The ongoing battle against pecan scab

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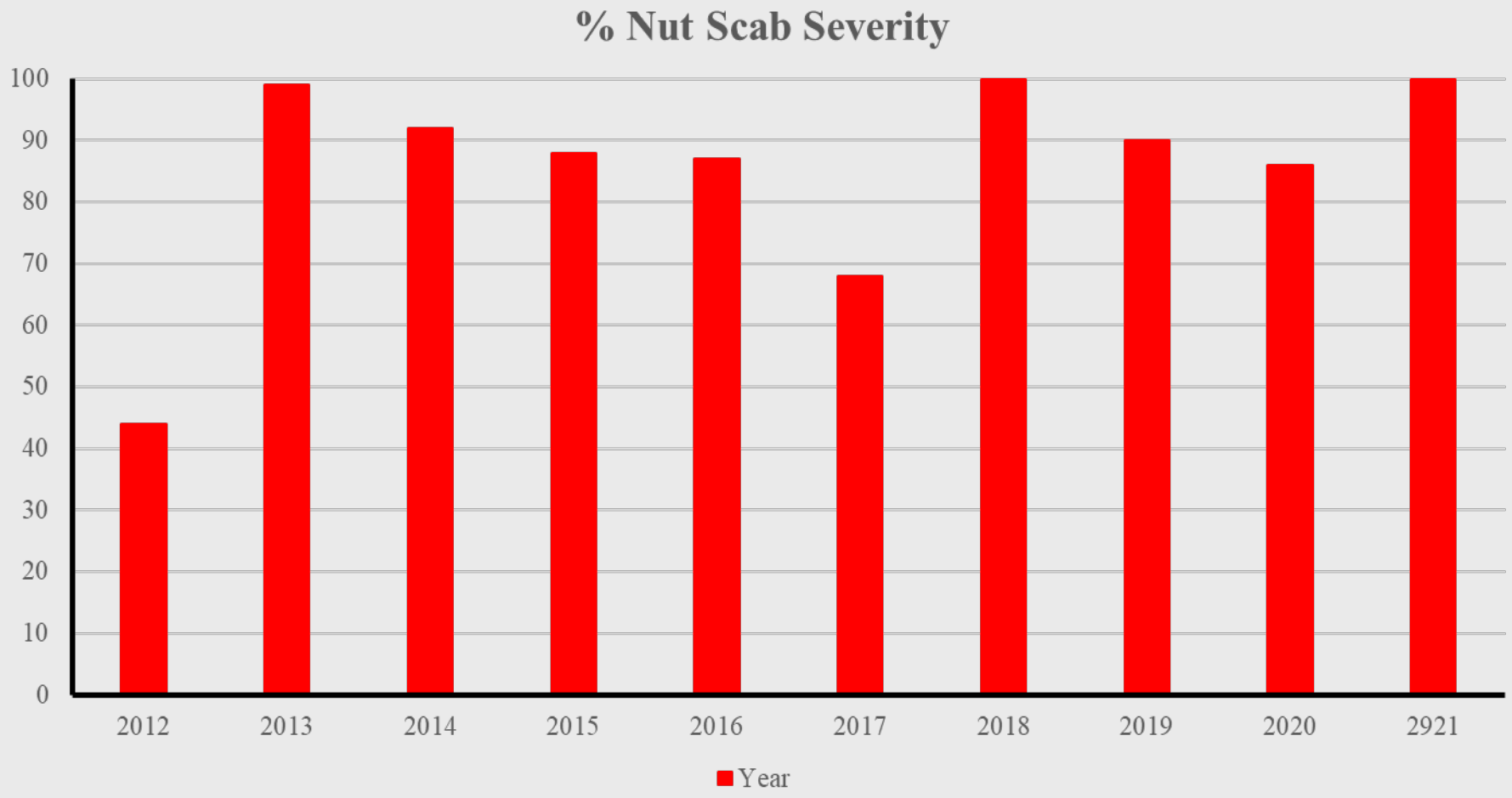
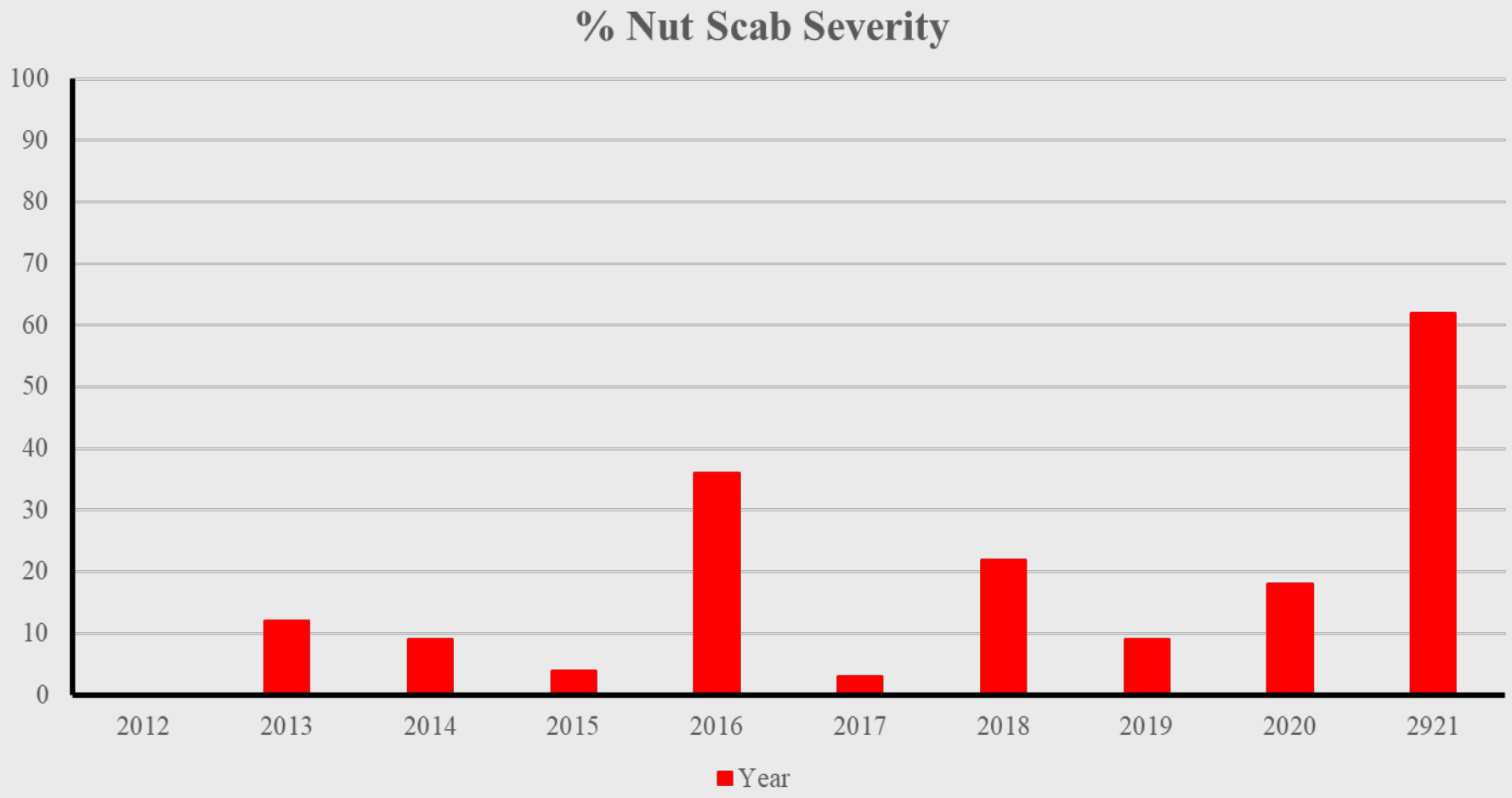
Is scab really a battle – don't we have more resistant cultivars now?

- About 1/3 of Georgia pecans are as susceptible or more so than Desirable, and most of the rest are moderately susceptible
- Only 5 -10% are highly resistant, and we know that resistance will not be permanent
- Fungicides are expensive, are being lost to resistance, and will be in short supply in 2022 (need bullets if you want to fight a war!)

