

# Management of Pecan Scab in Oklahoma

***Oklahoma Pecan Growers Annual Conference***  
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- **FMC = Food Machinery and Chemical Corporation**
- **An American agricultural sciences company that advances farming through innovative crop protection solutions:**
  - **Insecticides, Herbicide, Fungicides, and Biologicals**
- **Originated in 1883 with creation of high-pressure sprayer by John Bean.**
- **Headquartered in Philadelphia and employs about 7,000 employees worldwide.**
- **About 100 sites across the world and revenue of around \$5 Billion/year.**



# THE FMC PECAN ACRE

## Fungicide



## Insecticides



NEW



## DISCUSSION OUTLINE

- ☐ ***Pecan Scab: Importance, Symptoms, Disease Cycle, and Scab Model***

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- ☐ ***Pecan Scab Fungicide Products and Management***

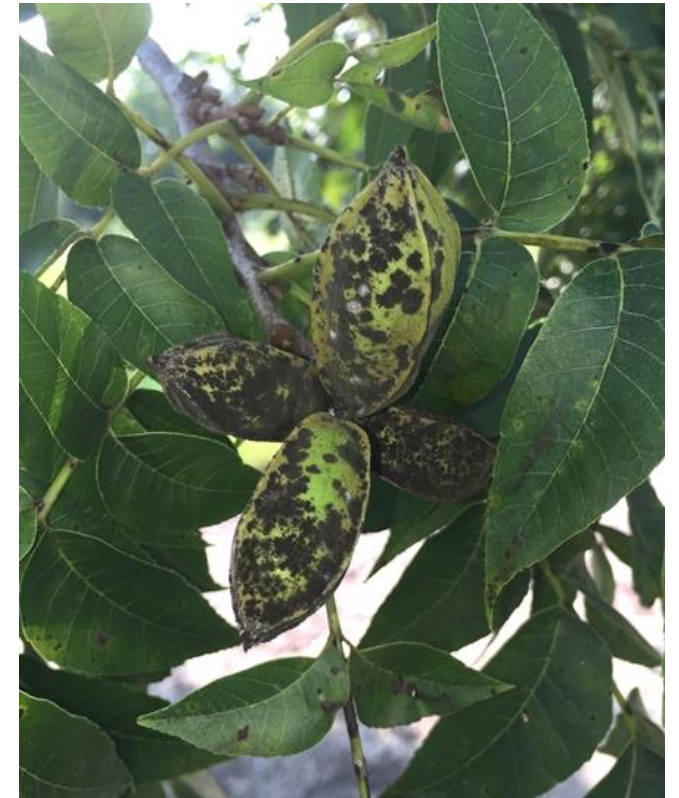
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- ☐ ***Oklahoma and Georgia Pecan Scab Fungicide Field Trials***

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## Pecan Scab, *Fusicladium effusum*

- Pecan scab affects the leaves, shucks, and twigs of the infected plant and manifests as small (1 to 5 mm), circular, black or olive-green lesions.



## Pecan Scab, *Fusicladium effusum*

Pecan scab affects nuts in several ways.

- If severe, infection can result in **defoliation** and a reduction of the size and quality of the nut; if the infection occurs early in nut development, the nuts will abort.
- In addition, if *F. effusum* reaches deep tissues in the shuck, it can cause the **shuck to cling** to the shell of the nut (a condition called “stick-tight”). Separating the nut from the shell is impossible, which is problematic for shelling.
- The surface of severely infected nuts may also crack, giving a point of entry for **secondary infections**.

