

2015 Pecan Disease Management Update

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“Lasiodiplodia sp.”

Neofusicoccum sp.





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First diagnosis at Tifton Plant Disease Clinic

2012: July 11

2013: August 27

2014: July 21



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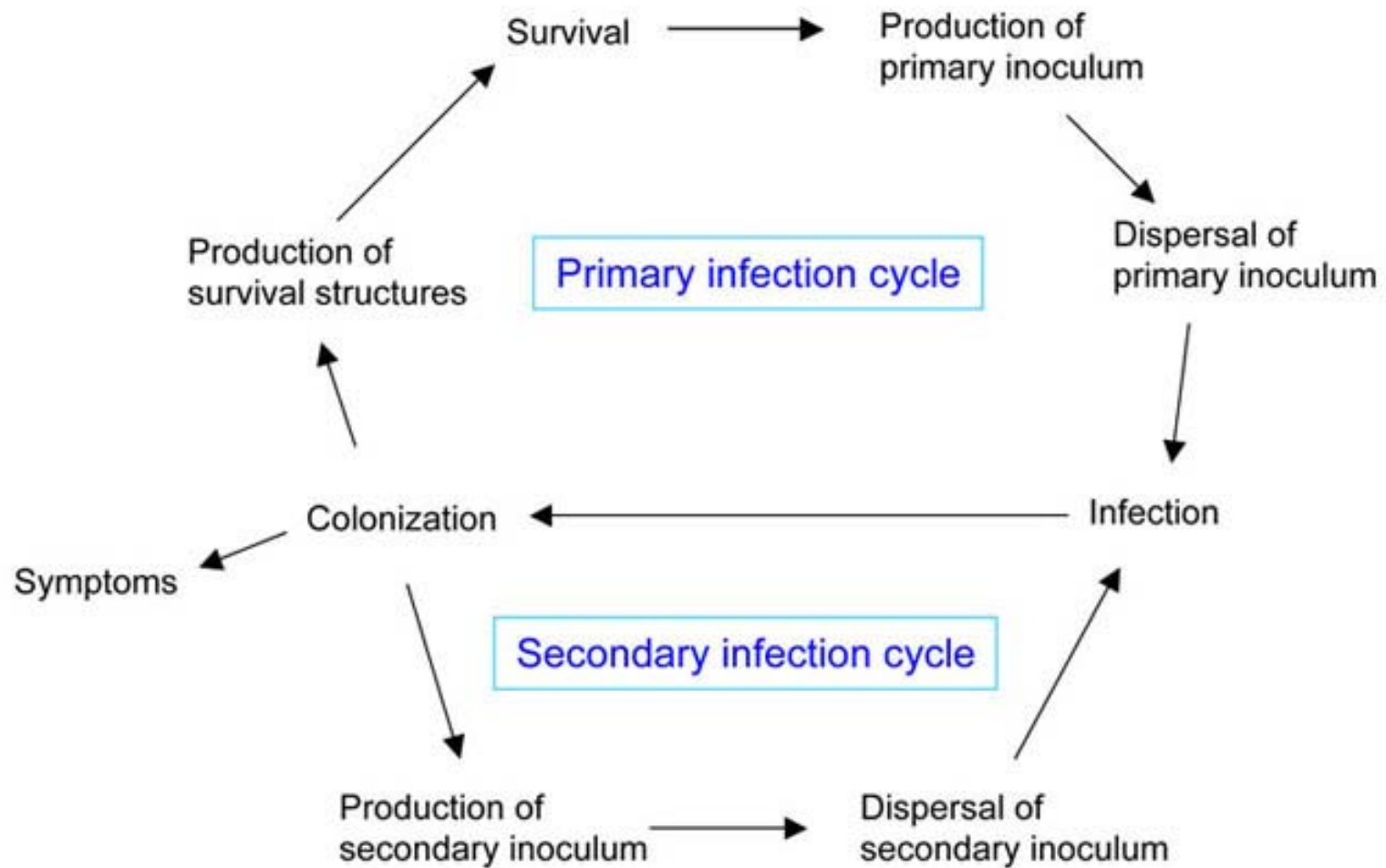
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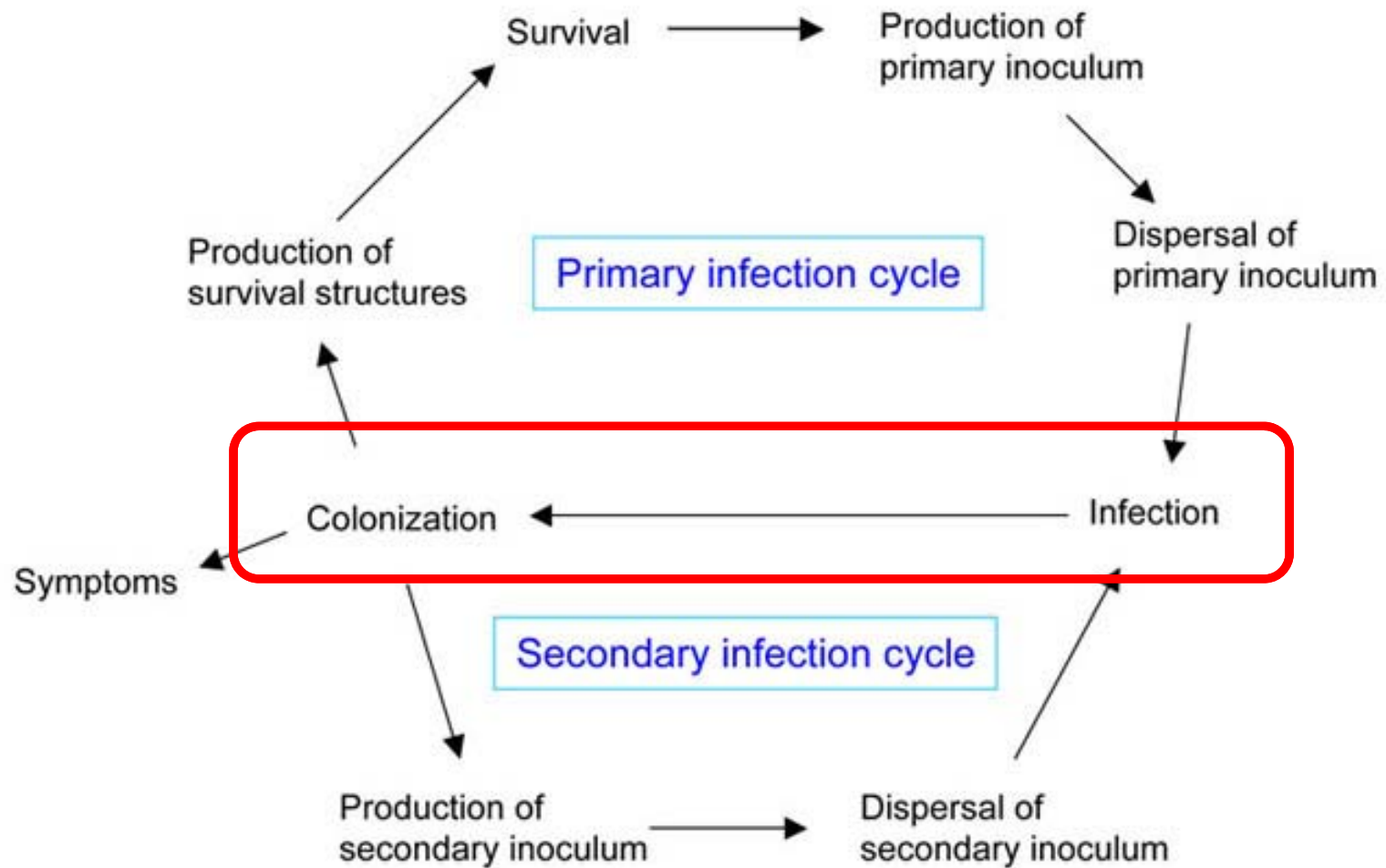
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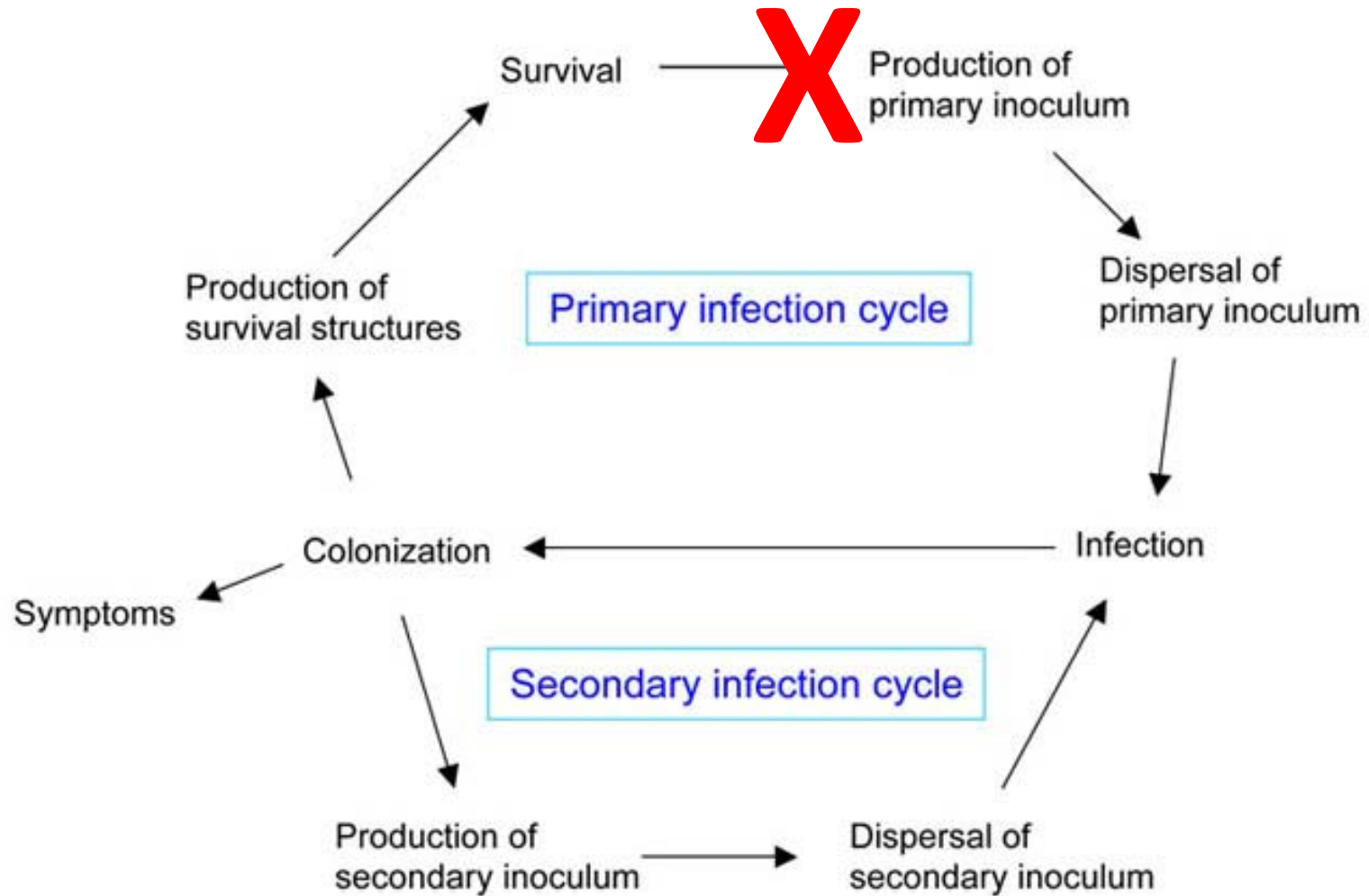
Dormant Fungicide Sprays



