Effect of Reduced Rates of Maleic Hydrazide on Sucker Control and Residues in Regional Burley Sucker Control Tests

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Tobacco Growth Regulator Committee

Objectives

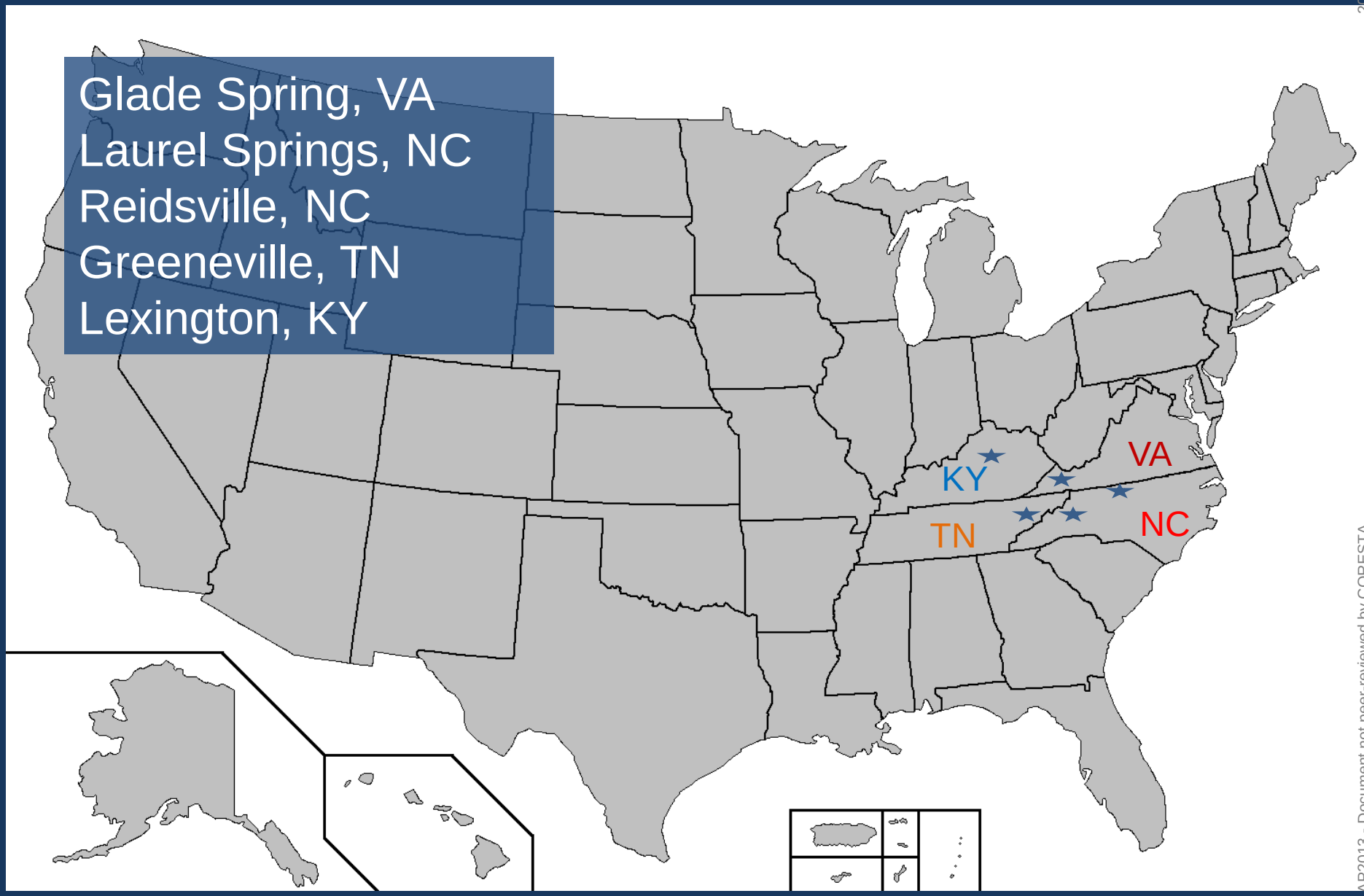
- Evaluate potential chemical compounds for growth regulator properties and their effectiveness for axillary bud (sucker) control in tobacco
- Evaluate tobacco for compound residues
- Evaluate potential application methods that may enhance efficacy and or reduce residues

Regional Tobacco Growth Regulator Committee

Cooperators

1. Scott Whitley – N.C. State University (2 locations)
2. Paul Denton – the University of Tennessee
3. Danny Peek – Virginia Tech
4. Bob Pearce – the University of Kentucky

Test Locations



Background Information for RSCT Field Studies

- Studies conducted as a Randomized Complete Block and treatments replicated four times
- All data based on 10 plants
- Data collected
  1. Number of suckers from 10 plants
  2. Weight of suckers from 10 plants
  3. Yield & Quality
  4. Residues (detectible 10 ppm)