## Pecan Scab, *Fusicladium effusum*

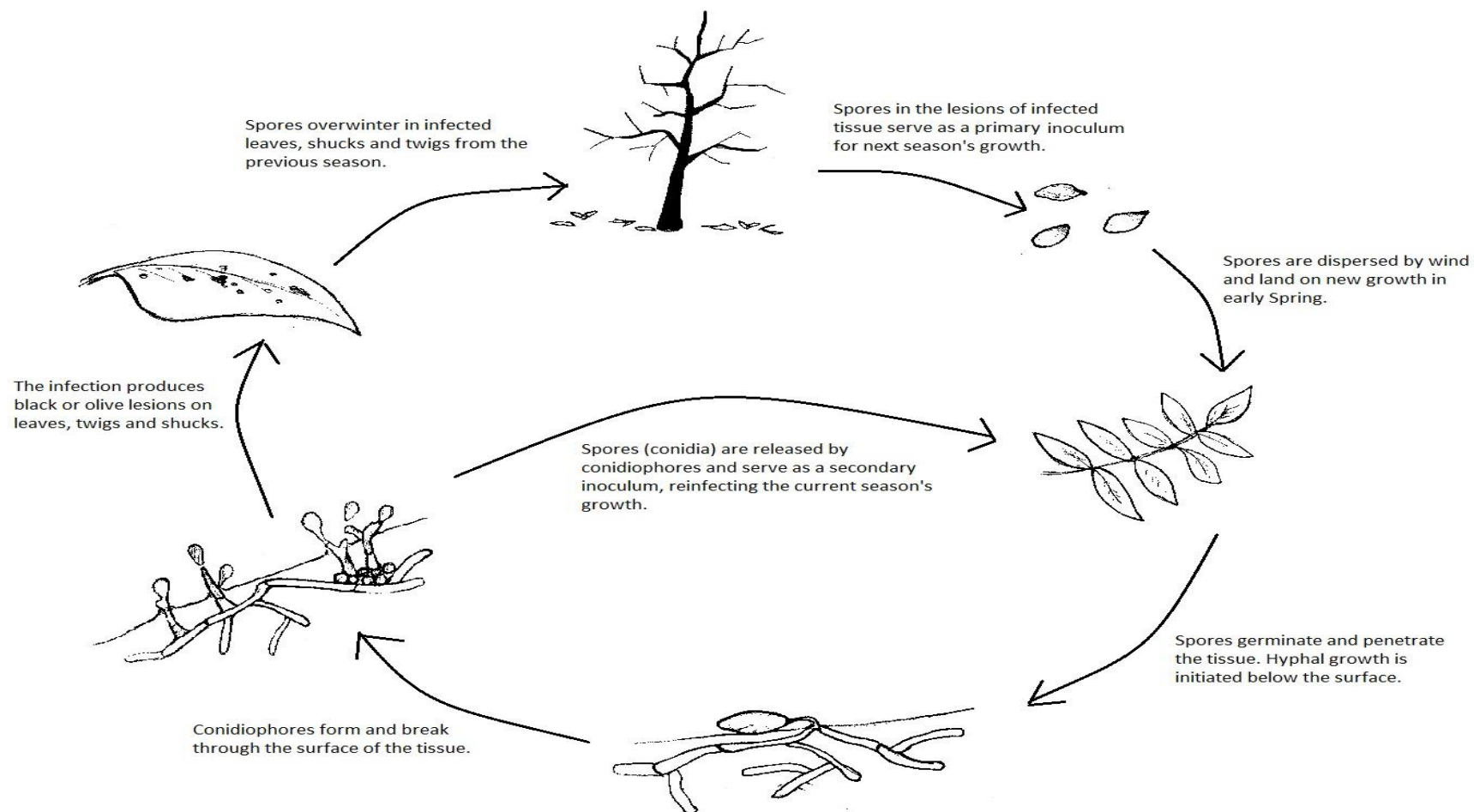
Pecan scab can have a significant economic impact due to crop yield reduction and loss in quality.

- The disease causes **nut drop**, with total crop loss possible in severe cases.
- **Reduction** in the **size** and **quality** of the nuts occurs.
- In addition, pecan scab lesions on foliage **reduce the photosynthetic area** of the tree, causing a reduction in the photosynthetic rate of the plant.
- This reduction, in turn, **may enhance alternate bearing**, which is the tendency to produce a heavy crop one season, followed by one or more years of little or no production.





# Pecan Scab, *Fusicladium effusum*





# Oklahoma Mesonet NEW Pecan Scab Model

- Tool that has been developed to aid pecan growers in proper timing of fungicide application for pecan scab.
- Uses the Oklahoma Mesonet to calculate "scab hours" for all Mesonet sites.
- Scab hour is defined as one hour with relative humidity of 90% or higher and an air temperature of 70°F or higher.
- Knowing the Pecan Scab Model hours and the susceptibility of the pecan variety, the grower can decide whether to spray or not.
- The threshold for:
  - Highly susceptible pecan varieties is **10 scab hours**
  - Moderately susceptible varieties is **20 scab hours**
  - Natives and less susceptible varieties is **30 scab hours**
- The Oklahoma Mesonet NEW Pecan Scab Model is updated hourly.

# Control of Pecan Scab

- Host Plant Resistance
- Cultural Control
- Chemical (Fungicide) Control

# Pecan Scab, *Fusicladium effusum*

## Host Resistance

- The first line of defense against pecan scab is the selection of resistant cultivars.
  - Kanza and Lakota are two recommended cultivars with low scab susceptibility for Oklahoma.

Highly susceptible 10 Scab Hours	Moderately susceptible 20 Scab Hours	Low susceptibility (resistant) 30 Scab Hours
Burkett	Caddo	* Native trees *
Squirrel's Delight	Colby	Barton
Western	Creek	Choctaw
Wichita	Giles	Graking
	Kiowa	Kanza
	Maramec	Lakota
	Mohawk	Mount
	Oconee	Nacono
	Shawnee	Osage
	Pawnee	Peruque
		Stuart

(data from *Pecan Varieties for Oklahoma*, McCraw, B.D., Smith, M. and Carroll, B., Oklahoma State University Extension Fact Sheet F-6201, June 2004.)

