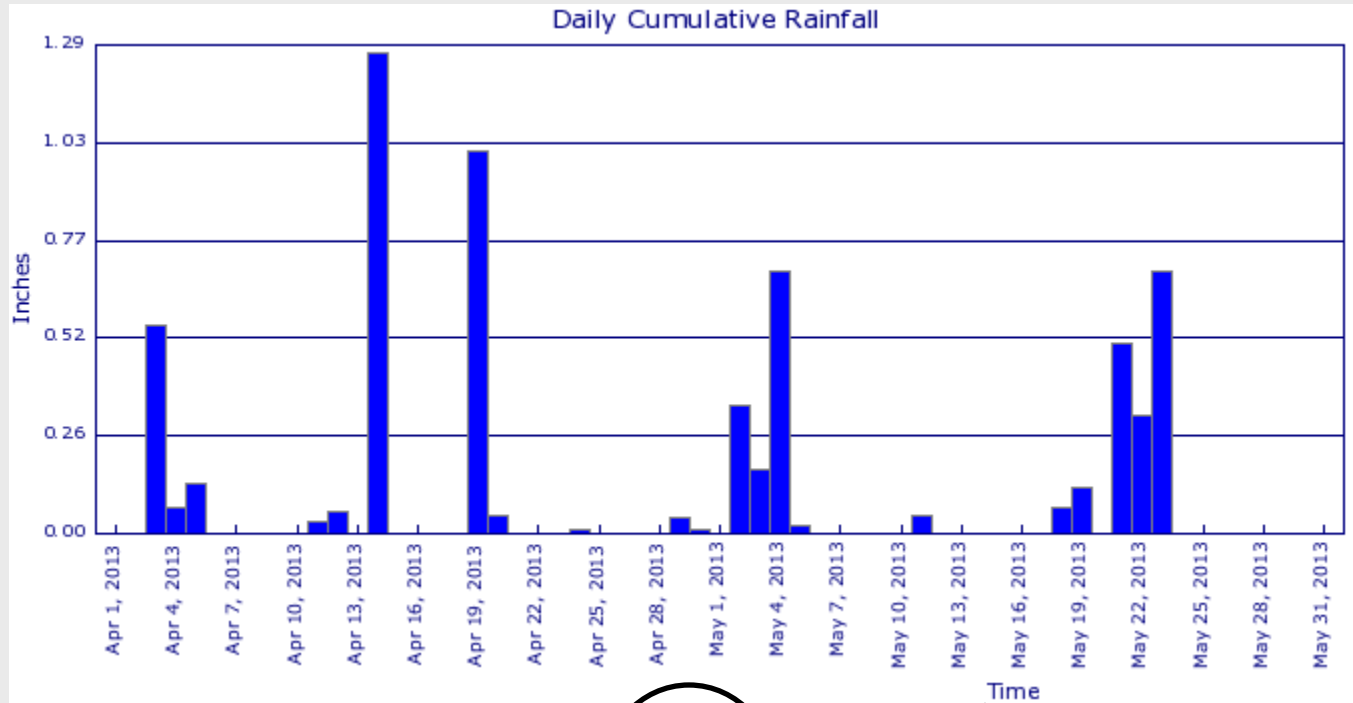
1. Fixed factors – site selection, cultivars, etc.
2. Cultural practices – pruning, thinning, clearing surrounding vegetation, mowing, etc. (much of which focuses on improved air movement and drying)
3. **Chemical control – the backbone of disease management, especially for susceptible cultivars in humid areas.**

How important are pre-pollination sprays?

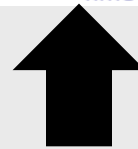
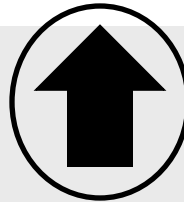
In some drier years they provide little, if any, benefit for disease control or yield. BUT, in wetter years they are critical to prevent early inoculum production!

This year they were needed.

Effects of Pre-pollination Spray Dates, 2013



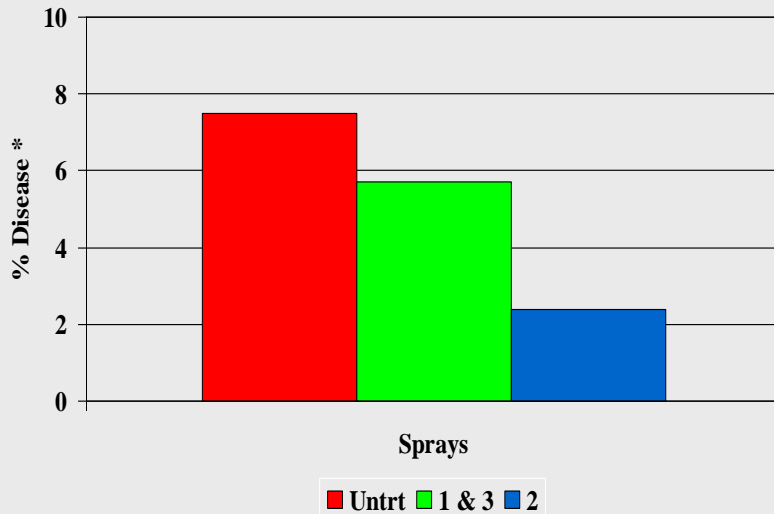
Light green



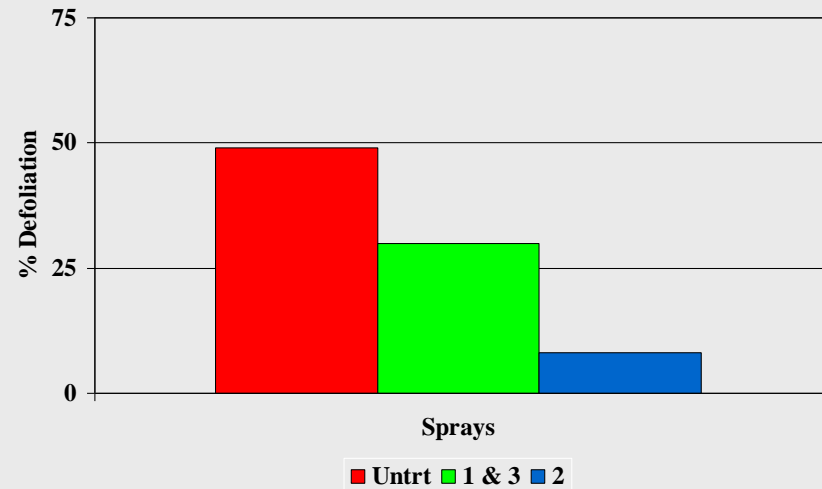
Effect of early season spray timing

(Super Tin / Elast - all trt's sprayed app's 4-10)

Leaf Scab



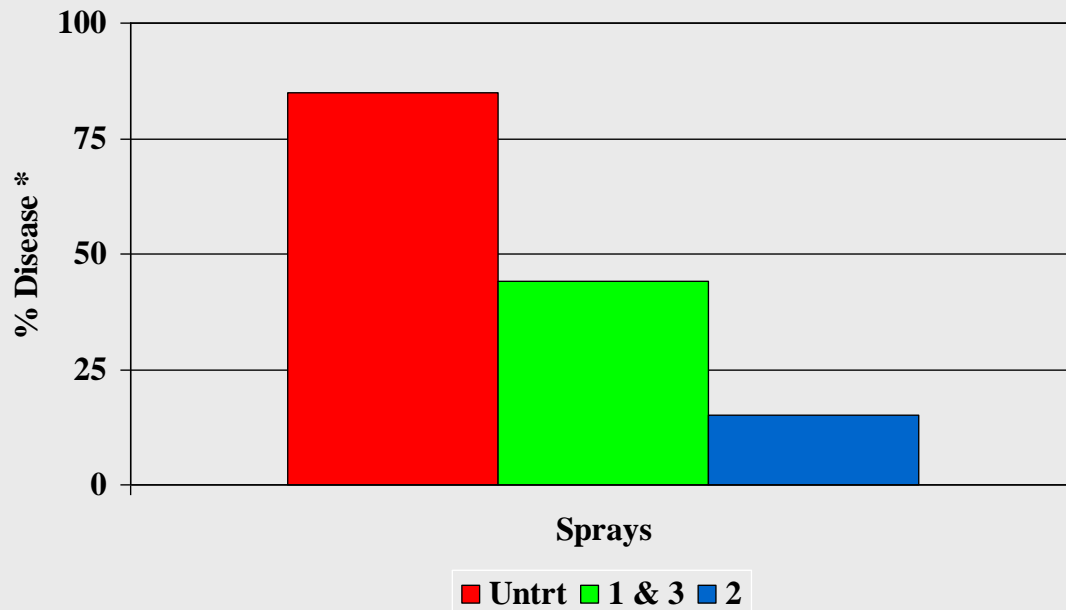
November Leaf Retention



Effect of early season spray timing

(Super Tin / Elast - all trt's sprayed app's 4-10)