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Dormant Sprays

- 2014 was a good year to see benefits
 - Inoculum potential from 2013
 - Favorable weather
- Effects have been marginal



UGA Pecan Scab Fungicide Sensitivity Screening Program



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Fungicide class	FRAC group	Common name	Trade name(s)	Risk
MBCs (benzimidazoles)	1	thiophanate-methyl	Topsin M	H
DMIs (sterol inhibitors, triazoles)	3	propiconazole fenbuconazole metconazole difenoconazole tebuconazole	Orbit, Propimax, Bumper, Quilt*, Quilt Xcel* Enable Quash Quadris Top* Folicur, Tebuzole, Monsoon, Toledo, Orius, Absolute*, Topsin XTR**, Custodia*, etc.	M
Qols (strobilurins)	11	azoxystrobin pyraclostrobin kresoxim-methyl trifloxystrobin	Abound, Quadris Top*, Quilt*, Quilt Xcel*, Custodia* Headline Sovran Absolute*	H
Organotins	30	fentin hydroxide	Super Tin, Agri Tin	L – M
Phosphonates (phosphites)	33	phosphorous acid and salts	Phostrol, ProPhyt, FungiPhite, Reliant, Viathon, Fosphite, Kphite, Phiticide, Rampart, Topaz	L
Guanidines	U12	dodine	Elast (Syllit)	L - M

* Formulated mixture of a DMI and a Qol

** Formulated mixture of a DMI and an MBC

How Does Resistance Develop?

Sudden, dramatic appearance of resistance (1-3 years)

- MBCs (Benlate, Topsin M)
- Qols (Abound, Sovran, Headline, etc.)

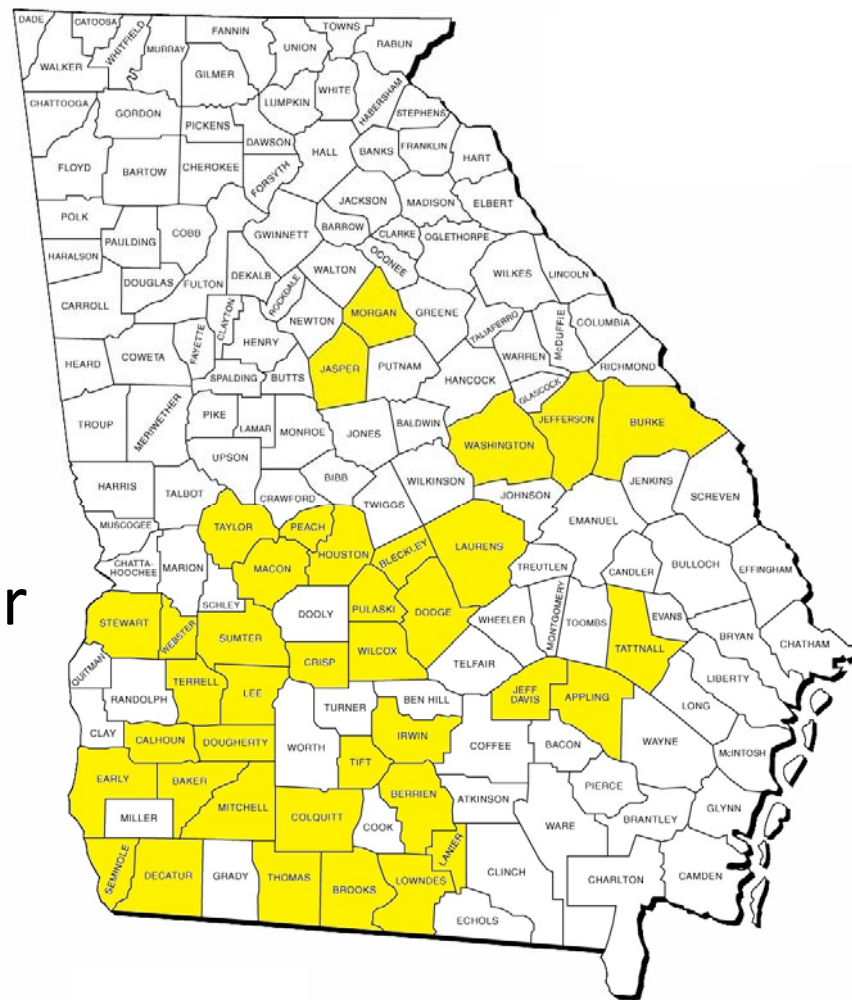
Gradual shift toward resistance (10 years or more)

- Dodine (Elast)
- Organotins (Super Tin, Agri Tin)
- DMIs (Propimax, Enable, tebuconazole products, Quash, Absolute*, Quadris Top*, Quilt*, etc.)