# Pecan Scab, *Fusicladium effusum*

## ***Cultural Control***

- When establishing new orchards, tree spacing and orientation are important considerations, because adequate exposure to sunlight and good airflow are two keys to keeping foliage dry.
- Selective pruning of damaged branches during the dormant season is also recommended to promote sun exposure and air circulation.
- Finally, good sanitation practices are recommended to limit the amount of primary inoculum that may cause infection.



# Pecan Scab, *Fusicladium effusum*

## Chemical Control

- Multiple fungicide mode of actions are used to control pecan scab. Overall, these chemicals inhibit spore germination or hyphal growth, kill germinating spores, or prevent sporulation.

Group	FRAC Code	Active Ingredient	Trade Names
DMI - triazoles	3	Flutriafol, fenbuconazole, tebuconazole, propiconazole, metconazole, difenoconazole	Enable, Quash, Tebucon
SDHI	7	Pydiflumetofen, fluopyram	in Miravis Ace and Luna
QoI - Strobilurins	11	Azoxystrobin, trifloxystrobin, pyraclostrobin, kresoxim-methyl	Abound, Headline, Sorvan
Organo tin compounds	30	Triphenyltin Hydroxide	Super Tin
Multi-site - Guanidines	M7	Dodine	Elast
Phosphonates	P7	Mono/Dipotassium Salts of Phosphoric Acid	Kphite
Dithiocarbamates	M3	Zinc Dimethyldithiocarbamate	Ziram
Benzimidazole Carbamates	1	Thiophanate-methyl	Topsin-M

- Important to not use same the same group of chemistry consecutively but alternating the different classes of chemistry in a growing season is recommended.

# Pecan Scab, *Fusicladium effusum*

## ***Chemical Control***

- Large, commercial air-blast sprayers are needed to ensure adequate coverage of fungicides, but even these sprayers may not be sufficient to reach the foliage and nuts in very tall trees.



Dr. Nathan Walker; Oklahoma State University, Perkins, OK, 2020.

- *Planted: Oct. 1994; CV = Maramec; Soil = Sandy loam (pH 6.3); Trees/Acre = 36.*
- *Low to Moderate Pecan Scab pressure.*

Trade Name	Active Ingredient	Group	FRAC Code	Signal Word
Miravis Top	Difenoconazolefe + Pydiflumetofen	DMI+SDHI	3 & 7	Caution
Topguard EQ	Flutriafol + Azoxystrobin	DMI+QoI	3 & 11	Caution
Super Tin	Triphenyltin Hydroxide	Phosphonates	30	Danger
Quilt Excel	Propiconazole + Azoxystrobin	DMI+QoI	3 & 11	Warning
Elast	Dodine	Multi-site - Guanidines	M7	Danger

# Dr. Nathan Walker; Oklahoma State University, Perkins, OK, 2020.

**Trial Info:** Planting Date: Oct. 1994; CV = Maramec; Soil = Sandy loam (pH 6.3); 5 trees/treatment; Thinning Date = 8/6/20; 1<sup>st</sup> Hard Freeze = 11/30/20; Harvest = 10/20/20; Trees/Acre = 36.

## Treatments:

1. **Miravis Top:** Super Tin (4L, 6 fl oz/acre) plus Elast (3.4FL, 25 fl oz/acre) [A, C, & E] alternated with Miravis Top (SC, 13.6 fl oz/acre) [B, D, & F]
2. **Quilt Xcel:** Super Tin (4L, 6 fl oz/acre) plus Elast (3.4FL, 25 fl oz/acre) [A, C, & E] alternated with Quilt Xcel (SC, 14 fl oz/acre) [B, D, & F]
3. **Miravis Top Advisory:** Super Tin (4L, 6 fl oz/acre) plus Elast (3.4FL, 25 fl oz/acre) [X] alternated with Miravis Top (SC, 13.6 fl oz/acre) [Y]
4. **Topguard EQ:** Topguard EQ (SC, 8 fl oz/acre) [A, C, & E] alternated with Quilt Xcel (SC, 14 fl oz/acre) [B, D, & F]; Carbine (50 WG, 2.50 fl oz/acre) [E]