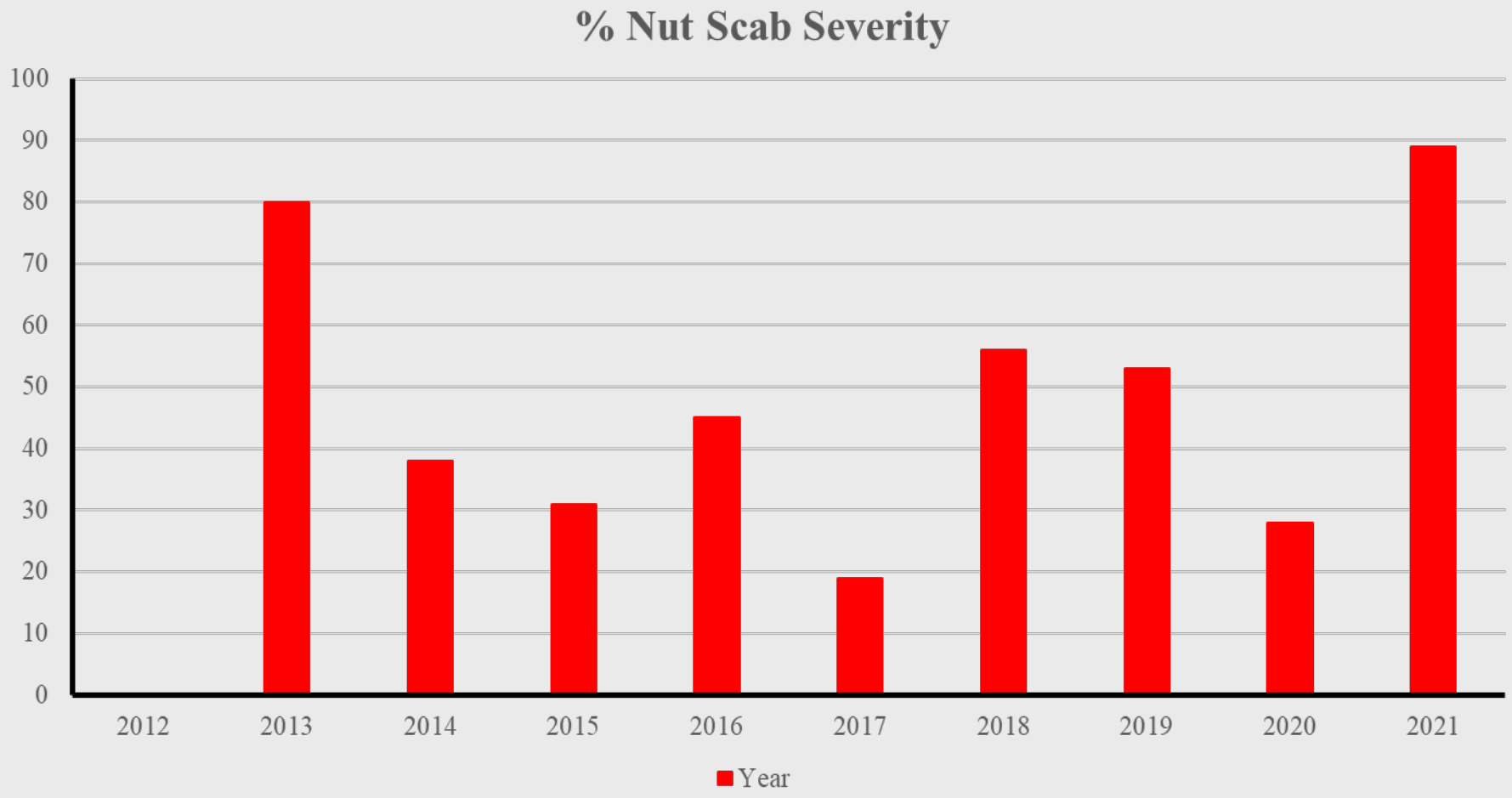
Scab severity on Desirable in Tifton, GA (Nonsprayed)



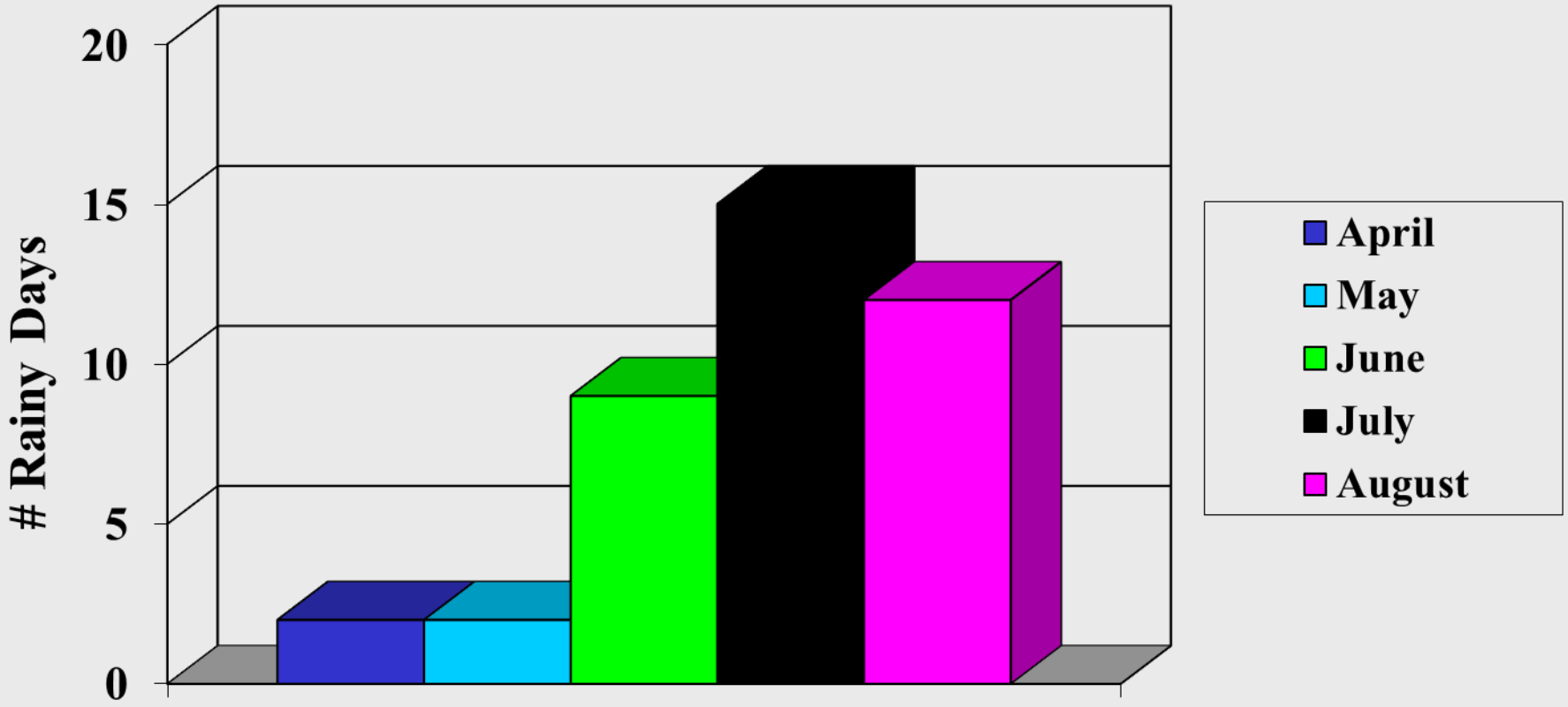
Scab severity on Desirable in Tifton, GA (Tin/Elast, 10X)



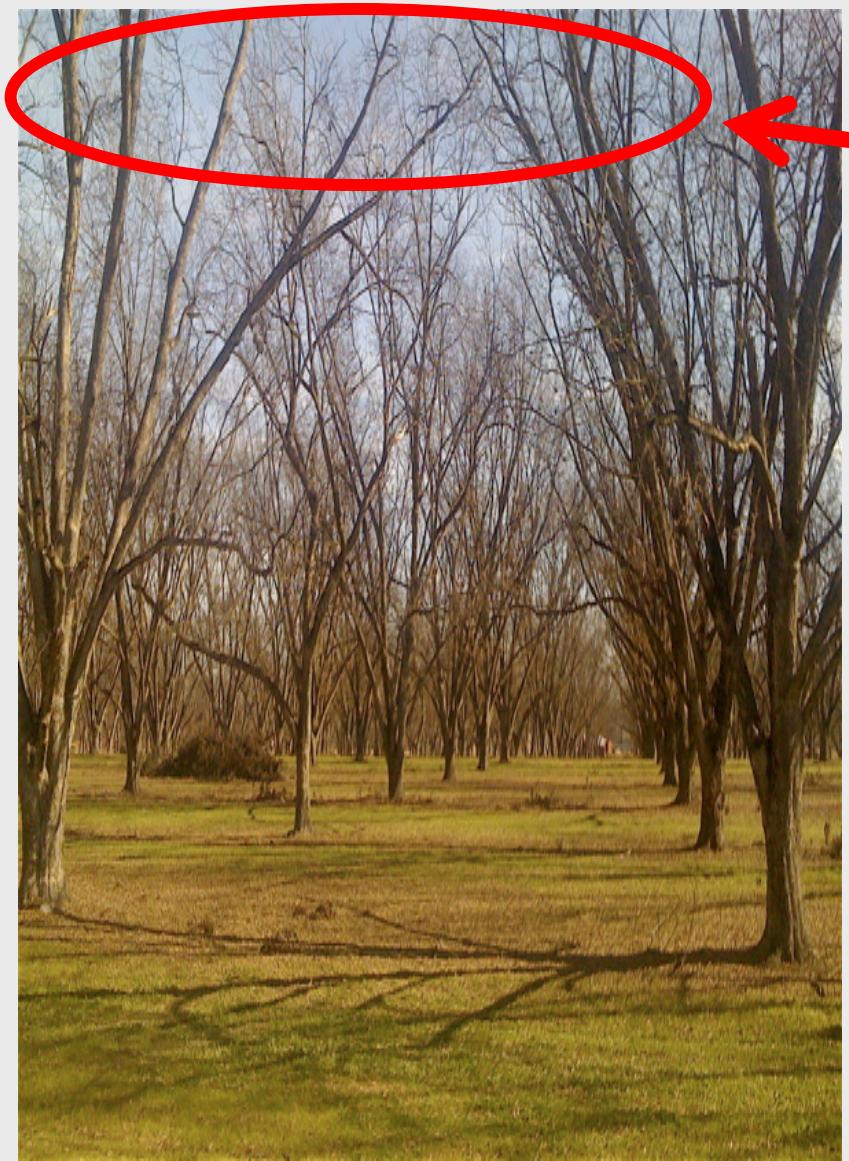
Scab severity on Wichita in Tifton, GA (Tin/Elast, 10X)