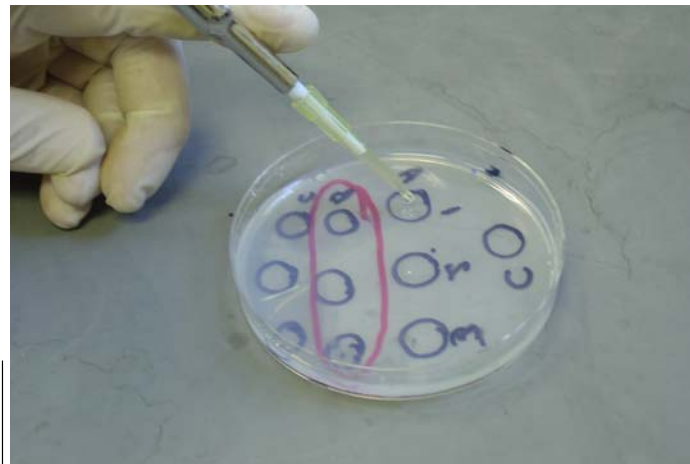


Pecan Scab Fungicide Sensitivity Summary - 2014

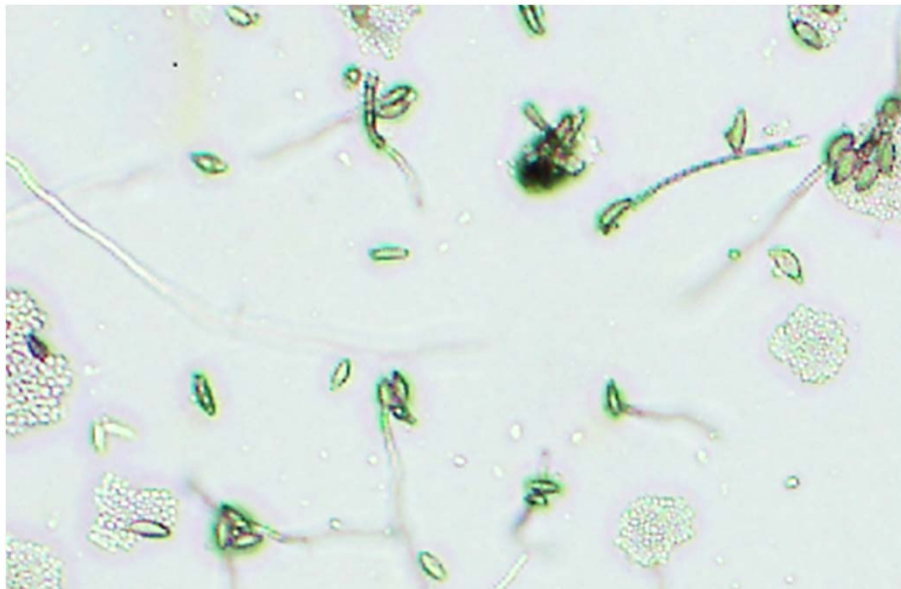
- 38 counties
- 179 samples
 - Results from 156 sample
 - More success with samples earlier in the year
 - No samples after July 31, 2015



New Rapid Assay



Conidia germination (2 days)



TPTH

Thiophanate-methyl
dodine

Relative germination (RGm):

$$\text{RGm} = \frac{\% \text{ germination on fungicide medium}}{\% \text{ germination on control medium}}$$

Micro-colony Growth (3 days)



Triazoles (DMIs)

Relative growth (RGr):

$$\text{RGr} = \frac{\text{mean colony diameter on fungicide medium}}{\text{mean colony diameter on control medium}}$$

Sample of 2014 Sensitivity Report

2014 UGA PECAN SCAB FUNGICIDE SENSITIVITY MONITORING PROGRAM

Name: [REDACTED] Sample #: 14056
 Email: [REDACTED] Sampling date: 6/6/14
 Farm: [REDACTED] Cultivar: Schley
 County: [REDACTED]

Mean % relative germination or growth (RG) on medium containing discriminatory fungicide concentrations ($\mu\text{g/ml}$) compared to non-amended controls
 Bulk spore method, 3 groups of 15 lesions from each sample
 Spore germination (48h): TPTH, azoxystrobin, thiophanate-methyl (TPM), dodine
 Fungal growth (72h): propiconazole, tebuconazole

Fungicide	TPTH	Azoxystrobin	TPM	Dodine	Propiconazole	Tebuconazole
Concentration	30.0	10.0	1.0	3.0	1.0	1.0
% RG	54	61	72	7	39	39

in vitro results \rightarrow efficacy in field

?

40-69 medium
 70 or more high

Summary:

Based on the assay results, there is a high level of insensitivity to thiophanate-methyl (TPM) and a medium level of insensitivity to TPTH at this sampling location. There is a low level of insensitivity to dodine, propiconazole and tebuconazole. There may be a medium level of insensitivity to azoxystrobin; however, further tests will be required to verify insensitivity to azoxystrobin.

For additional interpretation of results or for recommendations on fungicide selection, please contact



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Number of samples with high insensitivity to one or more fungicide classes