Nut Scab Incidence

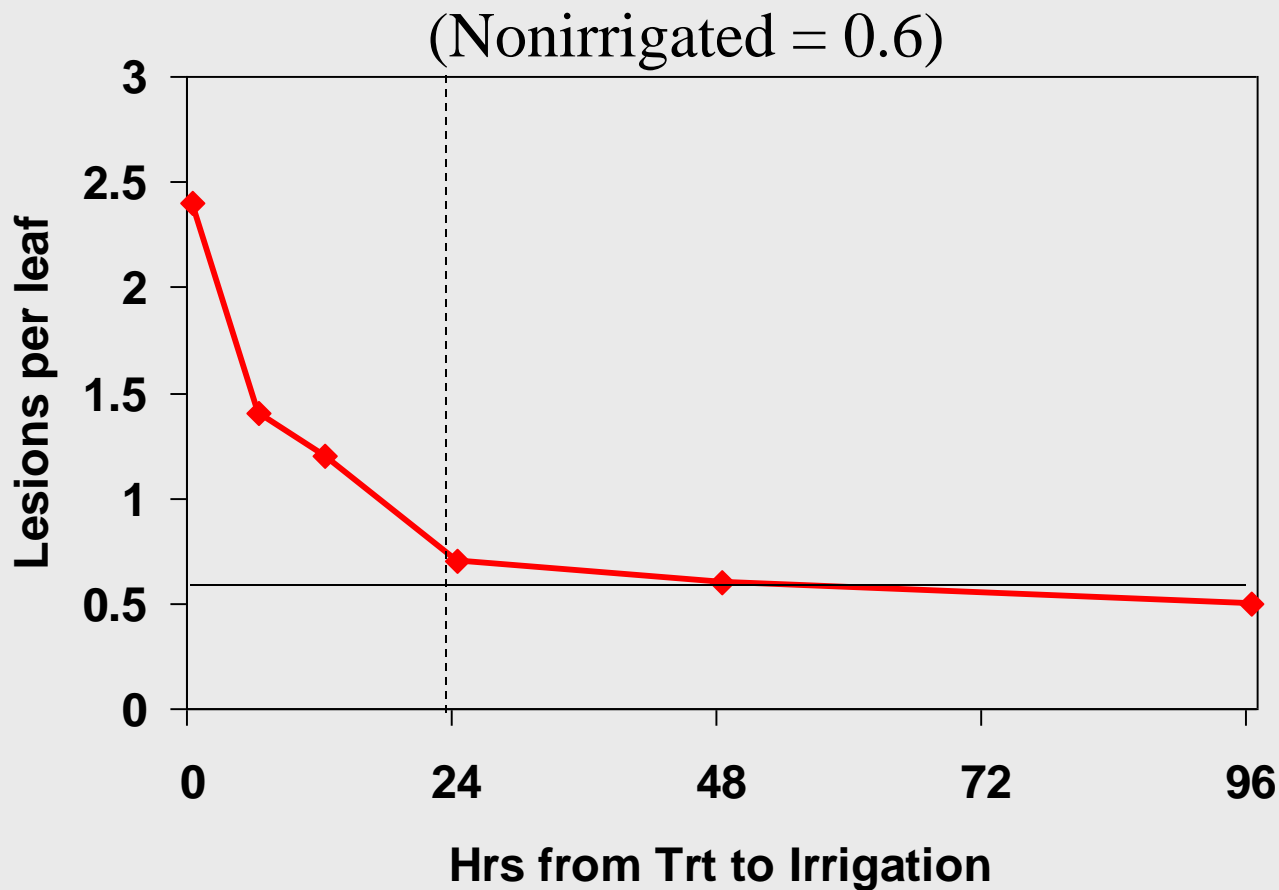


How much drying time do I need for my fungicides?



- Compared Folicur, Bravo/Moncut, and Abound programs
- 0, 6, 12, 24, 48 and 96 hours from spray to irrigation (0.5 in.)
- 7 reps, 3 years
- 154 total microplots

Effect of Irrigation after Fungicide Application on Leaf Spot*



* Mean data for Bravo/Moncut, Folicur & Abound programs, 3 years

How much drying time do I need for my fungicides?

More is clearly better – to get maximum benefit from each spray requires more time than just “until the leaf dries”

Varies with fungicide – systemics less vulnerable than protectants, but systemics vary widely in time of uptake (ex. Headline)

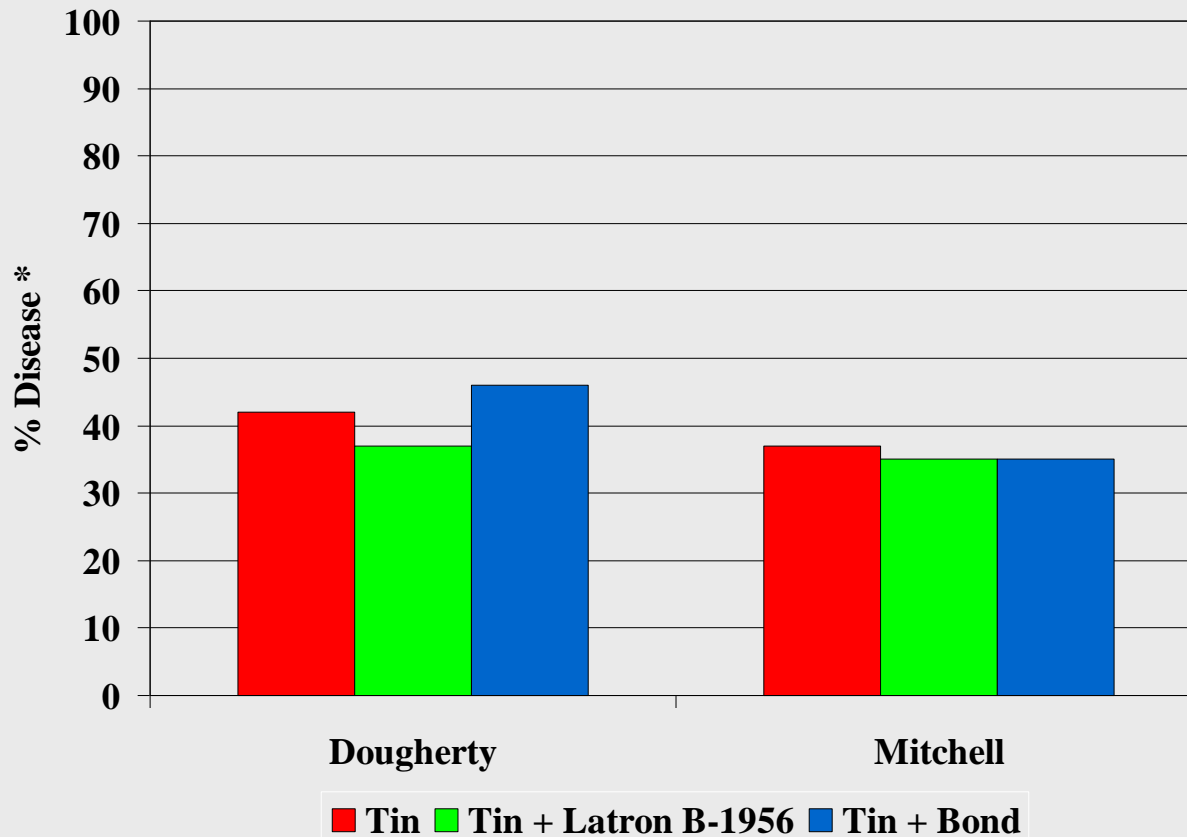
Will spray adjuvants improve my disease control?

Theoretically yes! Remarkably little data, but they can affect uptake by plant (ex. we do not use them on peanuts due to increased uptake)

Some growers feel they are beneficial

Varies with fungicide – systemics most likely to benefit. Elast is a cationic surfactant.