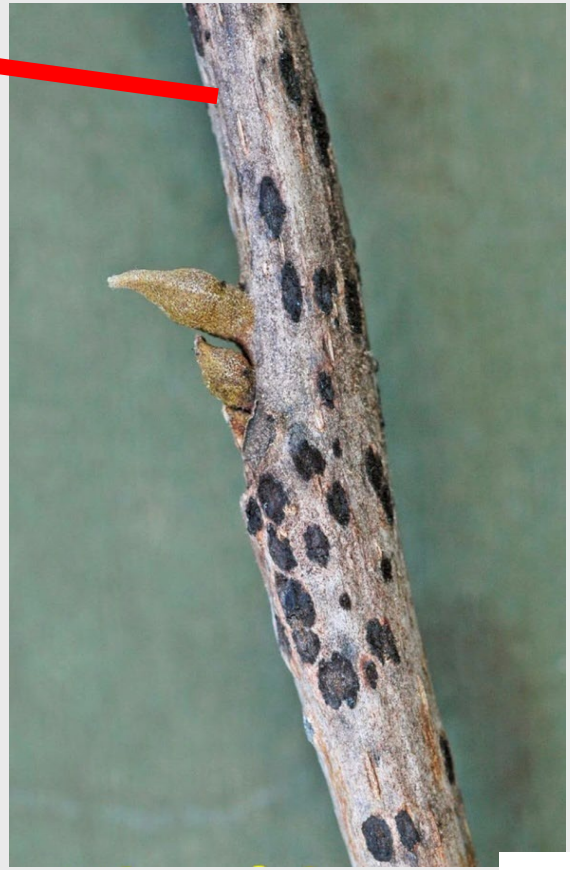


Rainy Days (> 0.10 inch) / Month, Tifton 2021



Next year will be bad for scab with all this inoculum, right? Maybe!