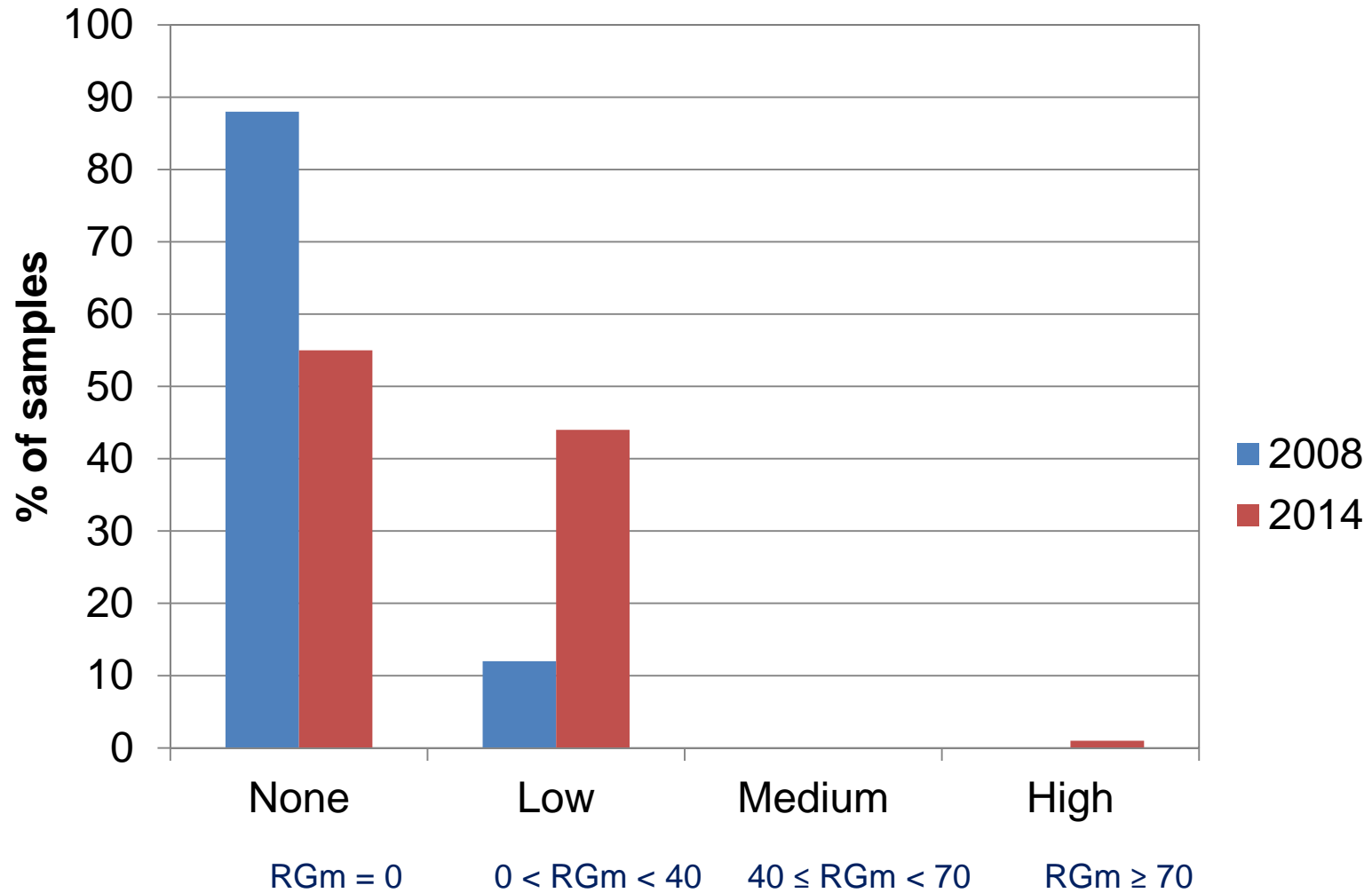
	# Samples	%
High insensitivity to 4 fungicide classes	1	~ 1
High insensitivity to 3 fungicide classes	1	~ 1
High insensitivity to 2 fungicide classes	17	11
High insensitivity to 1 fungicide class	67	43
High insensitivity to 0 fungicide classes	70	45
Total	156	100