Background Information for RSCT Field Studies

- Plants topped at 25 – 50% Elongated bud
- Treatments applied as a coarse spray at a total volume of 562 L/ha
- Treatments applied over the row with 3 solid cone nozzle arrangement (TG3-TG5-TG3) generally with a CO_2 powered backpack sprayer

Tractor Mounted Tobacco Sucker Control Sprayer

Background Information for RSCT Field Studies

- Plants topped at 25 – 50% Elongated bud
- Treatments applied as a coarse spray at a total volume of 562 L/ha
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- Plots harvested 28 DAT

MH Treatments

Application rates

1. MH 3.36 kg ai/ha
2. MH 2.52 kg ai/ha
3. MH 2.52 kg ai/ha + DNA 0.5 gpa
4. MH 2.52 kg ai/ha + DNA 0.5 gpa w/conveyor
5. MH 1.68 kg ai/ha + DNA 0.5 gpa

Reduced MH Rates

The systemic activity of MH provides a much needed tool for sucker control in burley tobacco

Reduced rates may allow for the continue use of MH by reducing residues

MH Residues on Tobacco Leaf

- MH residues are a concern in the tobacco industry
  - Industry standard: less than 80 ppm
  - Some countries: less than 60 ppm
  - Zero tolerance in some areas
  - Some buying companies in US requiring < 80 and/or strictly enforcing tolerance
  - Future regulations???
    1. US FDA
    2. World Health Organization (FPTC)

MH Residues 2010

	Lexington, KY				Glade Spring, VA		
MH Rate	Cutter	Leaf	Tip		Cutter	Leaf	Tip
kg ai/ha	**PPM**				**PPM**		
3.36	82.9 cd	103.5 bc	185.4 a		18.8 b	26 ab	59.5 a
2.52	104.8 bc	82.3 cd	129 b		10 b	10 b	36.5 ab
1.68	38.1 e	32 e	58.4 de		10 b	10 b	10 b

	Lexington, KY		Glade Spring, VA
MH Rate			
kg ai/ha	% Control		% Control
3.36	98		100
2.52	91		94
2.52 (DNA	93		99
1.68 (DNA)	98		98

Effects of MH Rates on Residues (averaged across stalk position) 2010

MH Rate	TN	VA	NC – LS	NC – R	KY
kg ai/ha	Parts Per Million (PPM)				
3.36	74.8 a	34.8 a	48.4 a	129.2 a	123.9 a
2.52	45.4 b	18.8 ab	25.4 b	56.4 b	105.3 b
1.68	23.1 c	10.0 b	11.0 b	35.4 c	42.8 c

MH Residues 2011

	Reidsville, NC				Glade Spring, VA		
MH Rate	Cutter	Leaf	Tip		Cutter	Leaf	Tip
kg ai/ha	PPM				PPM		
3.36	69.8 bc	74.6 bc	209.4 a		19.1 b	21.3 b	39.1 a
2.52	83.9 b	61.6 cd	48.6 de		13.3 b	12.0 b	17.6 b
2.52 w/Conv.	74.9 bc	70.1 bc	71.3 bc		12.6 b	10.5 b	14.3 b
1.68	32.8 e	45.3 de	84.5 b		10.6 b	10.0 b	10.4 b

	Reidsville, NC		Glade Spring, VA
MH Rate			
kg ai/ha	% Control		% Control
3.36	96.8		98.8
2.52	97.6		97.6
2.52 w/Conv.	97.2		97.2
1.68	99.4		98.9

Effects of MH Rates on Residues (averaged across stalk position) 2011

MH Rate	TN	VA	NC - LS	NC - R	KY
kg ai/ha	Parts Per Million (PPM)				
3.36	76.3 a	26.5 a	48.1 a	117.9 a	
2.52	56.2 b	14.3 b	17.2 b	64.7 b	
2.52 w/Conv.	56.2 b	12.5 b	12.0 b	72.0 b	
1.68	22.7 c	10.3 b	15.1 b	54.2 c	