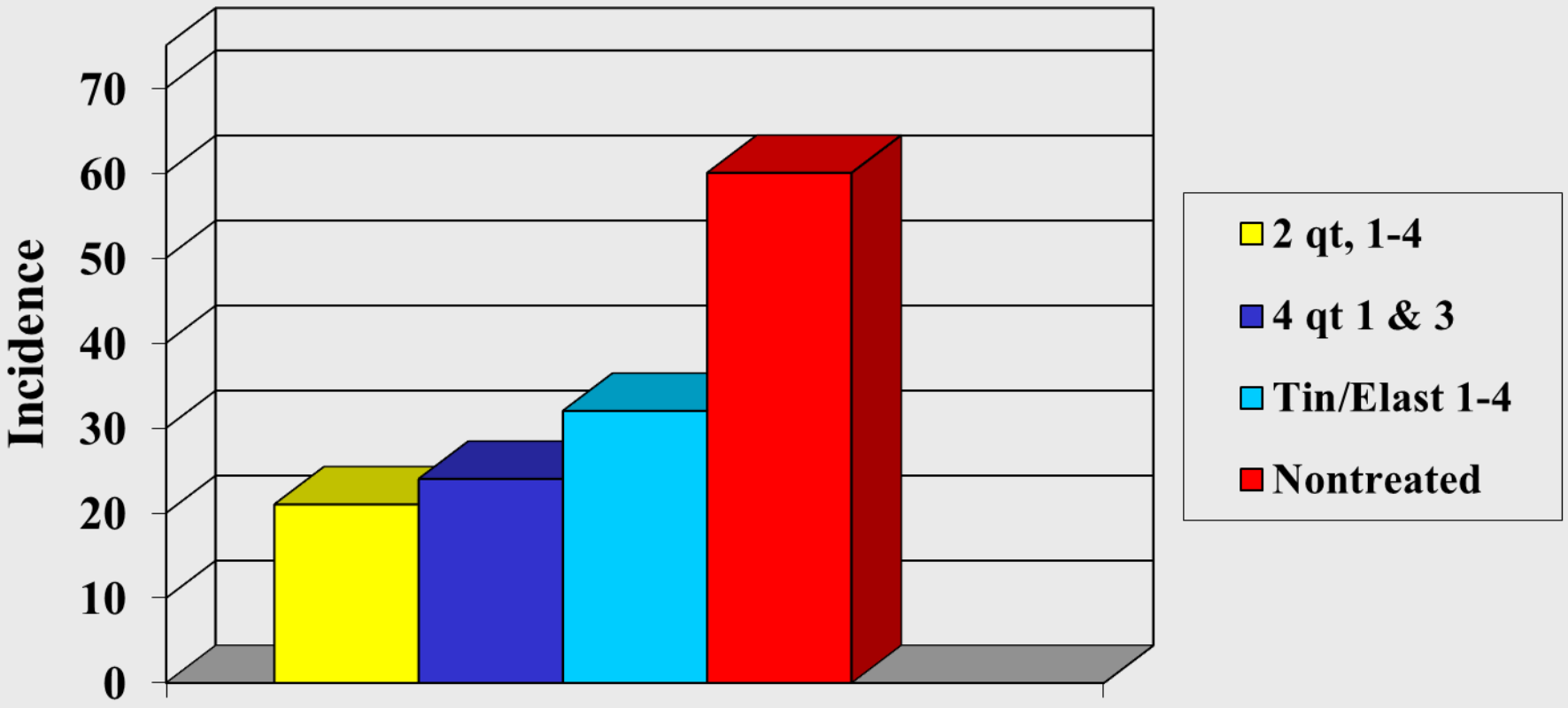




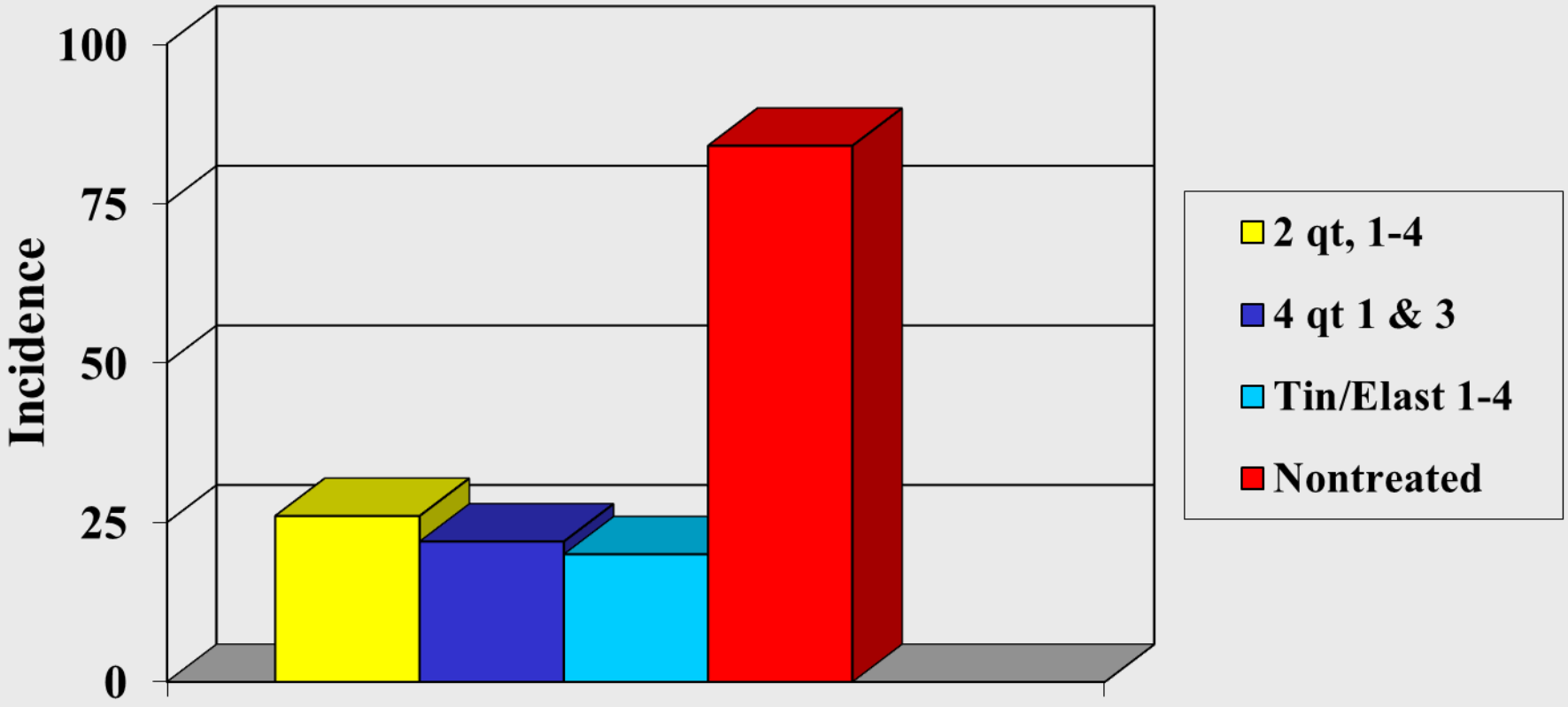
How can we improve our spray programs and hopefully save $?

Kphite Timing Study
Leaf Scab, 2019-2021

(Mean of 5 trials, Desirable and Wichita)



Kphite Timing Study
Nut Scab, 2019-2021
(Mean of 5 trials, Desirable and Wichita)

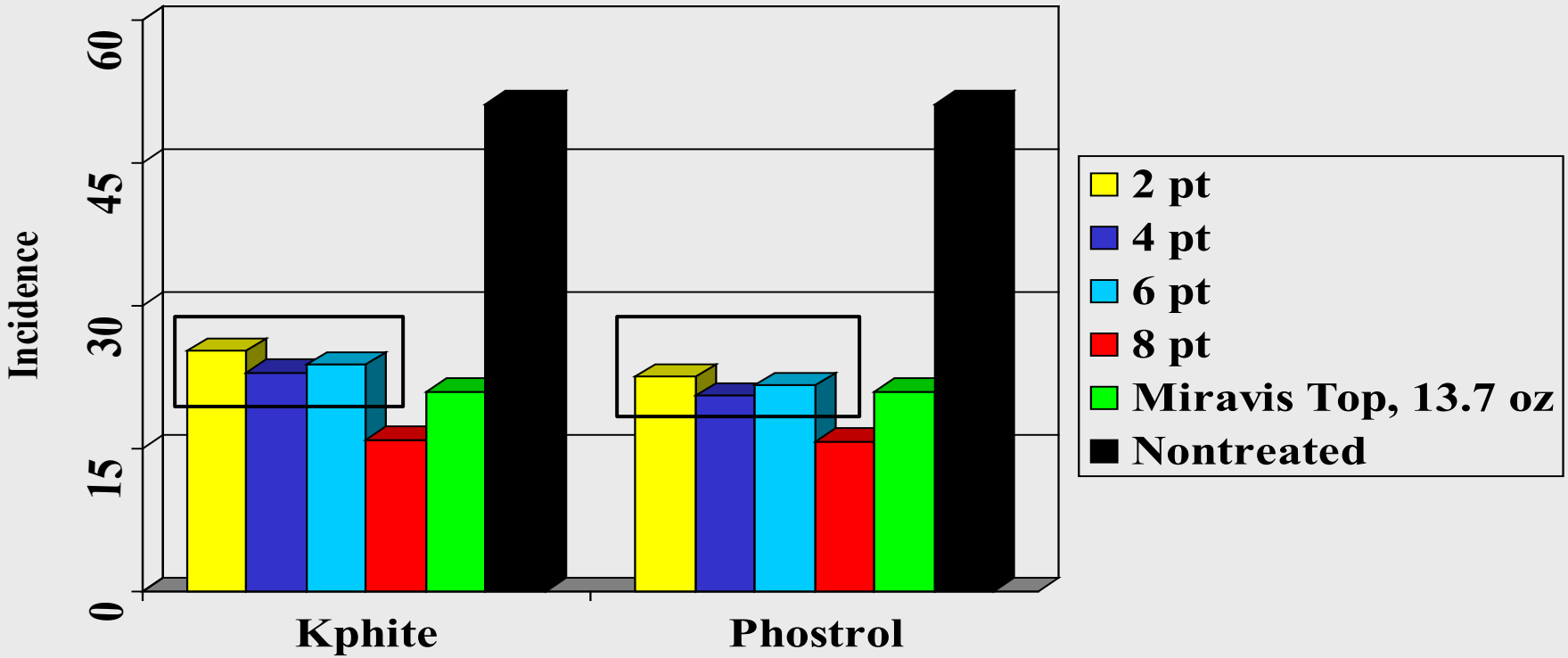


Phosphite Formulations and Rates

- Kphite vs Phostrol
- 2, 4, 6 and 8 pt /A
- Evaluate scab control and phytotoxicity
- Individual terminal sprays
- 8 replications and 3 year study, 2019-2021

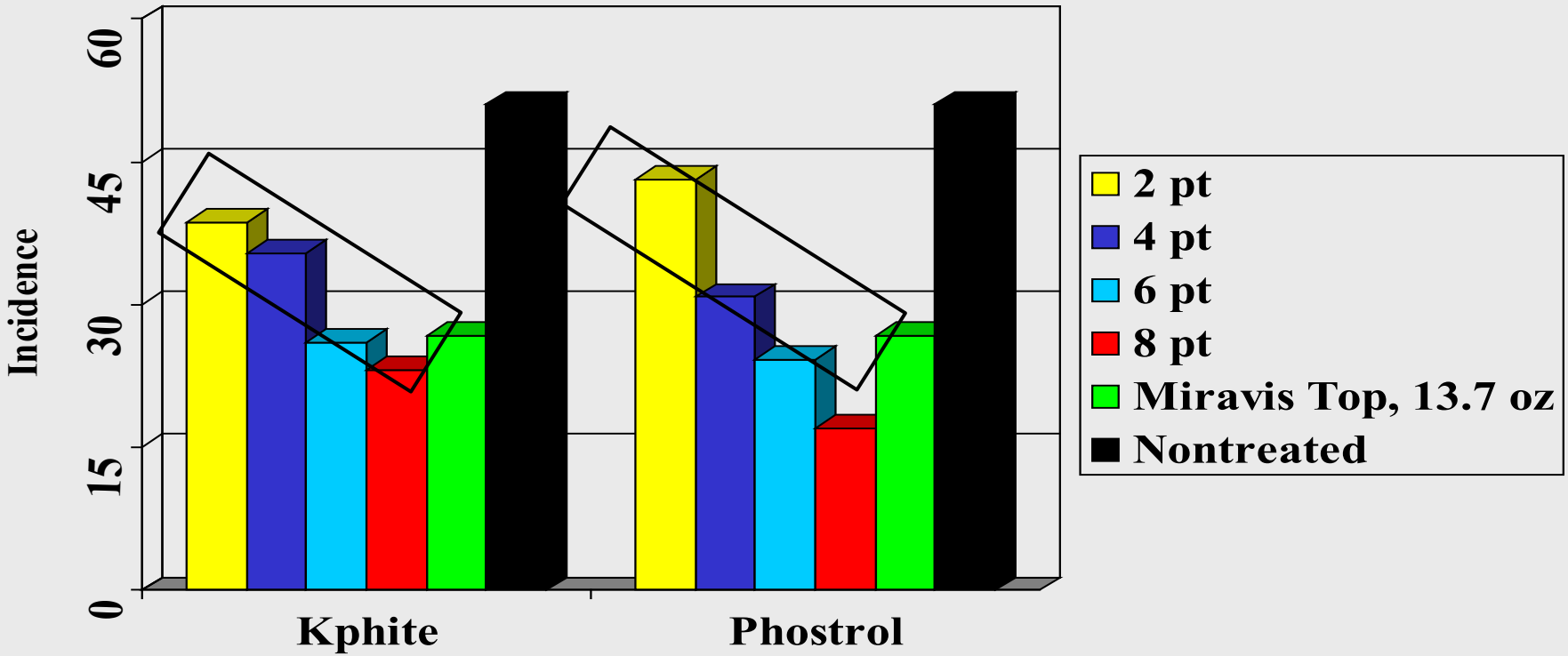
Phosphite Rate Study, Leaf Scab – Desirable