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dodine



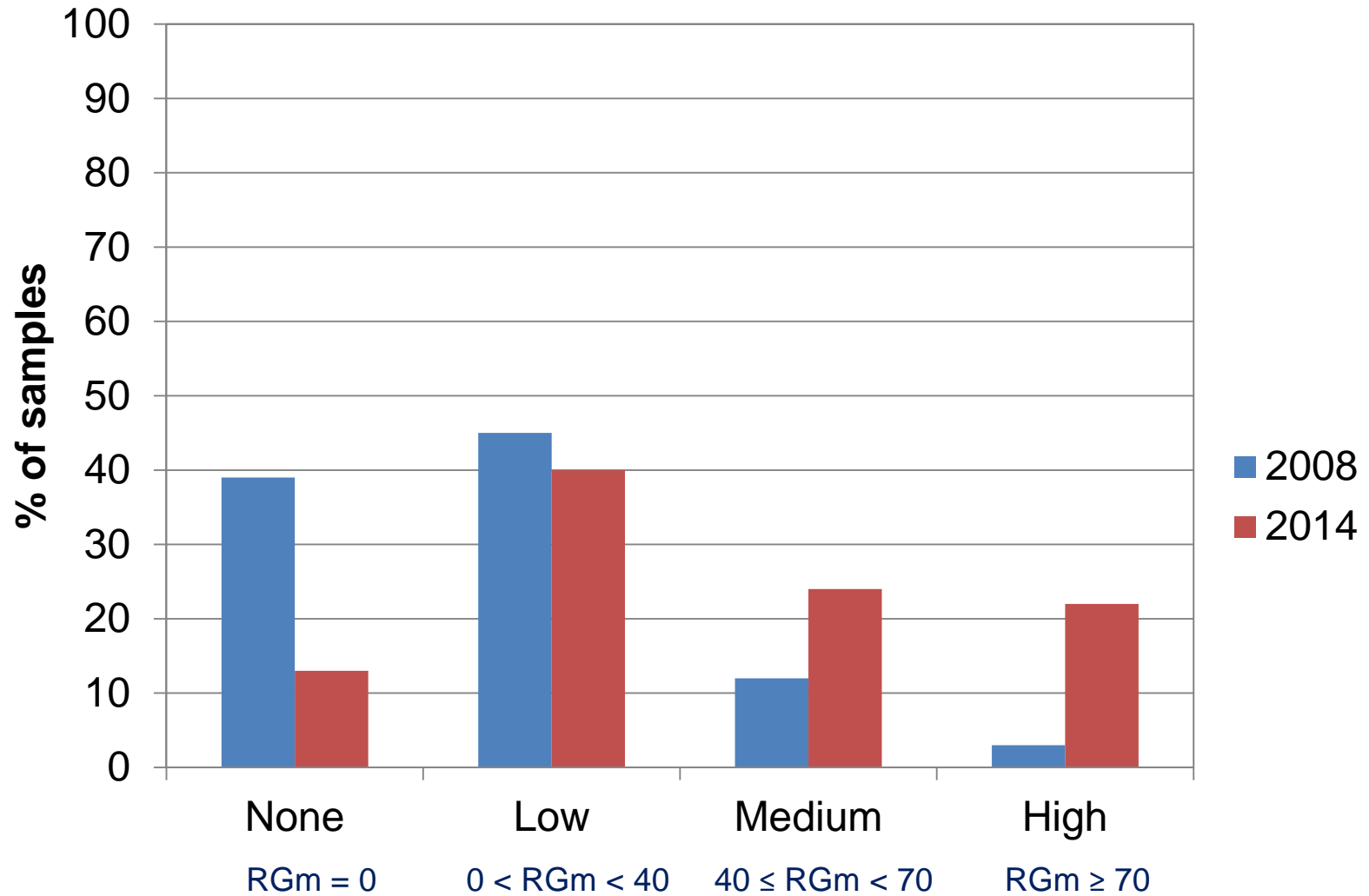
dodine

- Elast FRAC GROUP U12
- Do not apply more than 6 applications per year.
- Rate: 48 fl.oz.
 - 25 fl. oz. common in tank mixes
- Best use: nut scab

Comments: Good sensitivity numbers;
good mixing partner



TPTH

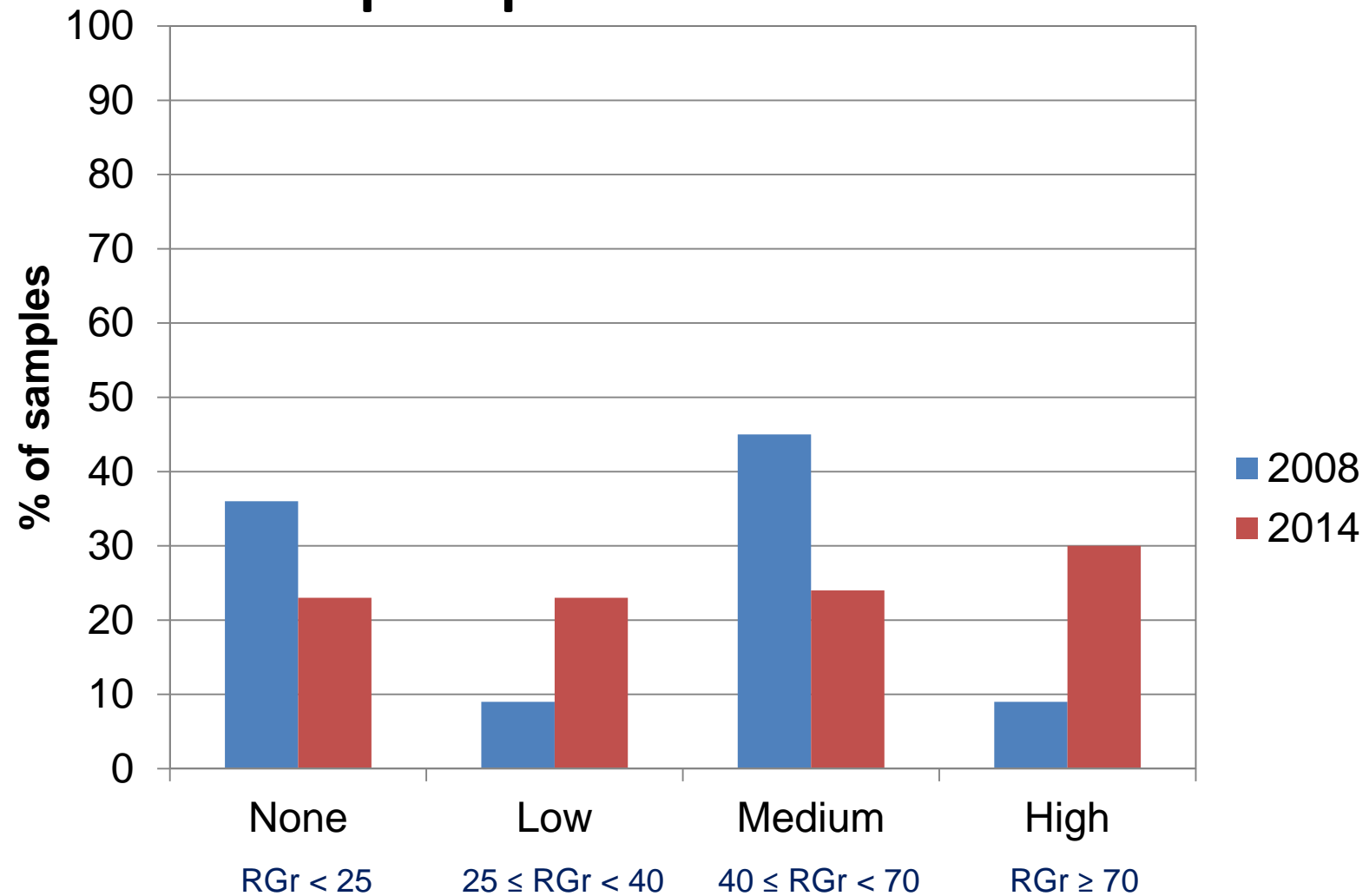


TPTH

- Super Tin; Agri Tin FRAC GOUP 30
- Do not exceed 45 oz. or 72 fl. oz. per year.
- Rates: 5.0 – 7.5 oz or 8 – 12 fl. oz.
- Best Use: nut scab
- Comments: If high insensitivity, limit number of applications and avoid reduced rates.



propiconazole



propiconazole

Represents DMI class – FRAC GROUP 3

- propiconazole (Orbit, Propimax, Bumper, Quilt*)
- fenbuconazole (Enable)
- tebuconazole (Folicur, Monsoon, Orius, Tebuzole, Toledo, Absolute* ...)
- metconazole (Quash)
- difenoconazole (Quadris Top*) — No cross resistance?