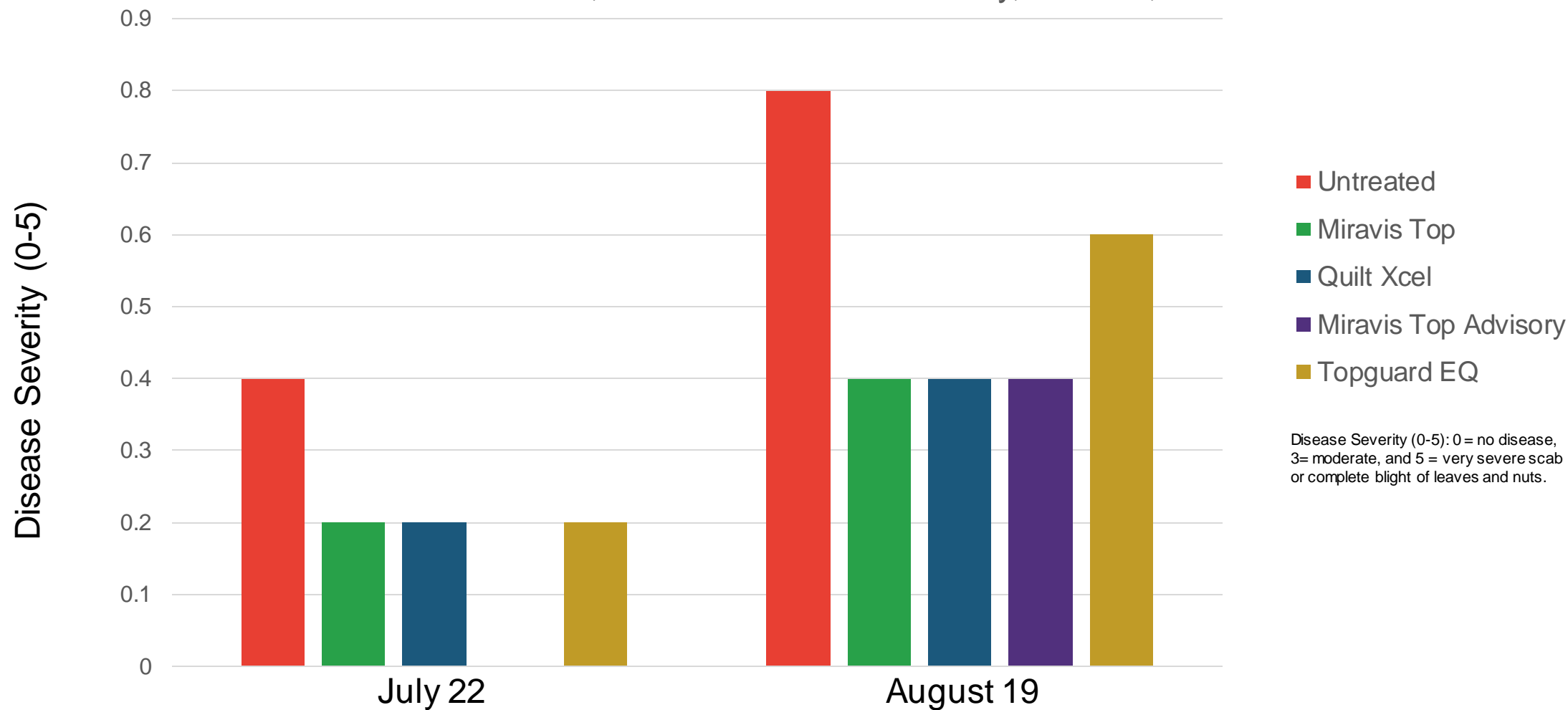
**Application Dates:** 6/1(A), 6/15(B), 6/26(C), 7/13(D), 7/27(E), and 8/10(F) ; Advisory based - 6/26(X) and 7/6(Y)



# 2020 Pecan Scab Foliar Fungicide Trial – Canopy Evaluation

USA-20-706 (TSS-20-913)

Dr. Nathan Walker; Oklahoma State University, Perkins, OK



**Trial Info:** Planting Date: Oct. 1994; CV = Maramec; Soil = Sandy loam (pH 6.3); 5 trees/treatment; Thinning Date = 8/6/20; 1<sup>st</sup> Hard Freeze = 11/30/20; Harvest = 10/20/20; Trees/Acre = 36.