(Disease Incidence, 2019-2021, LSD = 12.0)



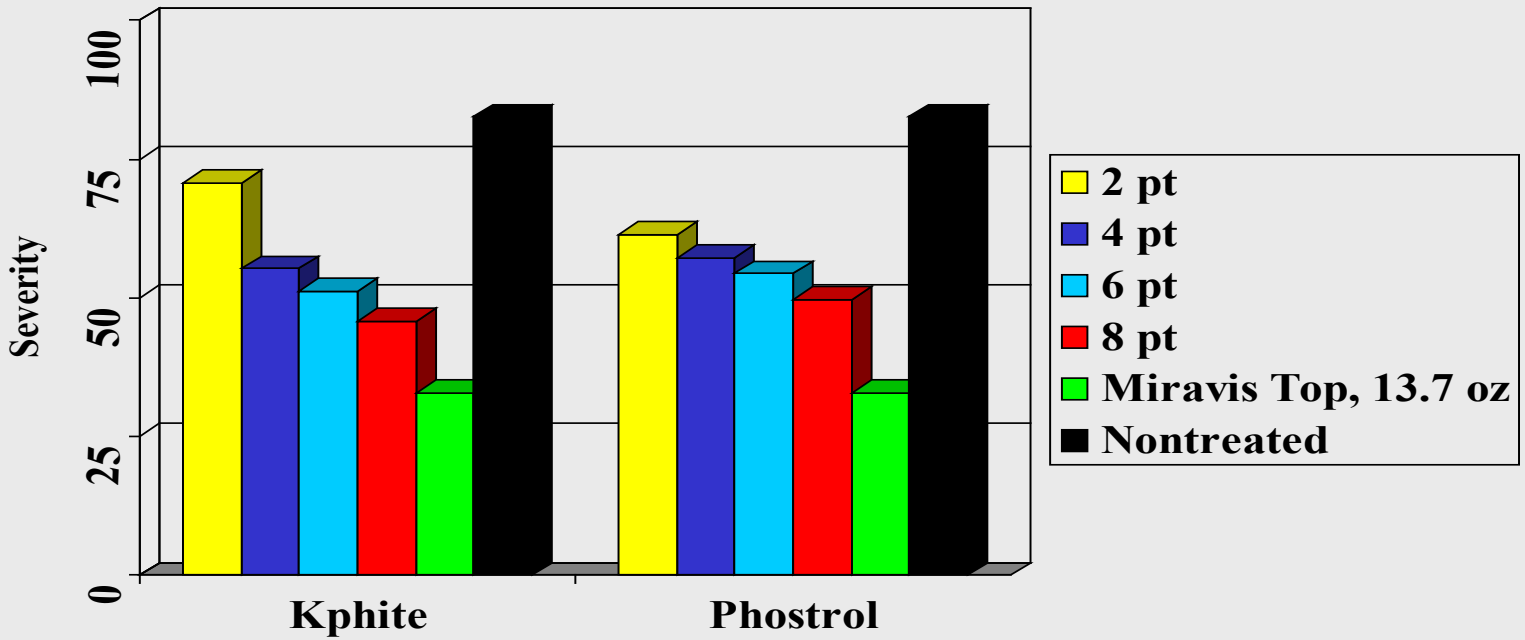
Phosphite Rate Study, Leaf Scab – Wichita

(Disease Incidence, 2019-2021, LSD = 13.1)



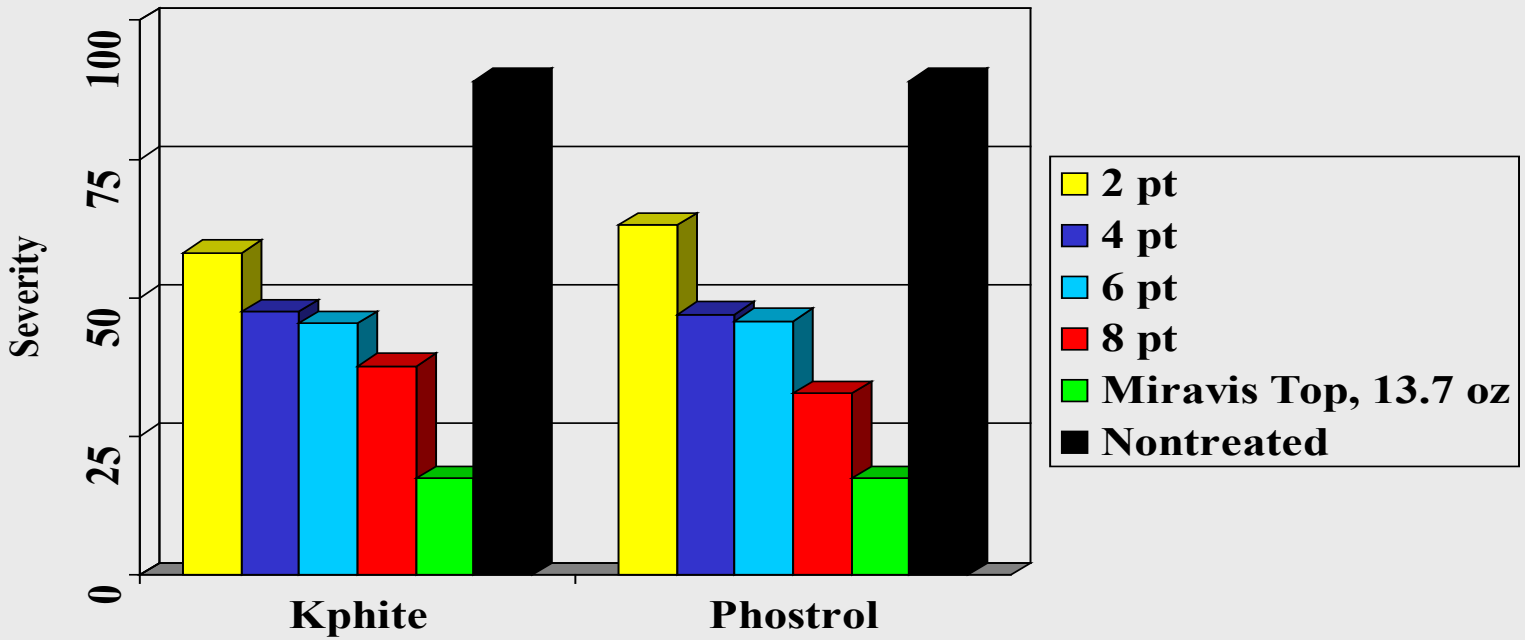
Phosphite Rate Study, Nut Scab – Desirable

(Disease Severity, August, 2019-2021, LSD = 19.6)



Phosphite Rate Study, Nut Scab – Wichita

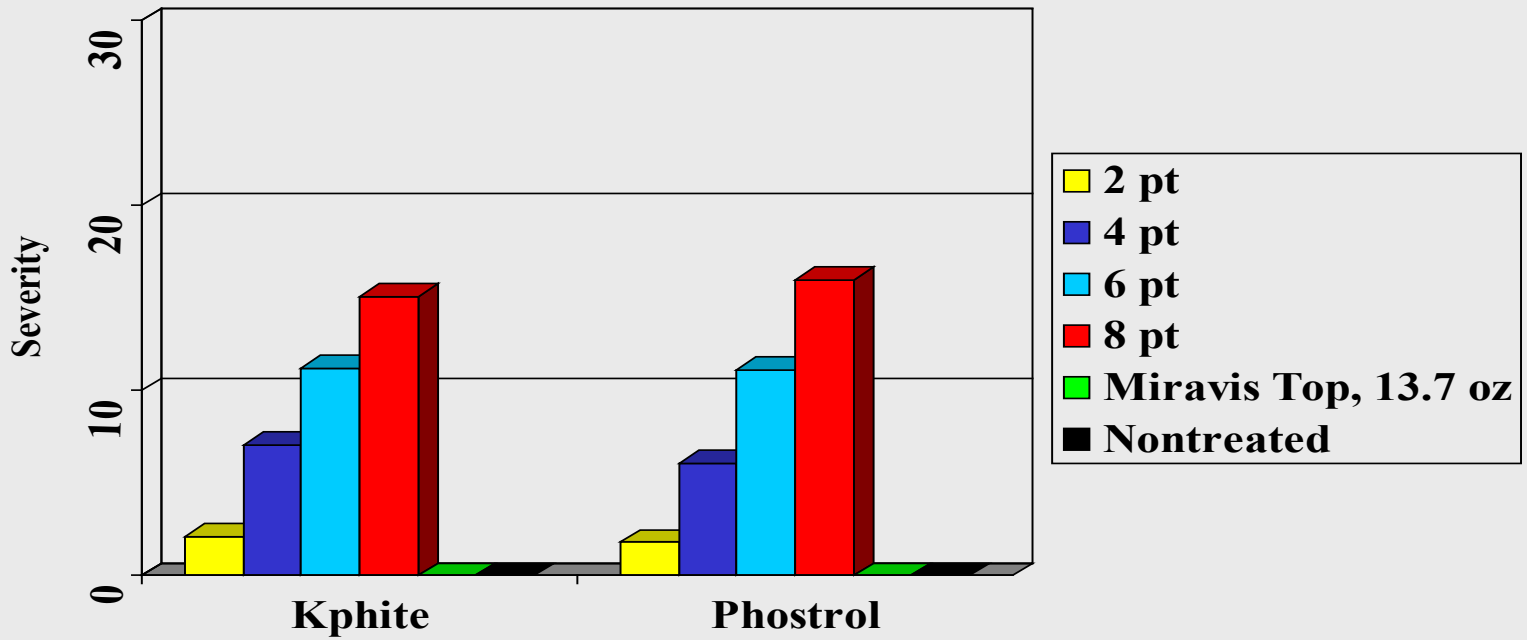
(Disease Severity, July, 2019-2021, LSD = 19.6)