MH Residues 2012

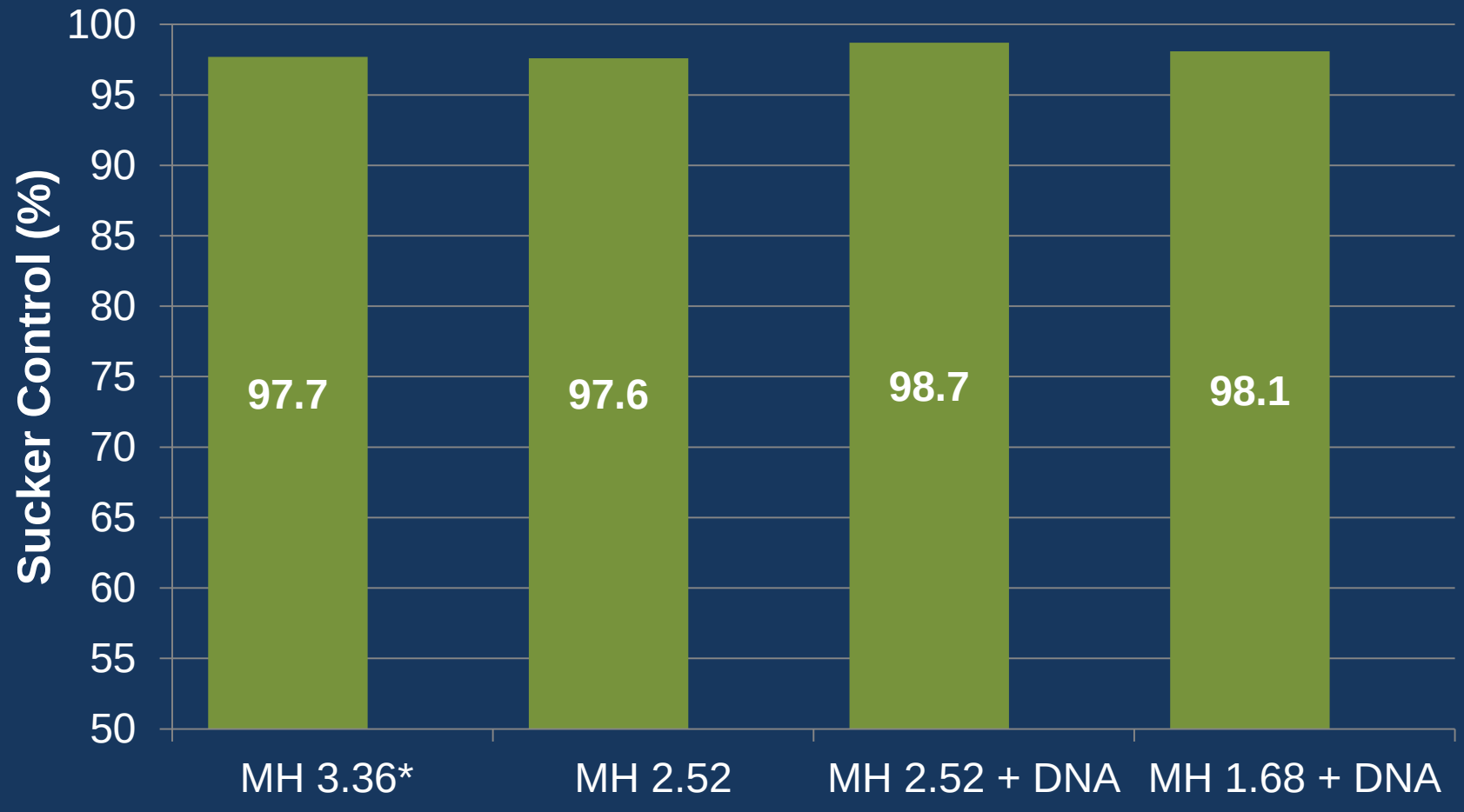
	Lexington, KY				Laurel Springs, NC		
MH Rate	Cutter	Leaf	Tip		Cutter	Leaf	Tip
kg ai/ha	PPM				PPM		
3.36	95.1 b	80.1 bc	148.3 a		10.0 b	22.5 b	86.8 a
2.52	47.1 cde	27.5 e	75.4 bcd		10.0 b	10.6 b	22.3 b
2.52 w/Conv.	32.6 e	35.5 de	44.8 cde		10.0 b	10.1 b	26.4 b
1.68	20.8e	22.8 e	34.3 e		10.0 b	10.0 b	18.3 b

	Lexington, KY		Glade Spring, VA
MH Rate			
kg ai/ha	% Control		% Control
3.36	98.2		99.0
2.52	99.4		99.4
2.52 w/Conv.	97.9		97.5
1.68	95.8		97.5

Effects of MH Rates on Residues (averaged across stalk position) 2012

MH Rate	TN	VA	NC - LS	NC - R	KY
kg ai/ha	Parts Per Million (PPM)				
3.36	24.1 a	18.5 a	39.8 a	65.7 a	107.8 a
2.52	14.8 b	13.9 ab	15.5 b	56.8 a	50.1 b
2.52 w/Conv.	13.4 b	11.6 b	14.3 b	45.7 a	37.6 b
1.68	10.1 b	10.9 b	12.8 b	20.3 b	25.8 b

Reduced Rates of MH Averaged Across Five Locations for Seven Years



*MH rate kg ai./ha and DNA 0.67 kg ai/ha

MH Residues

Summary

- ✓ Commonly recommended rates of MH can result in unacceptable residues
- ✓ Reducing the MH rate to 1.68 kg ai/ha reduced residues to below 80 ppm with the exception of Reidsville in 2011, but not always below 50 ppm
- ✓ Generally, MH residues were higher in tobacco from the tip stalk position
- ✓ No consistent difference in residues when MH was applied using the conveyor hood

Sucker Control with MH

Summary

- ✓ Although the application of MH at 1.68 kg ai/ha provided excellent sucker control, data from other trials has demonstrated reduced effectiveness
- ✓ Possibly due to:
  - ✓ Precision application of RSCT
  - ✓ Small plot scale
  - ✓ Generally RSCT studies are not conducted on damaged tobacco