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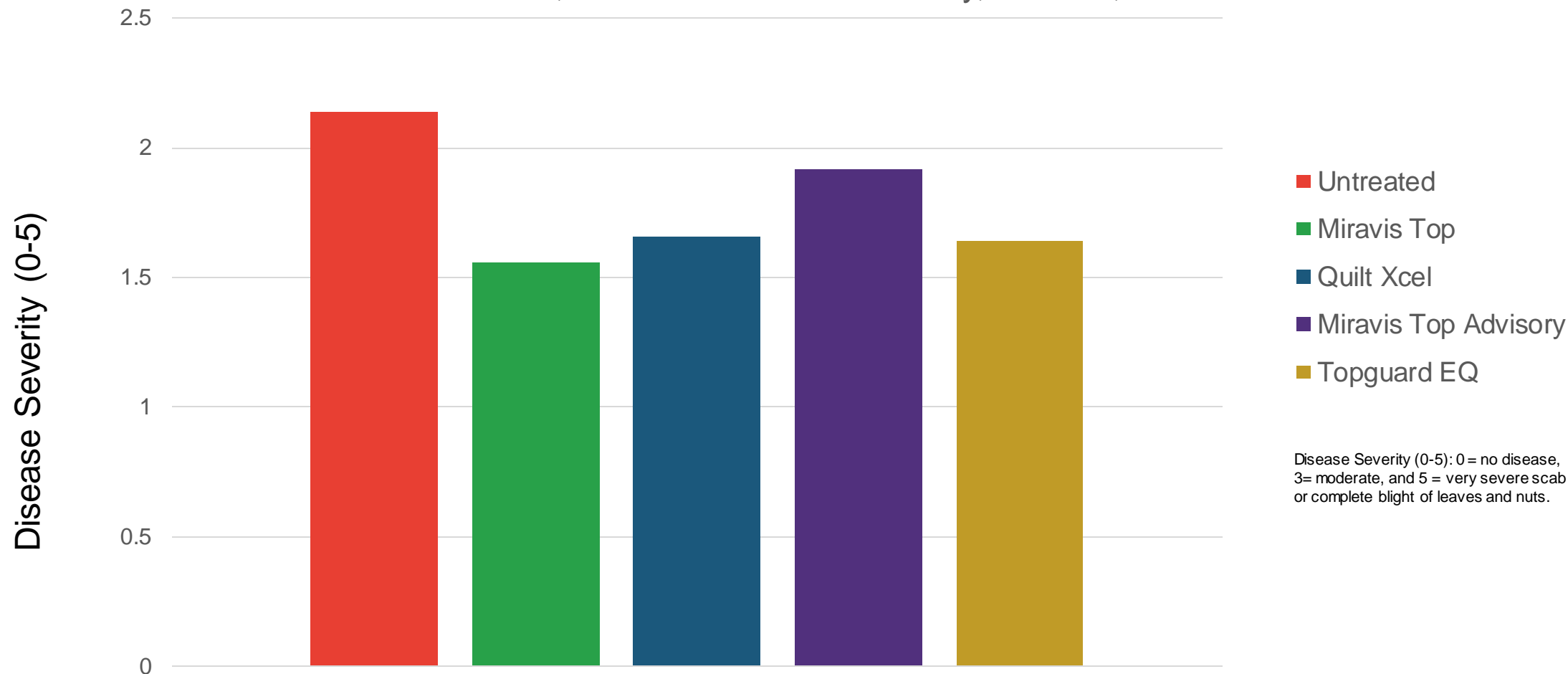


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# 2020 Pecan Scab Foliar Fungicide Trial – Nut Evaluation

USA-20-706 (TSS-20-913)

Dr. Nathan Walker; Oklahoma State University, Perkins, OK