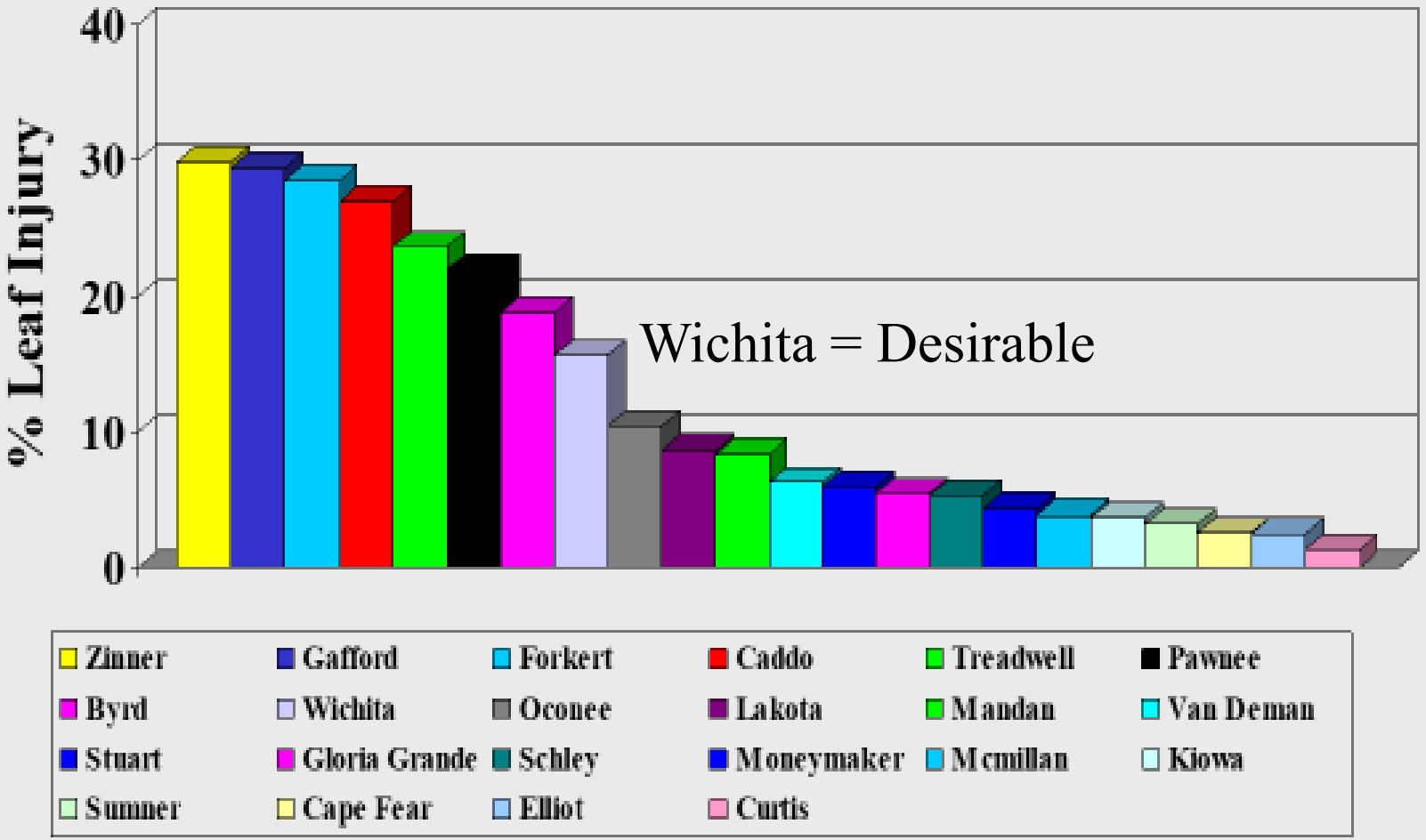
Phosphite Injury
(from single terminal sprays)

Phosphite Rate Study, Leaf Burn – Desirable

(Severity in July, 2019-2021, LSD = 2.6)



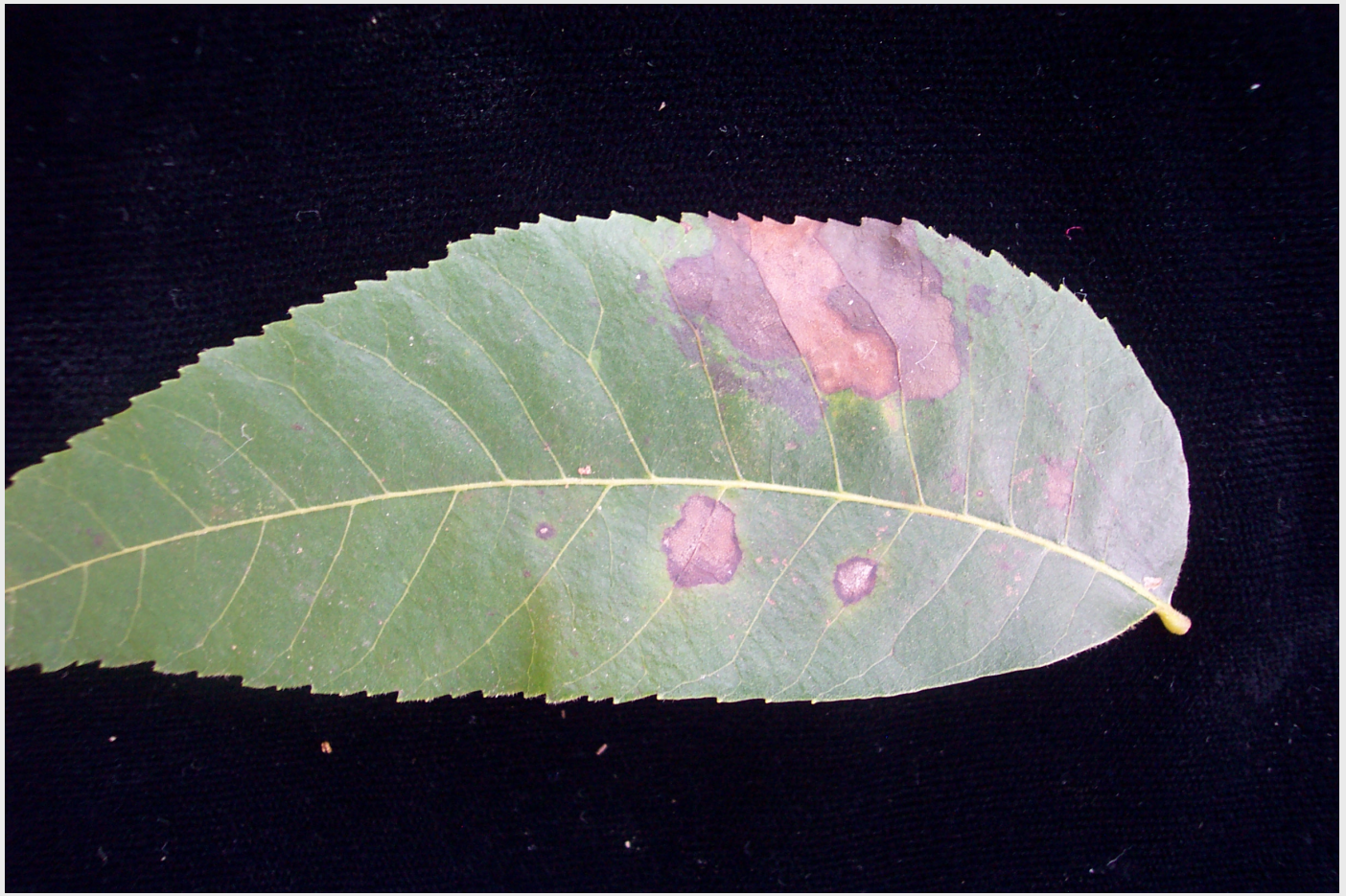
Cultivar susceptibility to leaf injury from concentrated applications of phosphite fungicides (LSD = 4.3)