Triazoles (DMIs or Group 3)

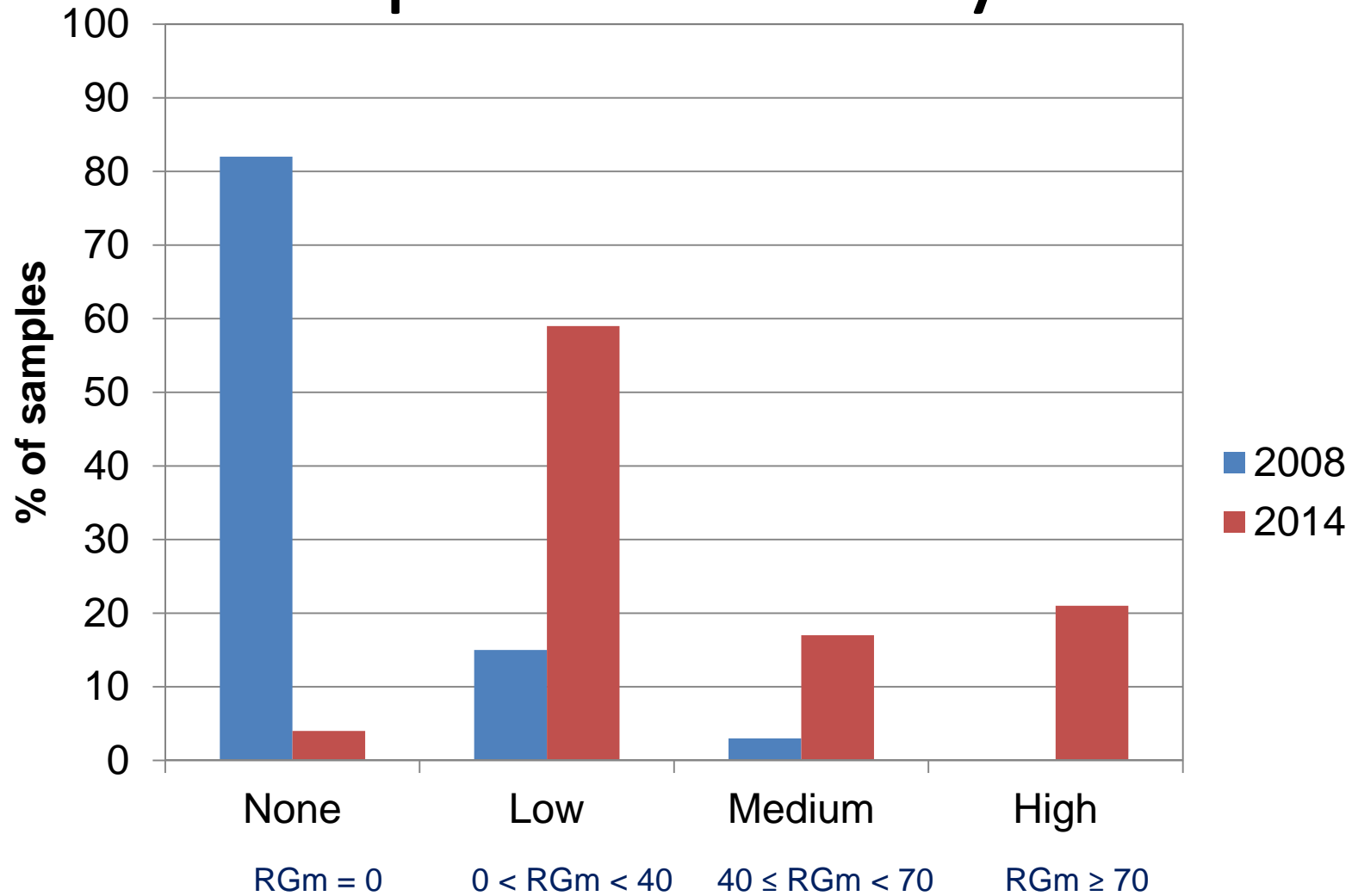
- Shifts in sensitivity dating back 20 years
- Rates: check label
- Do not follow full rate applications with reduced rates at later date.



Triazoles (DMIs or Group 3)

- Best use: leaf scab; powdery mildew; zonate leaf spot
- Comments: When medium-to-high insensitivity is known, avoid stand alone use, use full rates, and limit number of applications.