**Trial Info:** Planting Date: Oct. 1994; CV = Maramec; Soil = Sandy loam (pH 6.3); 5 trees/treatment; Thinning Date = 8/6/20; 1<sup>st</sup> Hard Freeze = 11/30/20; Harvest = 10/20/20; Trees/Acre = 36.

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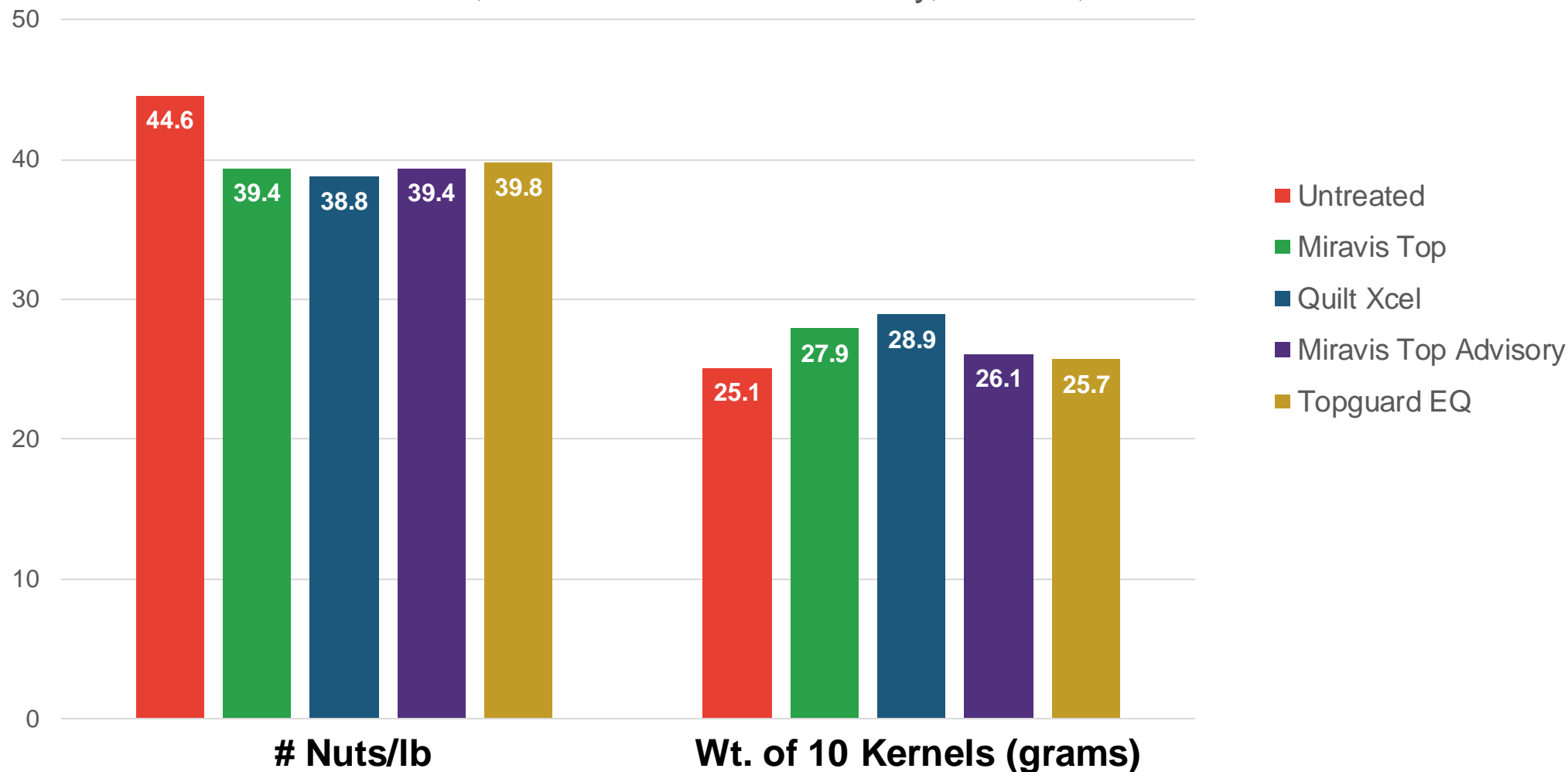