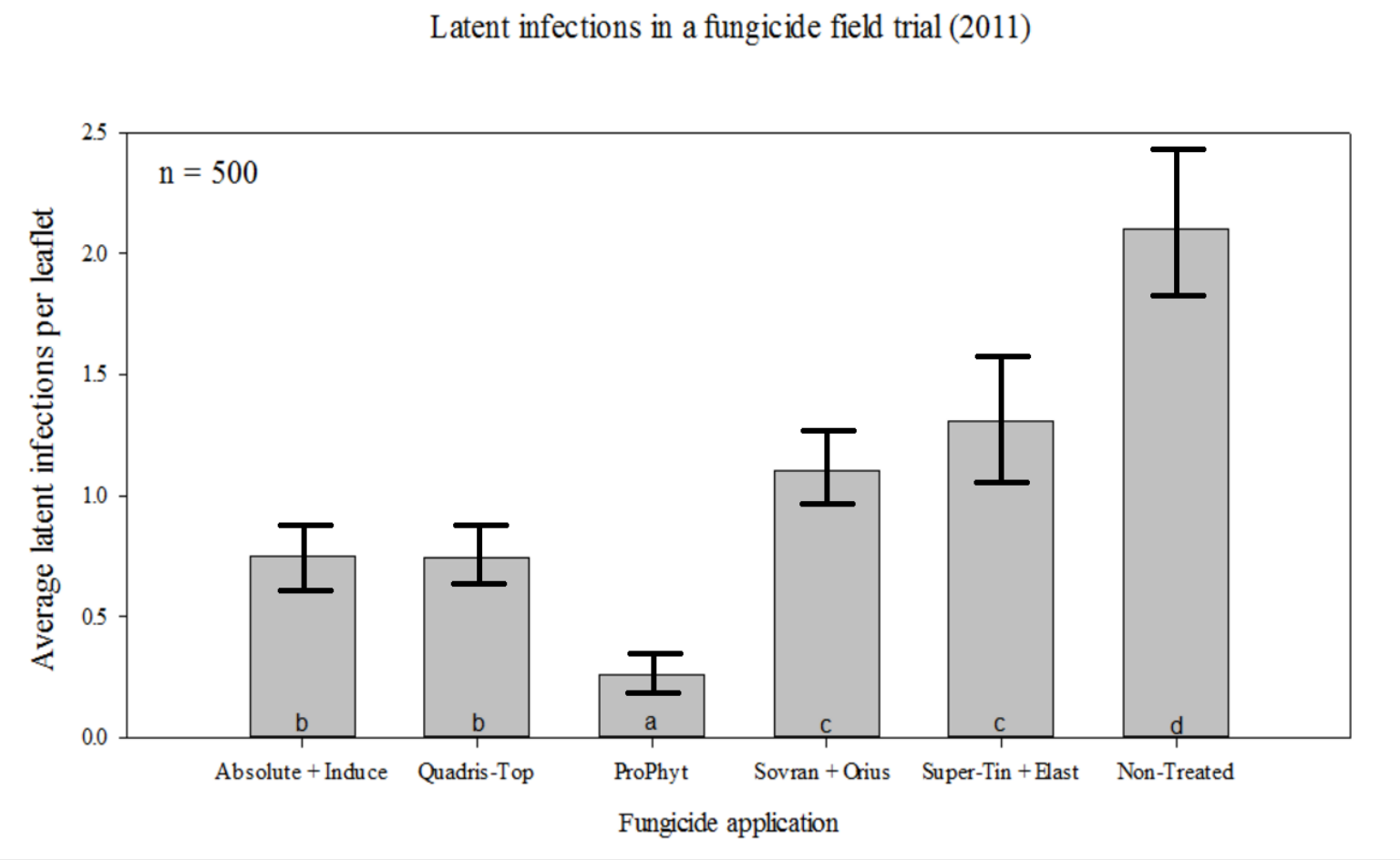
Summary of phosphites

- Phosphites are very active on leaf scab
- Different “phites” tend to perform similarly
- Cultivars may respond differently to phites
  - Potential for burn varies among cultivars
  - Leaf scab 1 qt = 3 qt on Desirable, not on Wichita
- Hedged orchards likely benefit from later season use to protect growth flushes
- Higher rates are needed for nut scab

Prepollination sprays are important for “minor” diseases – most evident in the fall



Fungicides for Anthracnose



Miravis Top – has it lived up to it's reputation?

- Contains Miravis, an SDHI (this fungicide class was not previously used on pecans, ie. resistance management tool!)
- Also has difenoconazole (same as in Amistar Top) which is a very active Group 3 (DMI)

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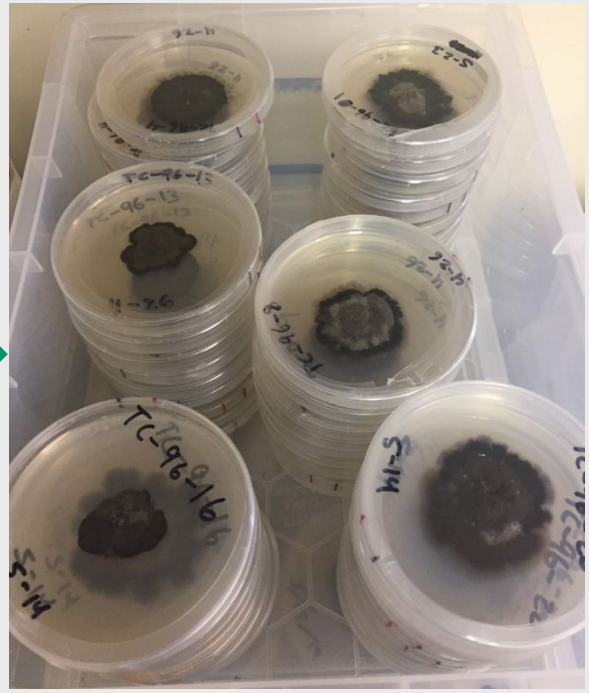
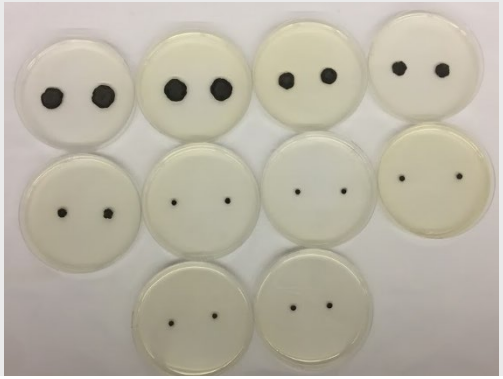
Baseline sensitivity of Miravis from 1990's isolates



$$RG\ r = \frac{\text{adjusted colony width on amended media}}{\text{adjusted colony width on non-amended media}} \times 100$$