Effect of adjuvants on efficacy of Super Tin 80WP

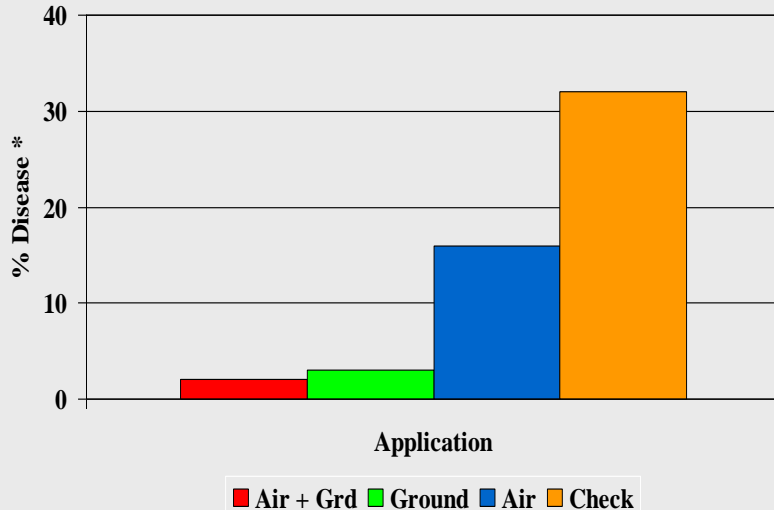


**Do aerial applications really do
any good?**

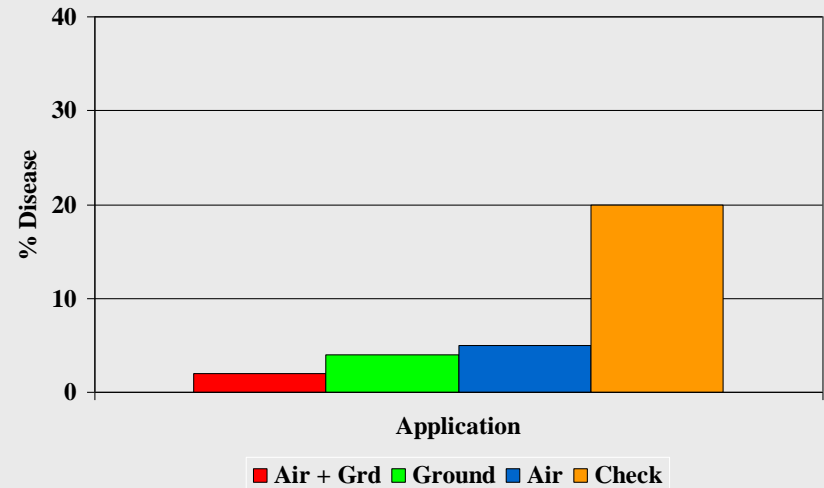
**YES, at least in the upper part
of the tree**

Effect of aerial applications for pecan scab (Schley, 3 yrs data)

Low (<15 ft)



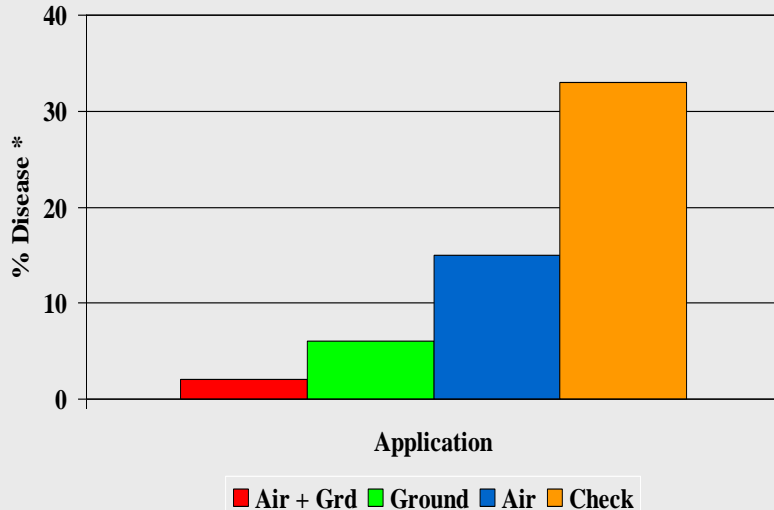
High (> 40 ft)



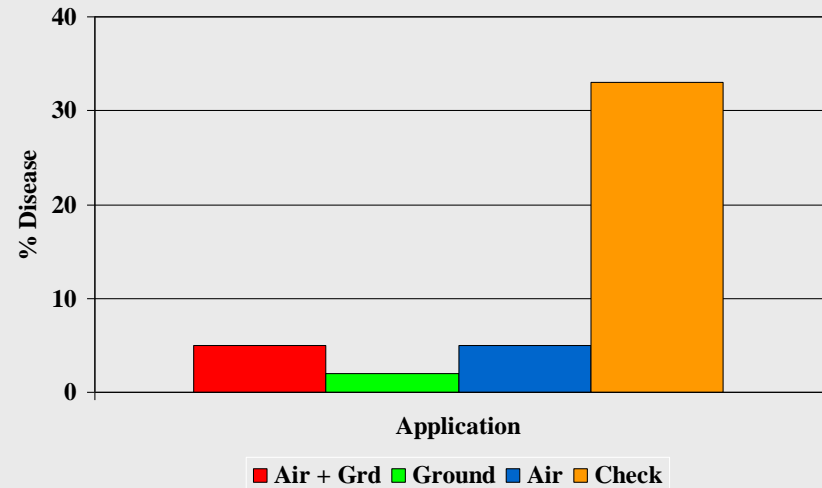
Bertrand and Brenneman

Effect of aerial applications for pecan scab (Desirable, 3 yrs data)

Low (<15 ft)



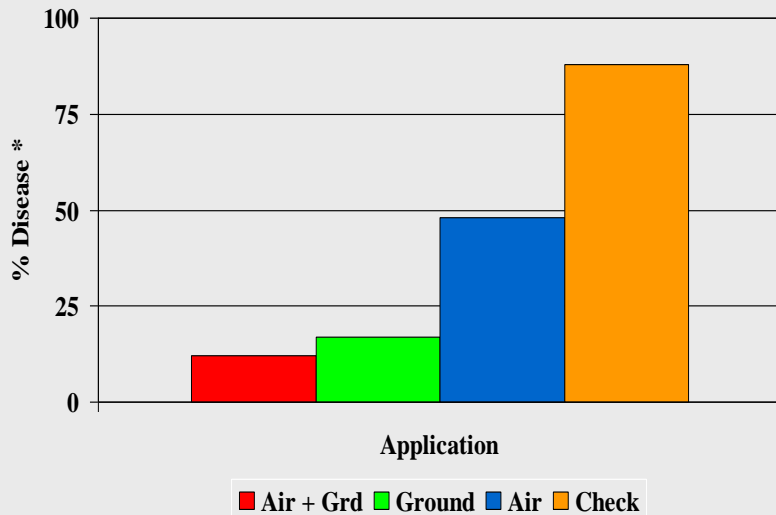
High (> 40 ft)



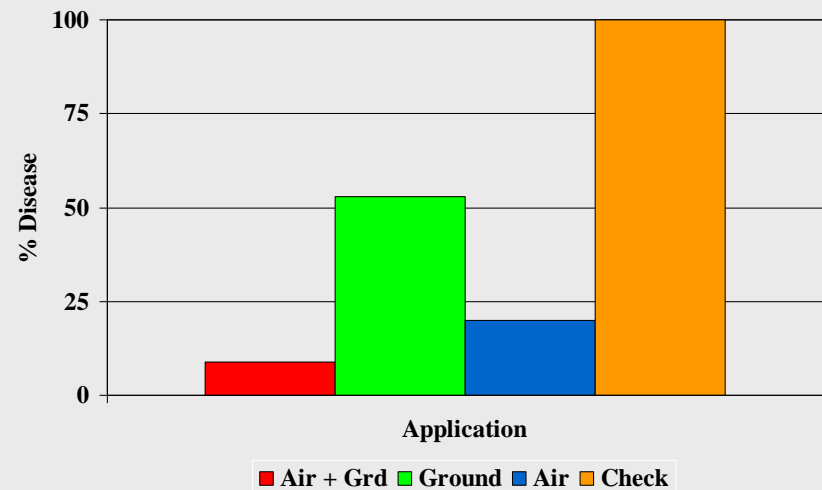
* Bertrand and Brenneman

Effect of aerial applications of Enable/AgriTin for pecan scab (Bertrand, 2001)