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# 2020 Pecan Scab Foliar Fungicide Trial – Nut Evaluation

USA-20-706 (TSS-20-913)

Dr. Nathan Walker; Oklahoma State University, Perkins, OK



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# **EFFICACY OF FUNGICIDES ON PECAN LEAF SCAB (*FUSICLADIUM EFFUSUM*)**

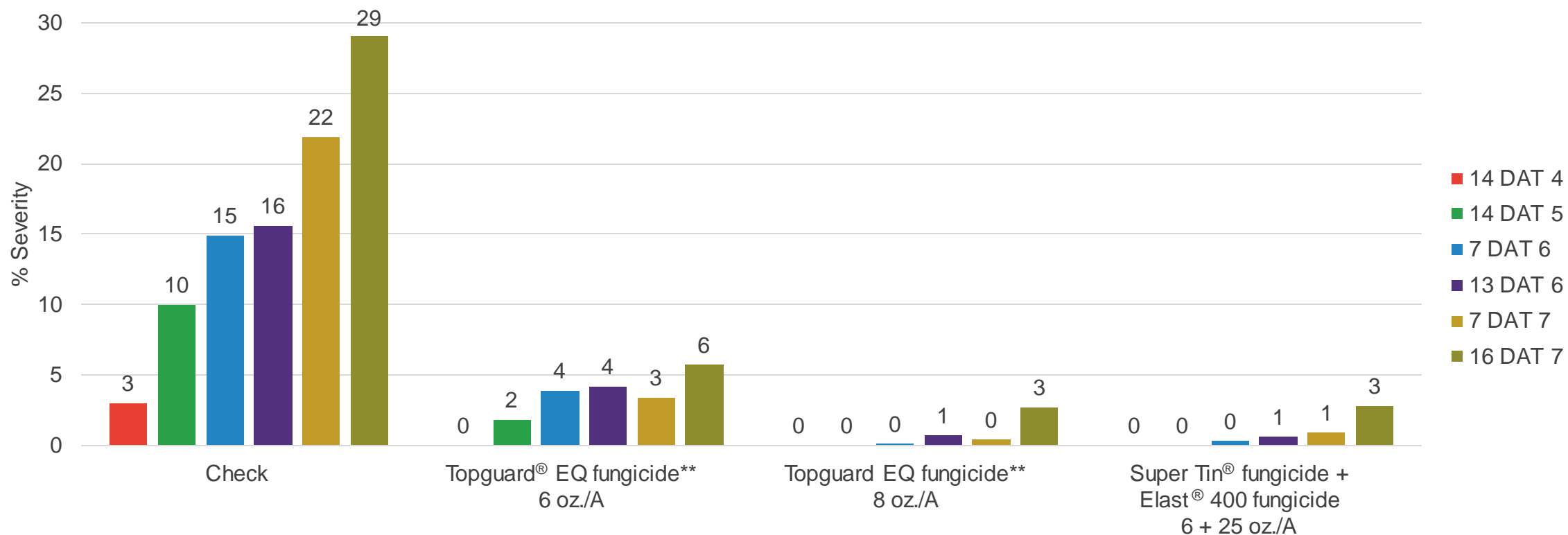
**in**

**Georgia**



# EFFICACY OF FUNGICIDES\* ON PECAN LEAF SCAB (*FUSICLADIUM EFFUSUM*)

Quitman, GA 2016

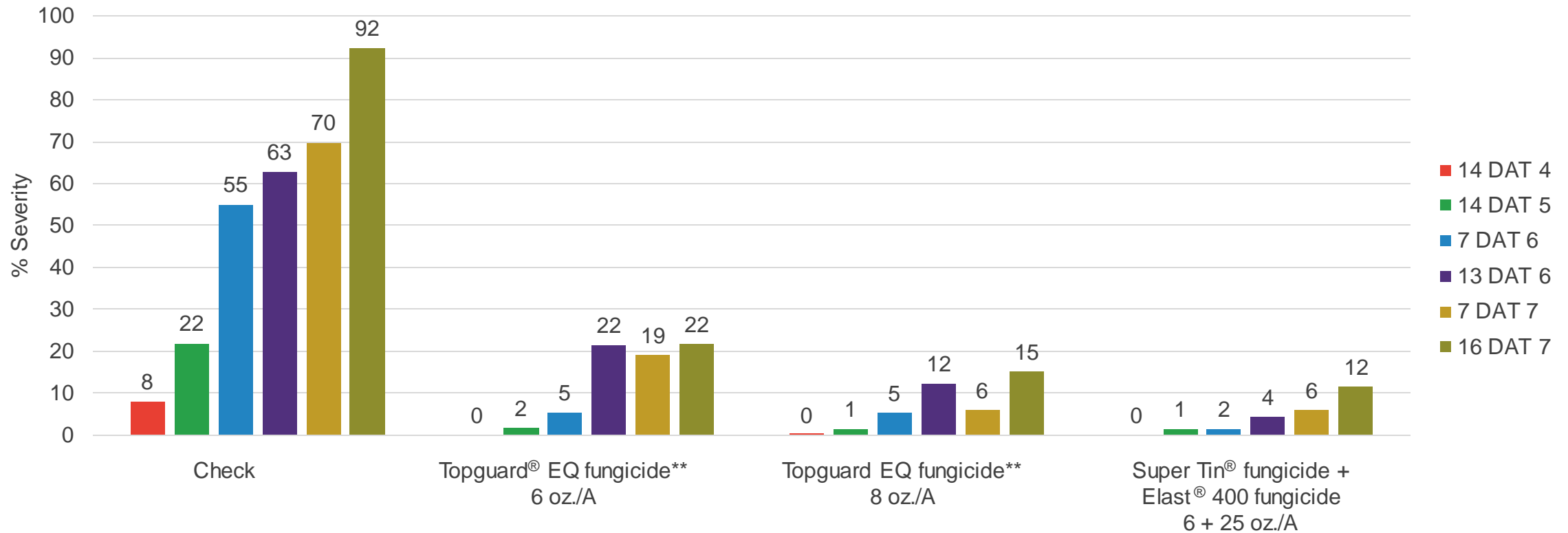


\*Treatments applied at seven-day intervals

\*\*Topguard EQ fungicide alternated with Super Tin + Elast 400F (6 oz. + 25 oz./A)  
Elast 400F = dodine