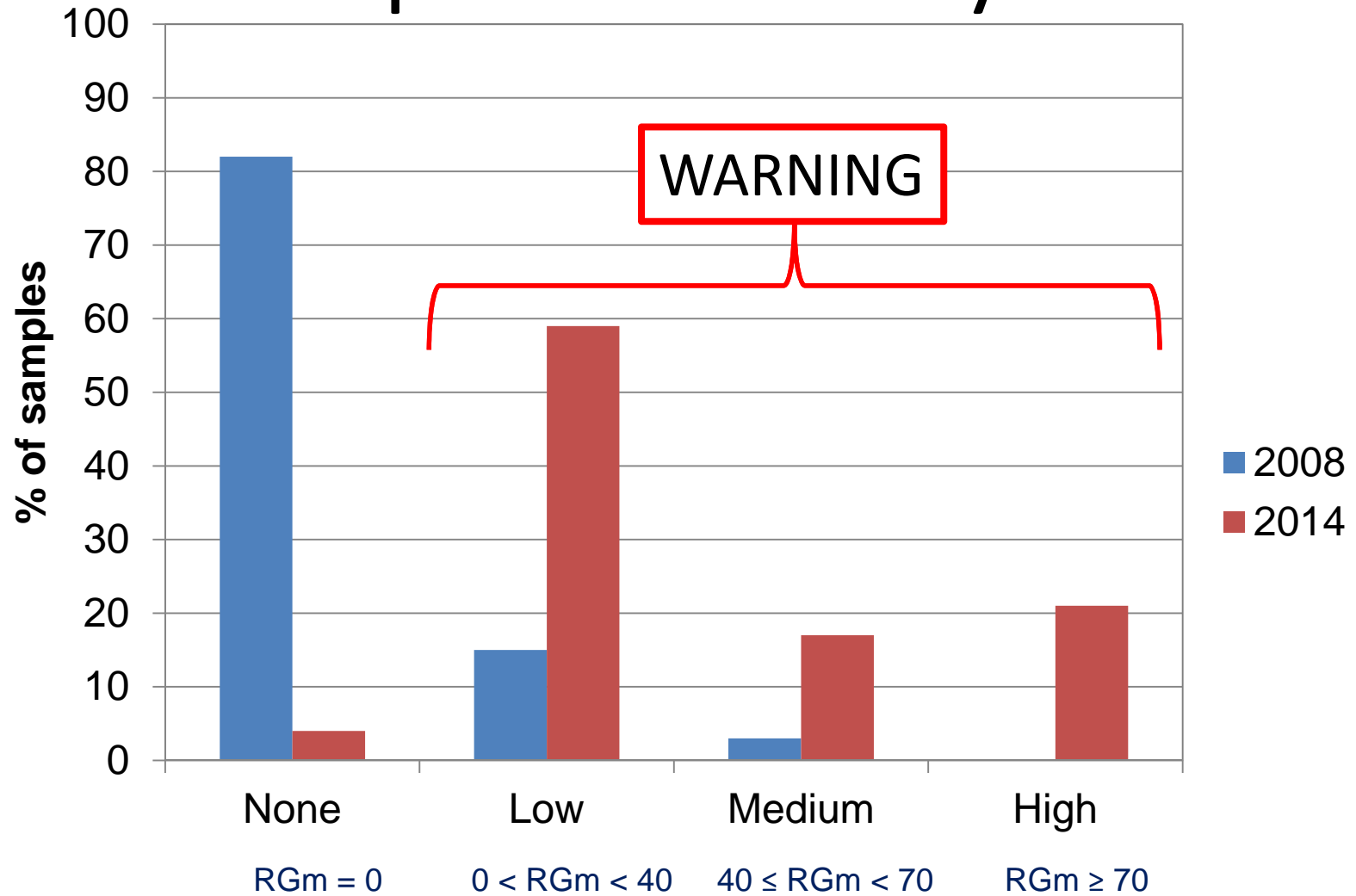
thiophanate methyl



Insensitivity class

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thiophanate methyl



thiophanate methyl

- Topsin M FRAC GROUP 1
- Topsin 4.5FL, Topsin 70WP, Topsin WSB, Topsin XTR2
- Rate: 1 lb.; 20 fl.oz.
- Do not apply more than 3 lbs or 60 fl .oz. per year.
[no more than 1 to 2 applications recommended]
- Always use in a tank mix.



thiophanate methyl

- Best Use:
 - Early season for leaf scab
 - May/Jun application for anthracnose and scab
 - Nut scab
- Comment: If high sensitivity, avoid use.



azoxystrobin

Insensitivity Class	2014	
	Samples	%
High (RG \geq 70%)	51	36
Medium (40% \leq RG<70%)	48	34
Low		

A PCR-based assay has been developed that is designed to detect the genetic mutation that confers resistance to Qols.

strobilurins

Represents strobilurins FRAC GROUP 11

- azoxystrobin: Abound, Quadris*,
Quadris Top*, Quilt*,
Quilt Xcel*, Custodia*
- trifloxystrobin: Absolute*
- kresoxim-methyl: Sovran
- pyraclostrobin: Headline



strobilurins

- Rates: check labels
- Recommended limit of 3 applications per season.
- Do not make more than 2 sequential applications.



strobilurins

- Best Use:
 - Excellent on leaf scab; should be good for anthracnose
 - Premixes with DMIs are also excellent nut scab materials
- Comments: No confirmed resistance; avoid overuse.

phosphites

Labeled for scab

- Phostrol
- ProPhyt
- Viathon
- FungiPhite
- Reliant

Labeled for Phytophthora

- Fosphite
- Fungi-Phite
- KPhite
- Phiticide
- Phostrol
- Rampart
- Topaz

The rapid assay method has not been tested with the phosphite materials.



phosphites

- For scab control, continue to compare well to our traditional fungicides in UGA research trials (Ponder Farm).
- Their strength is on leaf scab.
- Use full labeled rates for nut scab.
- Should be good selection for suppressing anthracnose.



phosphites

- Use up to 5 applications, but not in consecutive applications
- With susceptible cultivars, mix with other class of fungicide.



2015 Fungicide Sensitivity Testing

- Will remain a “free” fungicide sensitivity testing service available to pecan growers in Georgia
 - Thanks to the Georgia Agricultural Commodity Commission for Pecans (Georgia Pecan Commission)



2015 Fungicide Sensitivity Testing

- Instructions for collecting and shipping samples, and sample information forms can be downloaded from the following websites:

www.georgiapecan.org

www.caes.uga.edu/commodities/fruits/pecan/
google “UGA Pecan”



Sampling Instructions and Information Form



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