Low (<15 ft)



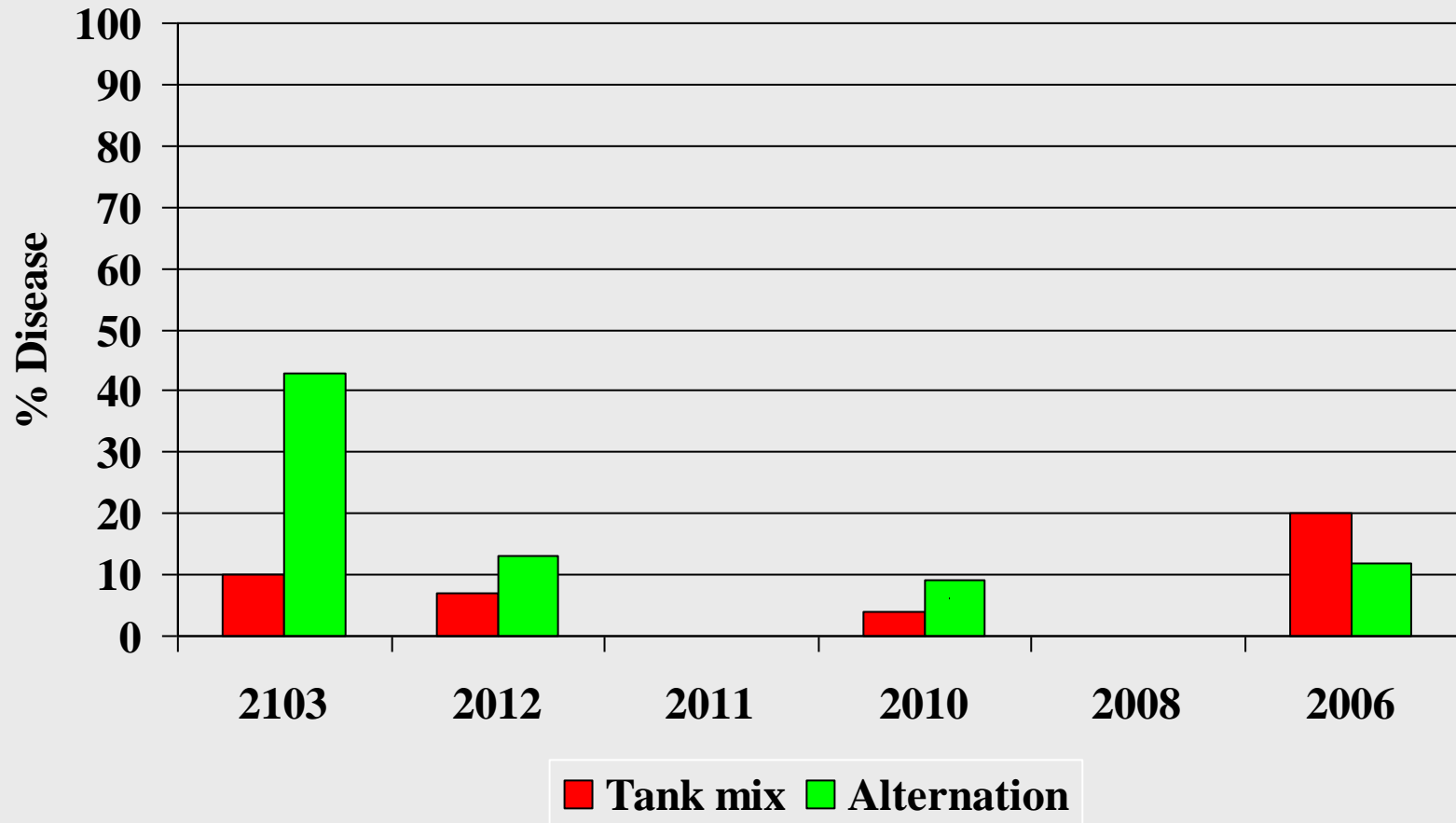
High (> 40 ft)



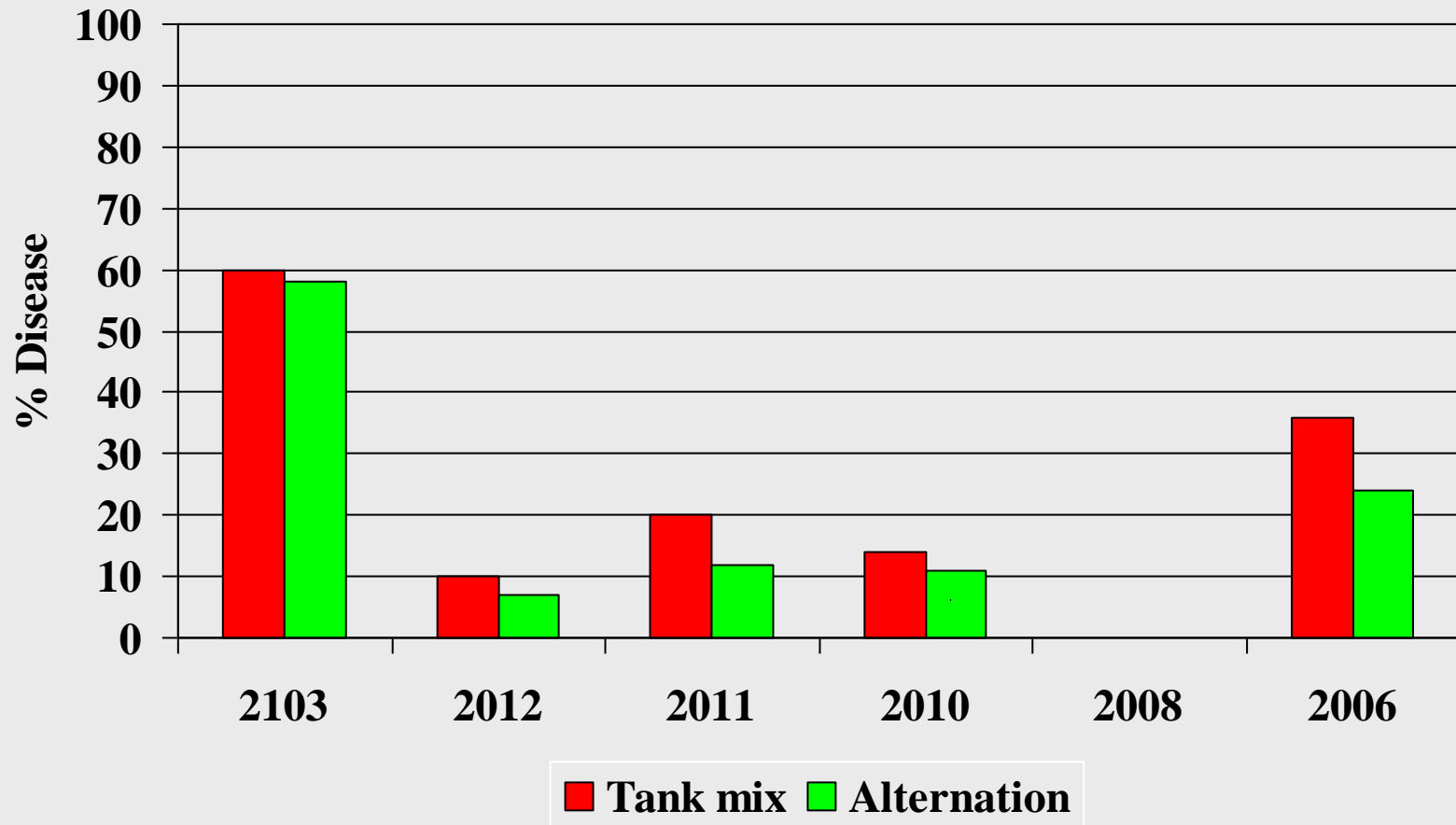
* Air app's w/ & w/out NIS – no difference low, but more disease high w/ the NIS!

Is it better to tank mix partial rates of fungicide or alternate sprays with full rates?