# EFFICACY OF FUNGICIDES\* ON PECAN NUT SCAB (*FUSICLADIUM EFFUSUM*)

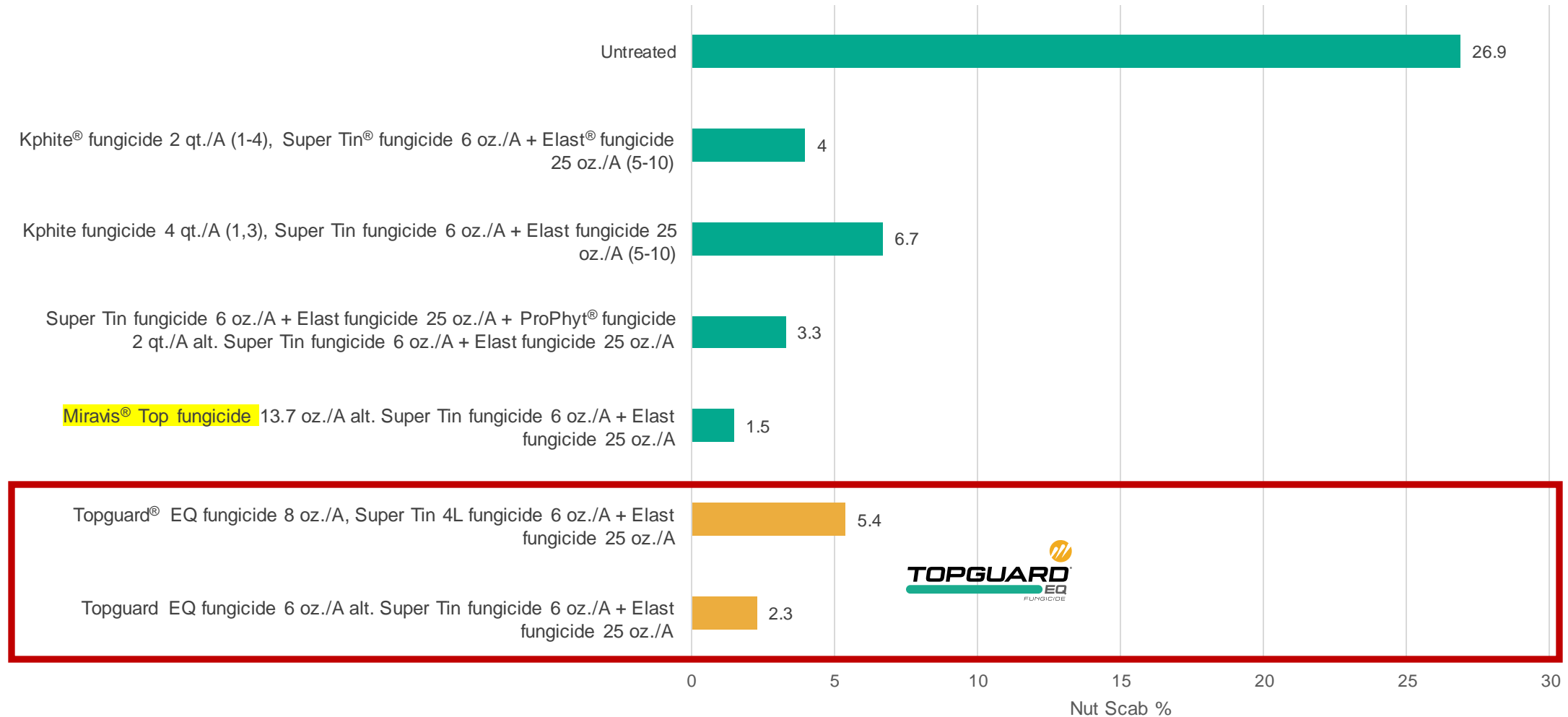
Quitman, GA 2016



\*Treatments applied at seven-day intervals

\*\*Topguard EQ fungicide alternated with Super Tin + Elast 400F (6 oz. + 25 oz./A)  
Elast 400F = dodine

# PECAN NUT SCAB SEVERITY



2020 T. Brenneman, UGA Tifton

# Summary – Pecan Scab Management

- Host Plant Resistance should be first line of defense.
- Miravis Top, Topguard EQ, Super Tin, Elast, and Quilt Xcel can aid in controlling/suppressing pecan scab. No products provided 100% control.
- These products can be/should be rotated in a Pecan Scab program and should not rely on just one product or one class of fungicide chemistry.
- Timing is essential, Pecan Scab model can aid in timing of initiation and future applications.
- Thorough coverage is essential, even the best product won't work if doesn't reach target. Somewhere between 30-150 GPA, generally around 100 GPA is recommended.
- Surfactants often times are not recommended, depends upon the product.
- *“Healthy pecan foliage is the cornerstone to a successful year. Knowing when and what to spray can help growers achieve that success.”* Dr. Charlie Graham; Noble Research Institute; May 1, 2020; Southeastern Shakings.

## DISCUSSION OUTLINE

 ***Pecan Scab: Importance, Symptoms, Disease Cycle, and Scab Model***

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 ***Pecan Scab Fungicide Products and Management***

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 ***Oklahoma and Georgia Pecan Scab Fungicide Field Trials***

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# THE FMC PECAN ACRE

## Fungicide



## Insecticides



NEW





# THANK YOU

**Besiege insecticide, Brigade 2EC insecticide/miticide, Elevest insect control, Mustang Maxx insecticide, Super Tin fungicide and Warrior II with Zeon Technology insecticide are Restricted Use Pesticides.** Always read and follow all label directions, precautions and restrictions for use. Some products may not be registered for sale or use in all states. Elevest insect control and Vantacor insect control may not be registered for sale or use in all states. Contact your local FMC retailer or representative for details and availability in your state. FMC, the FMC logo, Aim, Authority, Brigade, Coragen, Elevest, Exirel, Mustang, Prevathon, Rynaxypyr, Topguard and Vantacor are trademarks of FMC Corporation or an affiliate. FloodJet is a trademark of Spraying Systems Co. Sharpen, Clarity and Headline AMP are trademarks of BASF. Miravis, Trivapro, Besiege and Warrior II with Zeon Technology are trademarks of a Syngenta Group Company. Delaro, Absolute, Luna, Roundup and Sivanto are trademarks of Bayer CropScience or an affiliate. Carbine is a trademark of Ishihara Sangyo Kaisha Ltd. Super Tin is a trademark of United Phosphorous, Inc. Elast is a trademark of an Arysta Life Science Group Company. Kphite is a trademark of Plant Food Systems, Inc. Domark and Badge are trademarks of Isagro SpA Corp. PhoPhyt is a trademark of Luxembourg Industries Ltd. Aproach, Intrepid 2F and Closer are trademarks of Dow AgroSciences, DuPont or Pioneer and their affiliated companies or respective owners. ©2021 FMC Corporation. All rights reserved. 21-FMC-2040 03/21