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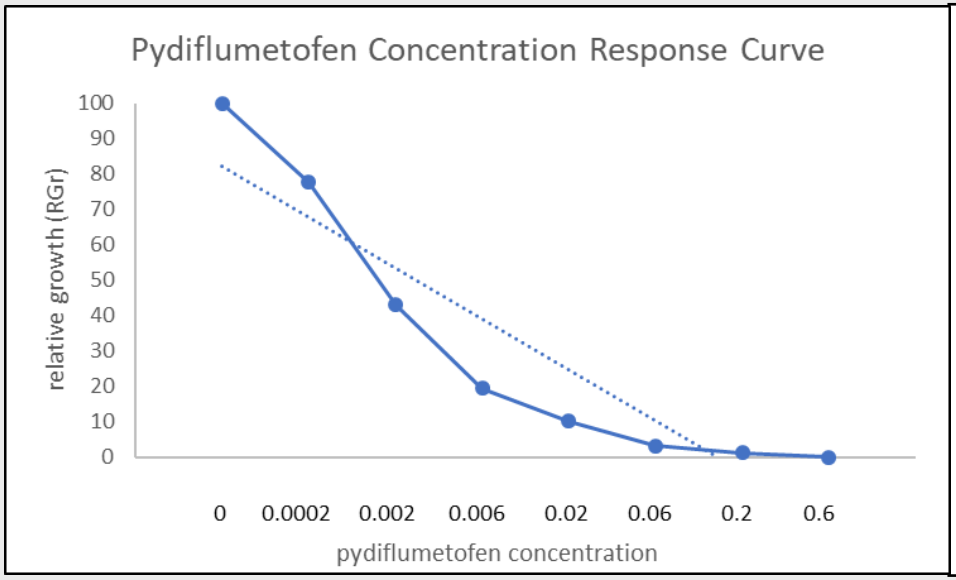
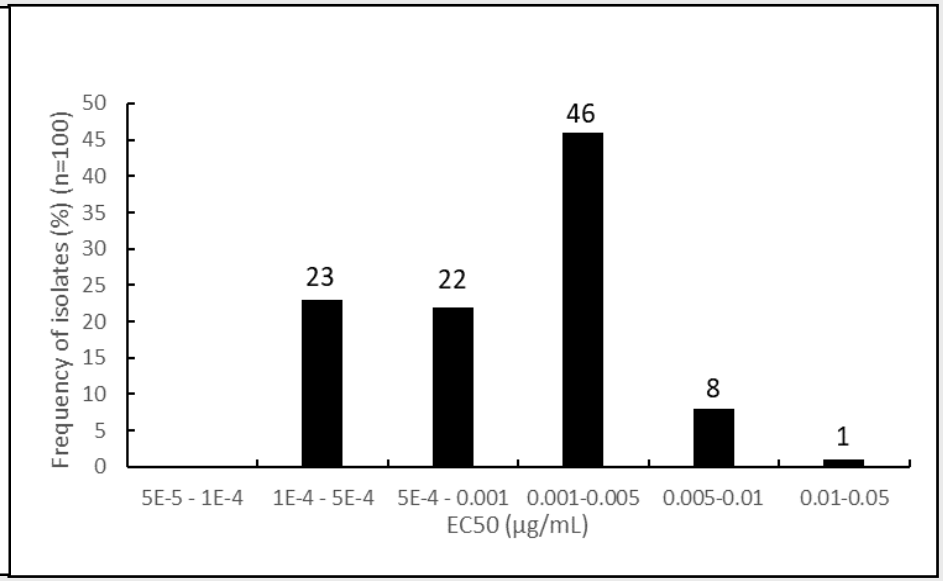
Miravis (Pydiflumetofen) EC50=0.0011 ug/ml





Sensitivity and Resistance of Current and Historic Isolates to Tebuconazole (Folicur)

	Isolate Name	Georgia County	Sensitivity Status	RGr at 1 µg/ml	RGr at 3 µg/ml	RGr at 10 µg/ml
1996	**T11**	Troup	Sensitive	0%	0%	0%
	T15	Troup	Sensitive	0%	0%	0%
	T37	Troup	Sensitive	0%	0%	0%
2020	**108**	Berrien	Resistant	100%	98%	100%
	241	Berrien	Resistant	100%	73%	58%
	253	Berrien	Resistant	100%	73%	58%
	254	Berrien	Resistant	92%	100%	67%
	407	Dougherty	Resistant	100%	76%	67%
	410	Dougherty	Resistant	100%	85%	62%
	482	Dougherty	Resistant	97%	75%	66%
	803	Dougherty	Resistant	100%	77%	77%

Tebuconazole is “wounded” – Do the new Group 3 fungicides still work?

DIFENOCONAZOLE | GROUP 3 | FUNGICIDE

Inspire®

syngenta

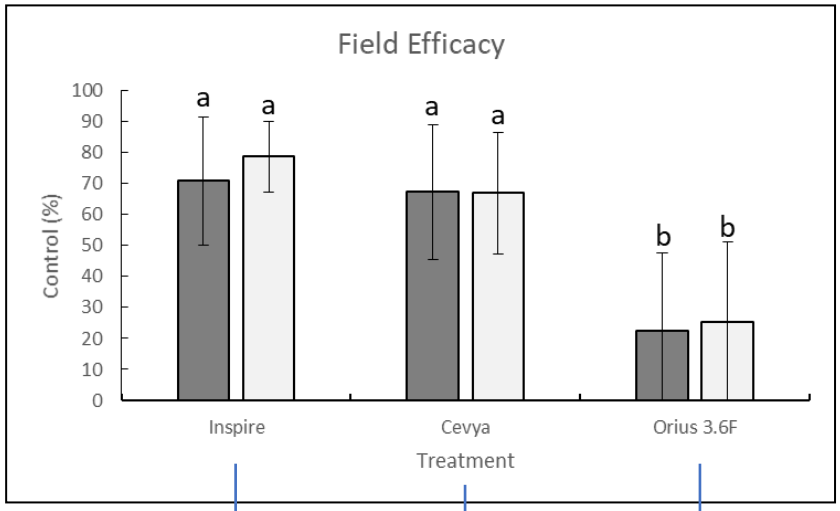
Cevya®

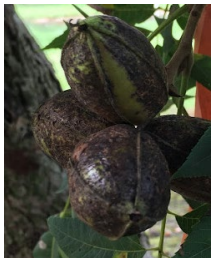
Fungicide BASF We create chemistry

Orius® 3.6F FOLIAR FUNGICIDE

ADAMA

Treatment	Active Ingredient	Rate (AI/A)
Inspire	difenoconazole	0.11 lb
Cevya	mefentrifluconazole	0.13 lb
Orius 3.6F	tebuconazole	0.23 lb
nontreated	n/a	n/a





Miravis Top – Summary

- New MOA
- Consistently strong nut scab control
- Use preventatively, not curatively
- **Rotate with other nut scab materials like Tin and Elast!!**

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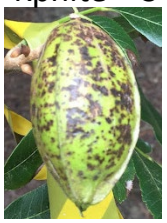
Sulfur mix Test (2021, Logan Moore)

	Leaf scab					Nut scab				
Fungicide	Stand-alone		With Sulfur			Stand-alone		With Sulfur		
Nontreated	0.0%	D	22.7%	D	ns	0.0%	D	5.2%	D	ns
Abound	58.5%	B	56.0%	B	ns	32.4%	BC	37.1%	AB	ns
Elast	59.3%	B	34.0%	CD	**	52.0%	AB	53.7%	A	ns
Kphite	86.0%	A	83.5%	A	ns	27.1%	C	26.6%	BCD	ns
Orius	40.5%	C	37.2%	C	ns	20.4%	CD	13.7%	CD	ns
Super Tin	52.6%	BC	43.9%	BC	ns	56.7%	A	40.0%	AB	ns
Topsin	55.4%	B	45.0%	BC	ns	27.1%	C	34.5%	ABC	ns

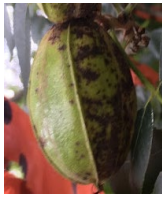
Kphite

Kphite + S

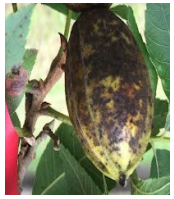


Orius

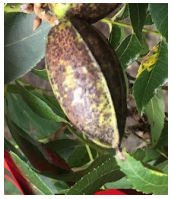
Orius + S



Abound

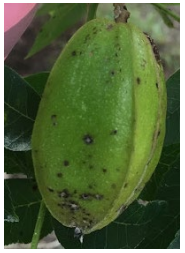


Abound + S



Super Tin

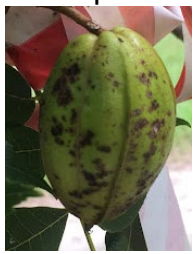
Super Tin + S



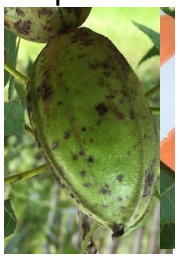
Nontreated

Sulfur

Topsin



Topsin + S



Elast

Elast + S

How can I save money on sprays in a tight year?

If you must stretch spray intervals do so wisely!

1) AU-Pecan (based on rain events and the 5 day % chance of rain) OR “Seat of your pants” knowing your orchards and weather
2) Make sprays count (surfactants with systemics)
3) Rates of phosphites? (need data on more cv’s)
4) Base sprays on stage of crop development

Timing sprays relative to pecan phenology

High Risk Periods

1) Rapid nut sizing (late June – mid August)
2) Shoot elongation in spring to protect stems and leaves from multiple diseases (possibly stretch intervals w/ phosphites)

Lower Risk Periods (NOT "No risk")

1) Late shoot growth – pre nut sizing
2) After shell hardening (2021 late Aug – early Sept had 10/11 days with some rain)

How do I prepare for chemical shortages and higher costs?

1) Plan early if possible
2) Have a “Plan B”, “Plan C” and “ Plan D”
2) Pray for high pecan prices and drier, sunnier weather than 2021

   (and no hurricanes or tornadoes!)

Thanks to Dr. Logan Moore

Thank you for your attention, the Georgia Pecan Commission, and the pecan growers who let us work in their orchards