Nut Scab Control with Tank Mixes of Half Rates vs Alternating Full Rates of Super Tin and Elast (12 oz and 50 oz)



Nut Scab Control with Tank Mixes of Half Rates vs Alternating Full Rates of Enable and Elast (8 oz and 50 oz)



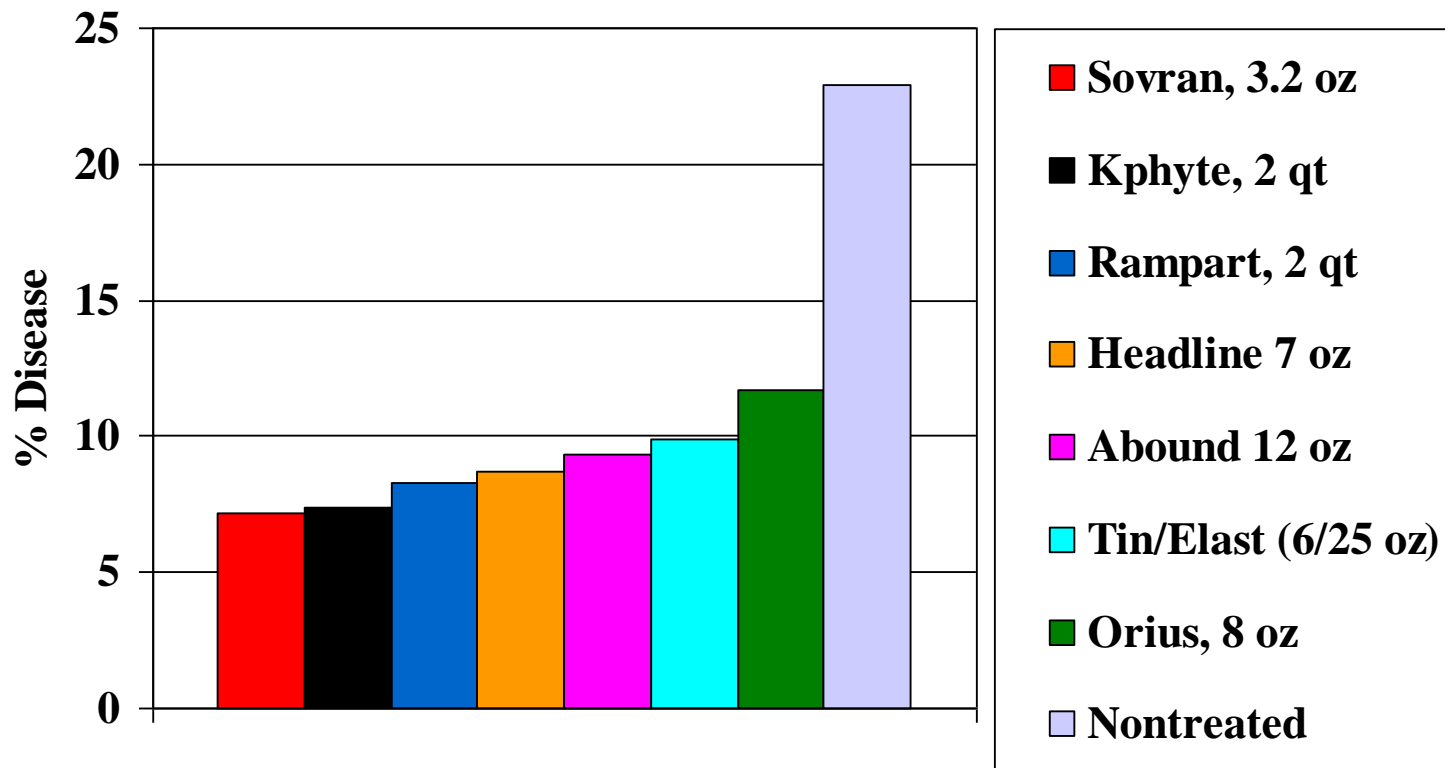
Tank Mixes vs Alternations?

- Tank mixes of Elast and Tin tend to do better than alternations of similar rates (additive or synergistic?)
- Alternating full rates of Elast and Enable tend to do better than tank mixes (probably due to gradual reduction in sensitivity to Enable)

**How did the different products
perform this year?**

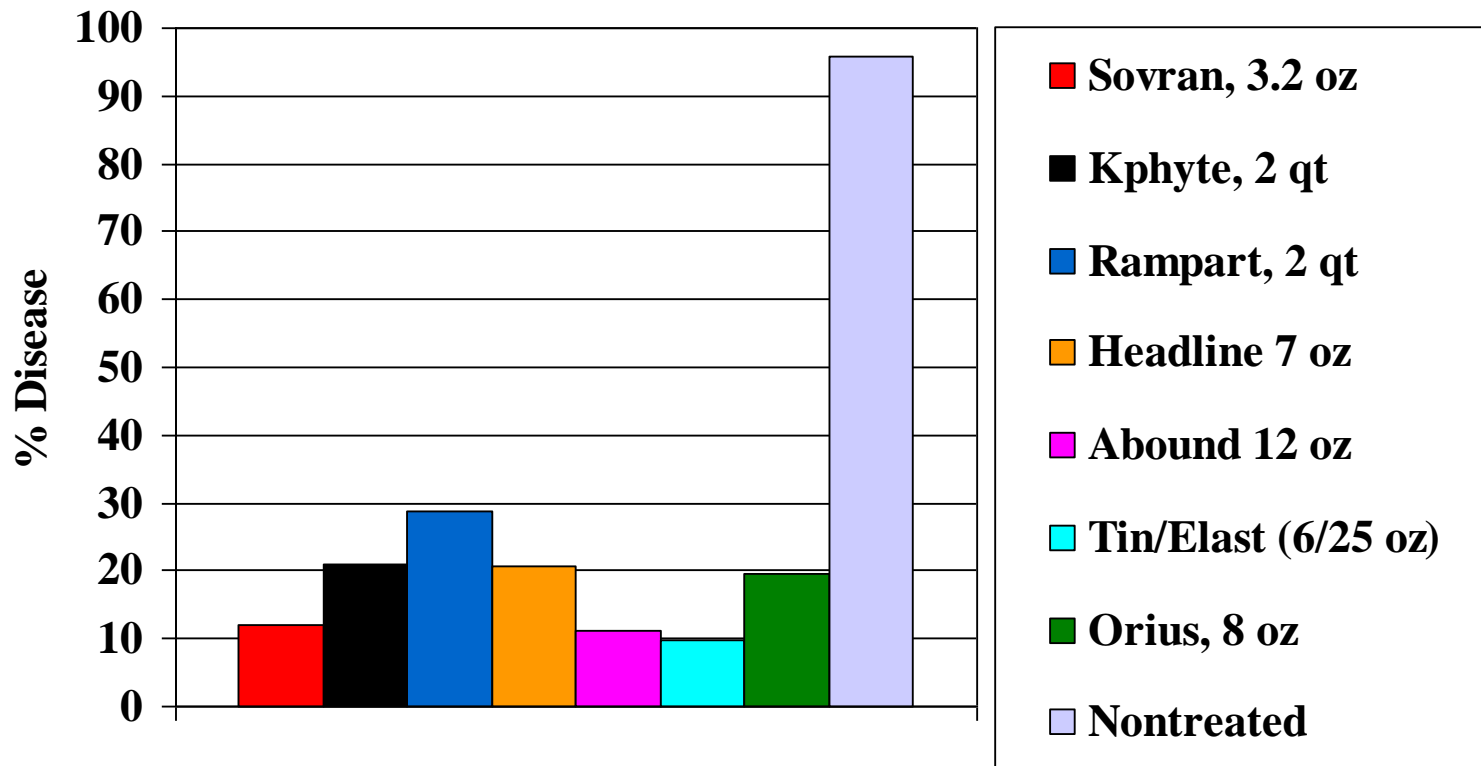
Effect of Fungicides on Leaf Scab Severity

(Desirable, Tifton, 2013; LSD = 3.1)
("Alt" programs are w/ Tin 6 oz + Elast 25 oz)



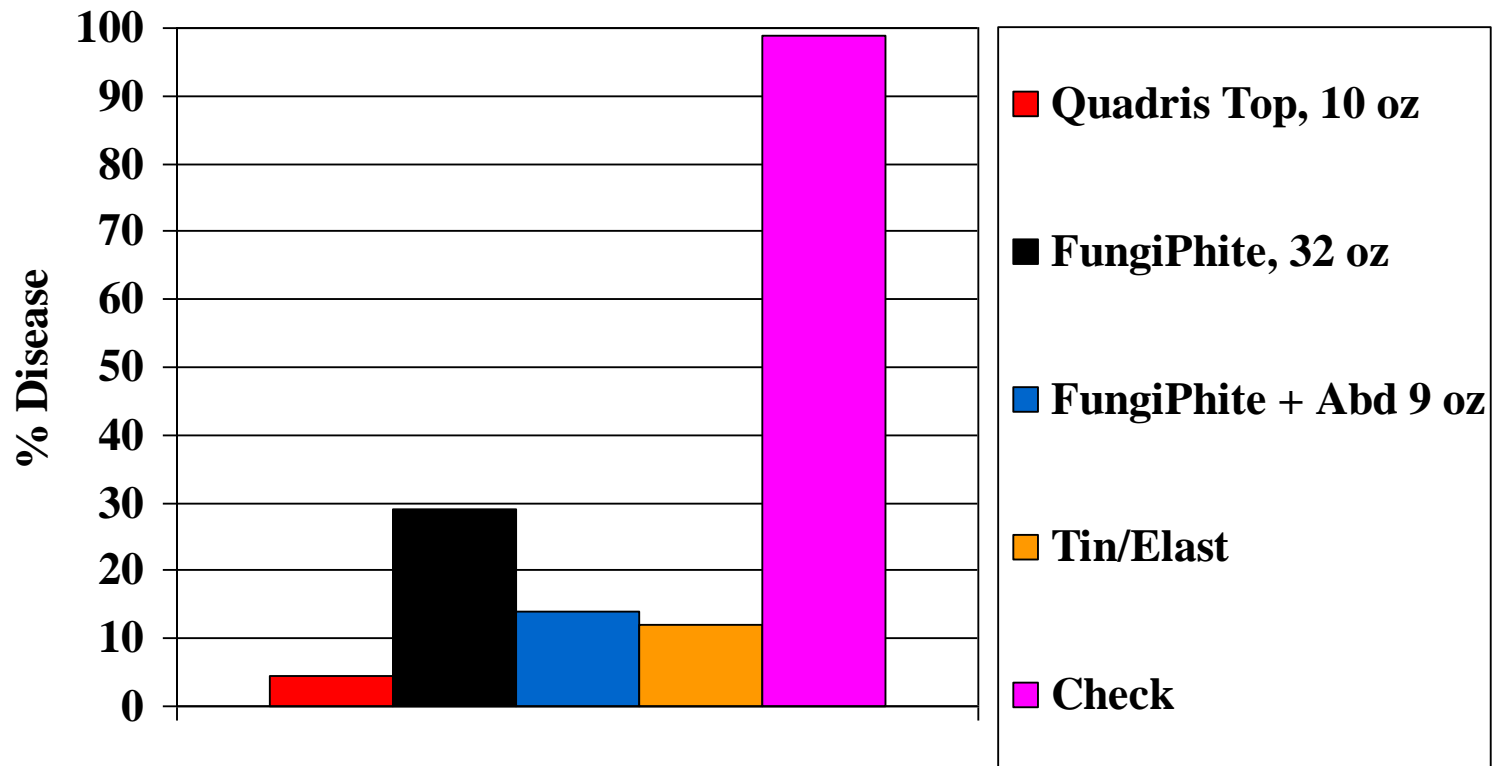
Effect of Fungicides on Nut Scab Severity

Desirable (South Block), Tifton, 2013 (LSD = 7.0)
("Alt" programs are w/ Tin 6 oz + Elast 25 oz)



Effect of Fungicides on Nut Scab Severity

Desirable (North Block), Tifton, 2013 (LSD = 5.9)
("Alt" programs are w/ Tin 6 oz + Elast 25 oz)



Generalizations on Fungicides

- Tin and Elast still core products for nut scab
- Triazoles still important but resistance is developing quickly (becoming risky to use a “solo” triazole)
- Topsin could be used more than it is
- Strobilurins (like Abound) will be used more, but will probably also have resistance issues
- Phosphites- have good potential for expanded use
- SDHI’s – used on other crops, but haven’t been outstanding for pecan scab.

Phosphite Summary

(K-Phite, Fungi-phite, Prophyt, etc.)

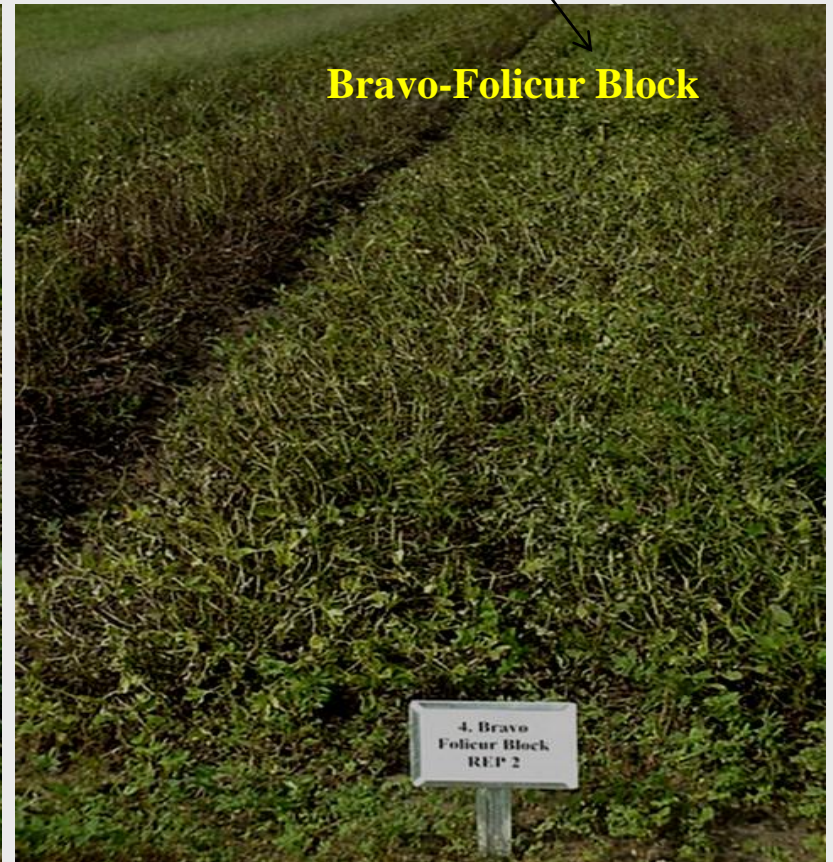
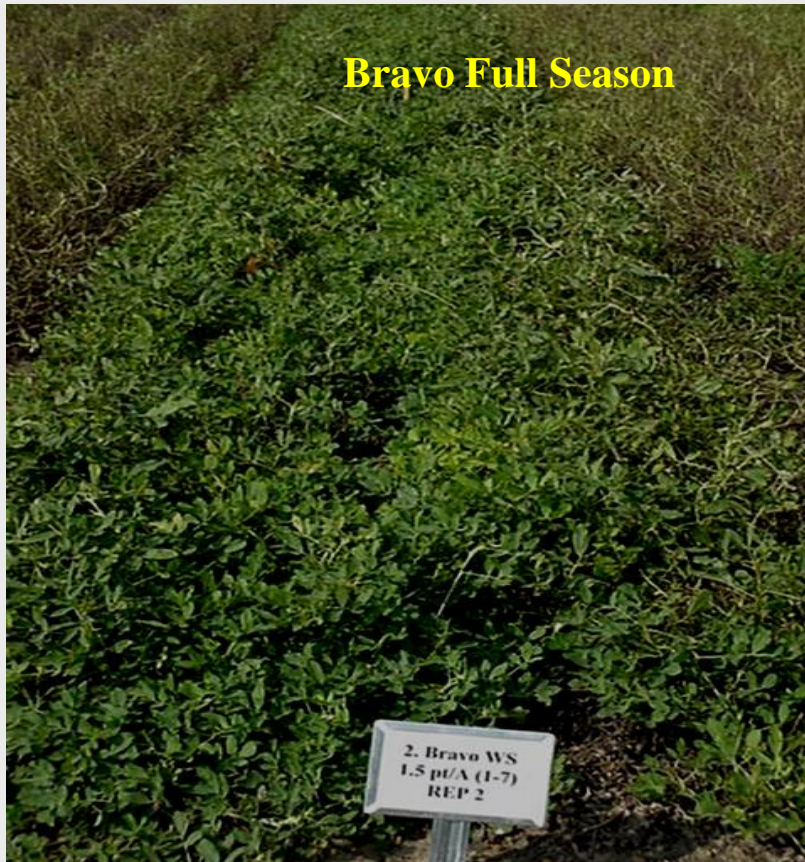
- Have efficacy on pecan scab and anthracnose; stronger on leaves than nuts
- Potential for leaf injury with lower spray volumes
- Have a good spectrum of activity with a different mode of action
- No indication of delayed shuck split with 5 app's
- Granular phosphites were NOT effective in 2013

We are abusing tebuconazole!

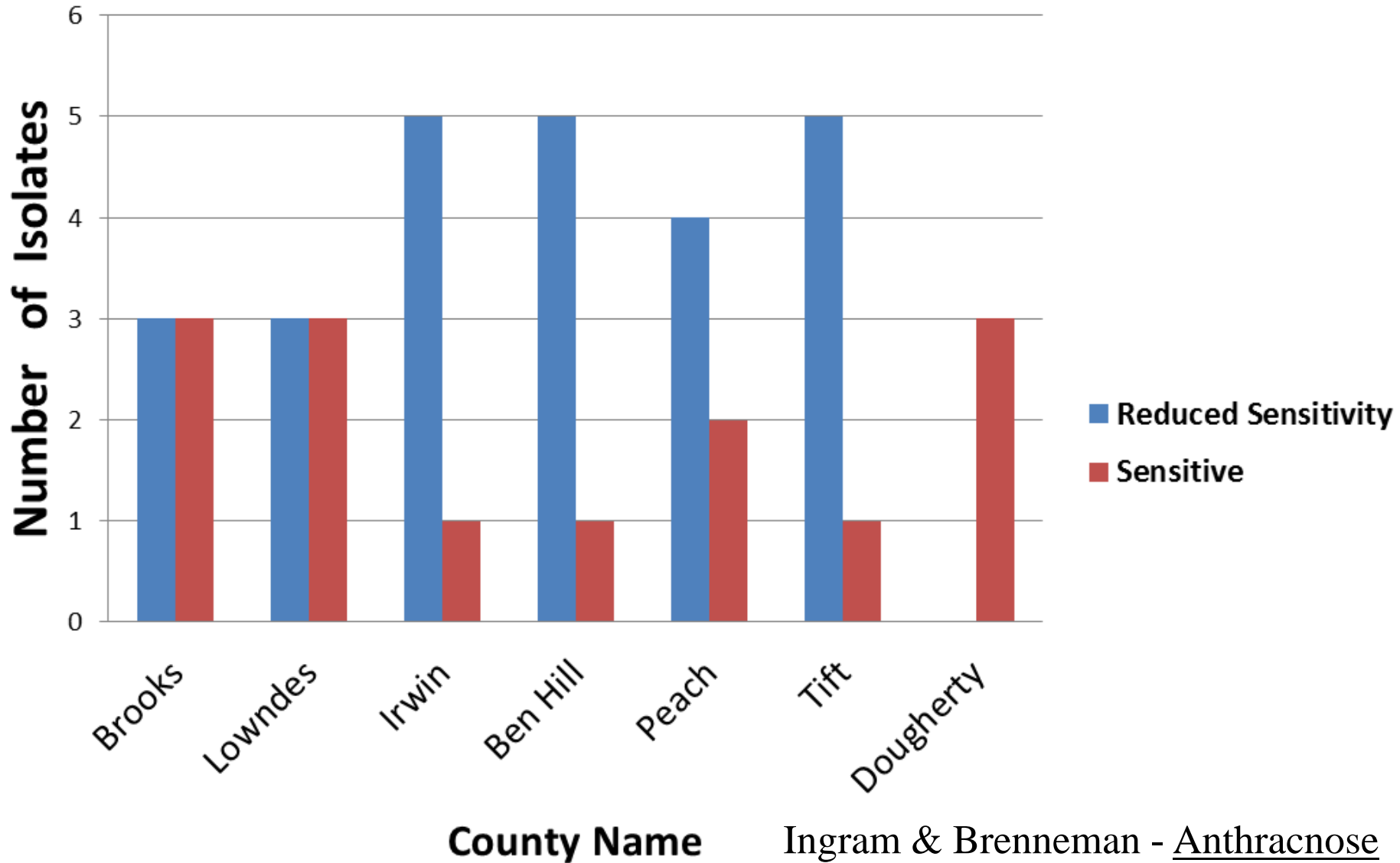
- It is added to many sprays “Just in case – it really doesn’t cost much of anything and it might help”
- Labeled rates and numbers of applications are not always followed
- Resistance is quickly developing in scab and other pathogens. It will affect the activity of Enable, Orbit, Absolute, Stratego, Quadris Top, Quilt, etc.
- Abound (azoxystrobin) is about to go off patent and the same thing may happen. (Sovran, Absolute, Stratego, Quilt, Quadris Top, etc.)

Tebuconazole (Folicur)

(Excellent on leaf spot in 1994, resistance developed by 2005, but still effective on white mold)



Tebuconazole (Triazole) Sensitivity



Ingram & Brenneman - Anthracnose

2014 UGA Program for Pecan Scab Fungicide Sensitivity Testing

(Stevenson, Brenneman and Brock)

- Growers mail samples to UGA/Tifton lab
- Will address growing need for “orchard specific” fungicide sensitivity data
- After 2014 we should know a lot more about fungicide resistance issues in the state, and some link to use histories

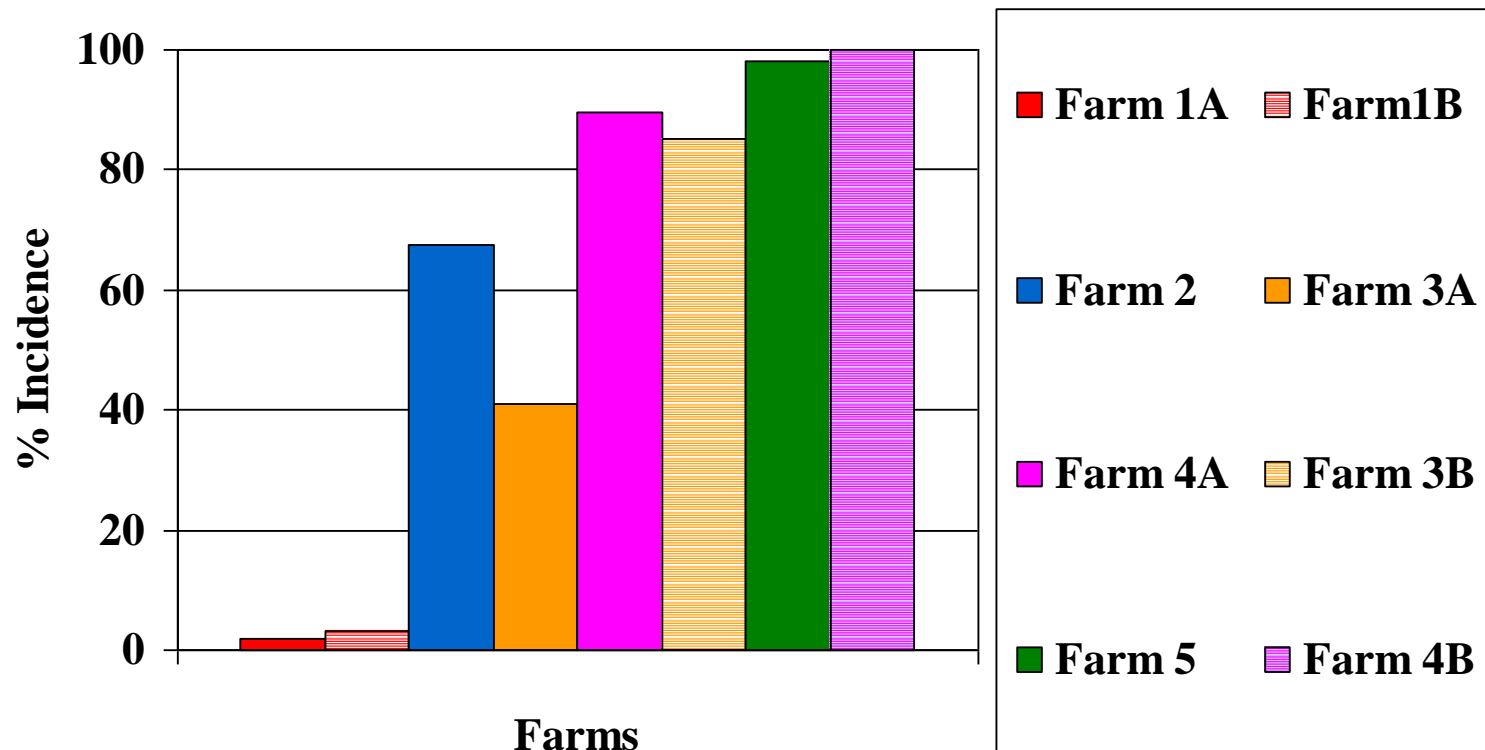
Could scab be controlled on Desirable's in the deep south in 2014?

Surveyed 8 very well managed orchards in late August and rated nut scab low in the trees (clearly more disease up high in most cases)

Nut Scab in Commercial Orchards, 2013

(All well maintained Desirable orchards, south GA)

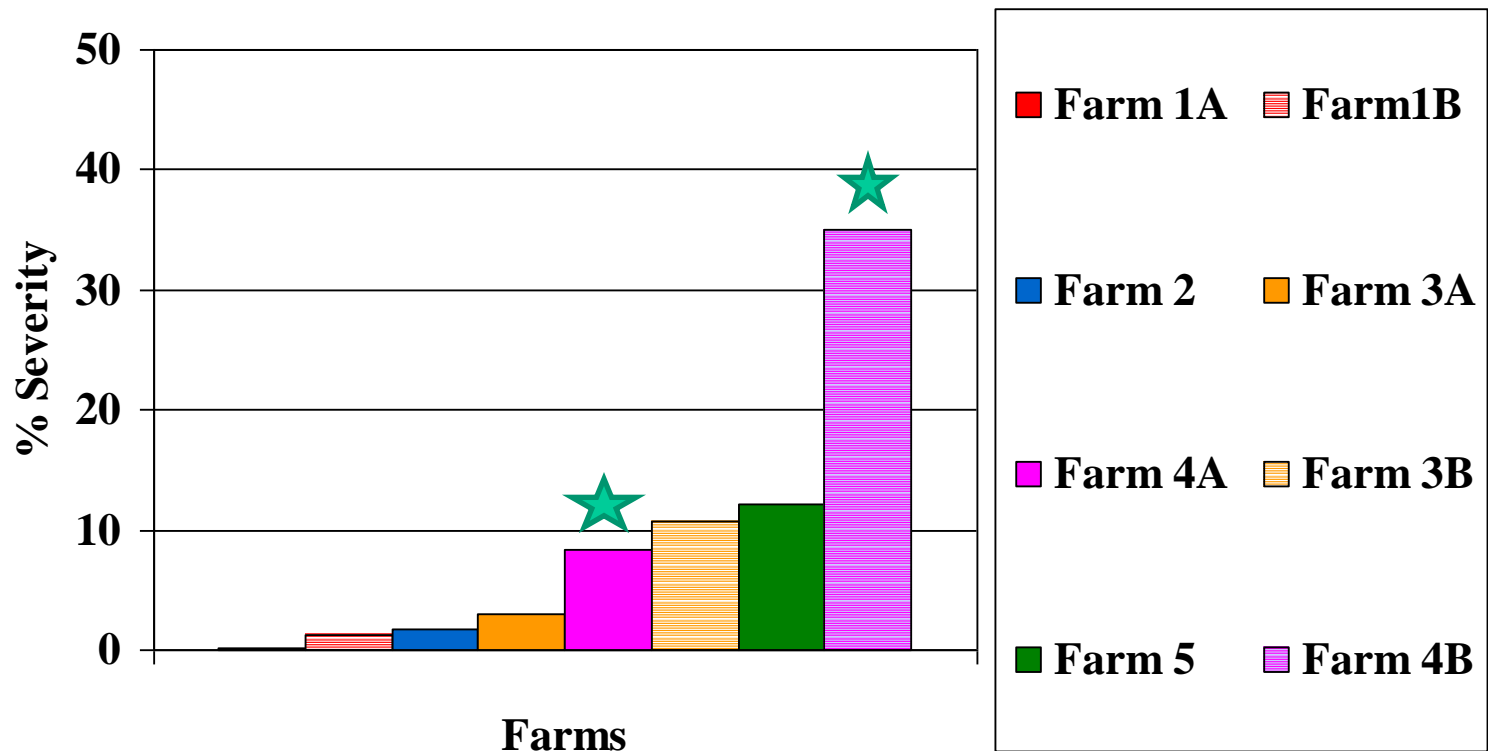
(Nut scab rated at ground level)



Nut Scab in Commercial Orchards, 2013

(All well maintained Desirable orchards, south GA)

(Nut scab rated at ground level)



What did it take to control scab on Desirable in South GA in 2013?

4/8 Absolute (5 oz)

4/16 Tin (12 oz) + K-phite (1 qt)

4/30 Tin (12 oz) + Elast (25 oz)

5/14 Tin (12 oz) + Topsin (20 oz)

5/22 Absolute (5 oz) + Teb (6.4 oz) + K-phite (1 qt)

5/29 Tin (6 oz) + Elast (50 oz)

6/6 Tin (6 oz) + Elast (50 oz)

6/12 Quadris Top (14 oz) + Sulfur (2 qt)

6/21 Tin (12 oz) + Elast (25 oz)

What did it take to control scab on Desirable in South GA in 2013?

7/1 Quadris Top (14 oz) + Sulfur (2 qt)

7/8 Tin (6 oz) + Elast (50 oz)

7/15 Tin (12 oz) + Topsin (20 oz) + Sulfur (1 qt)

7/22 Tin (12 oz) + Kphite (2 qt)

7/29 Syllit (50 oz) + Tebuconazole (6.4 oz)

8/7 Absolute (7.5 oz) + Tin (6 oz) + Sulfur (1 qt)

8/12 Syllit (50 oz) + Tin (6 oz)

15 sprays (& counting)

What did it take to control scab on Desirable in South GA in 2013?

1. Excellent spray coverage
2. Started early and stayed on a tight (7-10 day) schedule most of the season
3. Open orchards with good air flow
4. Premium fungicides & full rates, usually combo's
5. Use of adjuvants?
6. Help from on high (some aerial application and some from higher than that!)

Can we grow Desirables economically in the deep south?

- Bill Goff – “I will no longer recommend ‘Desirable’ for planting in the southern half of the pecan growing areas in SE states” (Jan. 2014 Pecan South)
- Excellent review of the pros and cons, and outlines alternatives
- Moving target – changing weather patterns and cv. susceptibility (some scab on Excel this year)

Can we grow Desirables economically in the deep south?

- Been a lot of money invested that says we can
- $\$0.50/\text{lb} \times 1000 \text{ lb}/\text{A} = \$500/\text{A}$ can buy a lot of fungicide!
- Will the current price structure continue?
- We better be good stewards of our fungicides
- Use more mixed cultivar plantings?

All farming is a gamble – growing scab-susceptible cultivars in the humid SE is a high stakes game!



Another Result of 2013 – Lots of Scab Inoculum!

(spores from shucks 1 ½ years later)



Stromata on wood is biggest problem. What should we do?



- some folks cut it out of their young trees
- Be prepared to start spraying early, especially if it is rainy.
- Pray for dry weather!
(Without water it will not matter)

What about dormant sprays?

- Early work in the 1950's w/ arsenic and mercury compounds showed benefits in reducing sporulation and scab severity (R. H. Converse, OK)
- Littrell (1984) stated “conidial viability was reduced by dormant sprays but no reduction in actual scab infection could be observed”
- Brenneman (1994) found some reduction in spore production with Tin, Orbit and Syllit (Elast)

What about dormant sprays?

- Currently evaluating lime-sulfur dormant sprays (w/ and without oil). Evidence for activity on *Phomopsis* and other pathogens in other crops
- Caustic and “burns out” the overwintering inoculum (also caustic to equipment – covering sprayers with diesel and immediate clean up is suggested!)
- NOT A RECOMMENDED PRACTICE ON PECANS AT THIS TIME FOR DISEASES, BUT IT IS LABELED AT LOWER RATES “IN SEASON” FOR APHIDS AND MITES

Early Sprays?

- More benefit from spraying actual leaves; wait until green up to get benefit on foliage and overwintering lesions
- Elast MAY have more effect on sporulation (normally I recommend it later season for nut scab)

**2013 was a wild ride - What doesn't
kill you makes you stronger!**

