

Tobacco Response to Simulated Drift of Glufosinate, Dicamba, and 2,4-D

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Overview

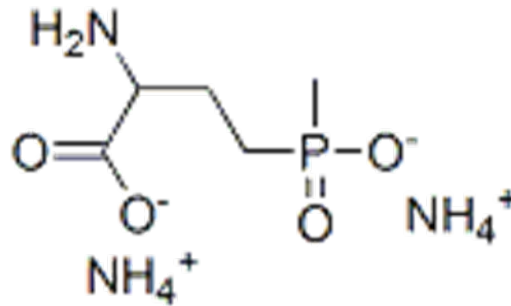
- Background
- Herbicide Descriptions
- Objectives
- Materials and Methods
- Application Rates
- Results
- Conclusion
- Future Research

Background

- Transgenic glufosinate and glyphosate crops are widely planted
- Development is under way for crop tolerance to dicamba and 2,4-D
- Increased use = increased opportunity for non-target movement and applications
- This research will help growers make management decisions after a drift event or misapplication has occurred

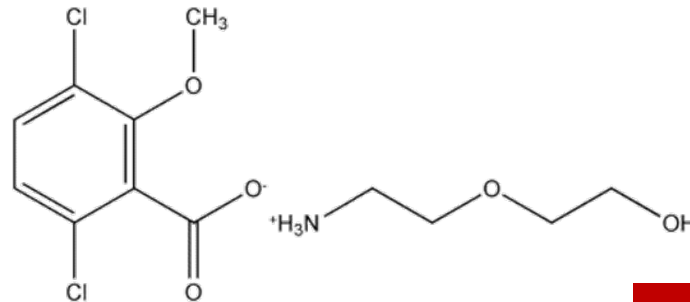
Glufosinate

- Phosphilic acid
- Trade names: Ignite, Liberty, and others
- MOA
 - Inhibits glutamine synthetase enzyme, which leads to an accumulation of ammonia in the cell
 - The ammonia is phytotoxic and destroys the cell membranes



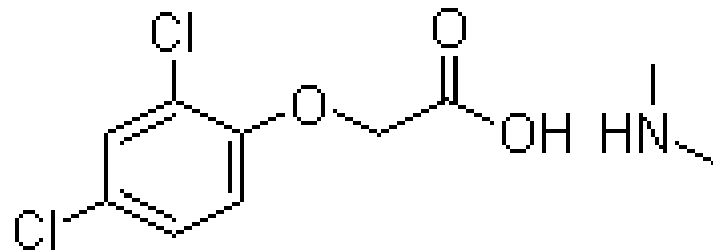
Dicamba

- Benzoic acid
- Trade names: Clarity, Banvel, Distinct, and others
- MOA
 - Synthetic auxin:
 - Interferes with nucleic acid metabolism and disruption of normal transport systems through massive cell proliferation



2,4-D

- Phenoxy-carboxylic acid
- Trade names: Weedar 64, Amine 4, and others
- MOA
 - Synthetic auxin



Objectives

- Simulate drift rates
- Create injury symptomology to correlate with yield and quality
- Evaluate three herbicides at simulated drift rates to assess injury and recoverability of tobacco

Materials and Methods

- 2 locations
 - Upper Coastal Plain Research Station (Rocky Mount, NC)
 - Cunningham Research Station (Kinston, NC)
- NC 71 was grown under recommended cultural practices until early to mid-June when treatments were applied
- Research also conducted on cotton, soybean, and peanut

Materials and Methods cont'

- Herbicides: glufosinate (Ignite), dicamba (Clarity), and 2, 4-D (Weedar 64)
- Two row plots, 40' long (treatments were applied to one row only)
- RCB, 4 replications
- Applied with a CO₂ backpack sprayer calibrated to deliver 15 GPA at 21 psi

Application Rates

- Glufosinate

- Ignite 29 oz/A (1X)

- 1) $1/2$ X
 - 2) $1/4$ X
 - 3) $1/8$ X
 - 4) $1/16$ X
 - 5) $1/32$ X
-

- Dicamba

- Clarity 8 oz/A (1X)

- 2,4-D

- Weedar 64 16 oz/A (1X)

- 1) $1/2$ X
- 2) $1/8$ X
- 3) $1/32$ X
- 4) $1/128$ X
- 5) $1/512$ X

Glufosinate

1/32nd full rate



1/16th full rate



1/8th full rate



1/4 full rate



1/2 full rate



Dicamba

1/512th full rate



1/128th full rate



1/32nd full rate



1/8th full rate



1/2 full rate



2,4-D

1/512th full rate



1/128th full rate



1/32nd full rate



1/8th full rate



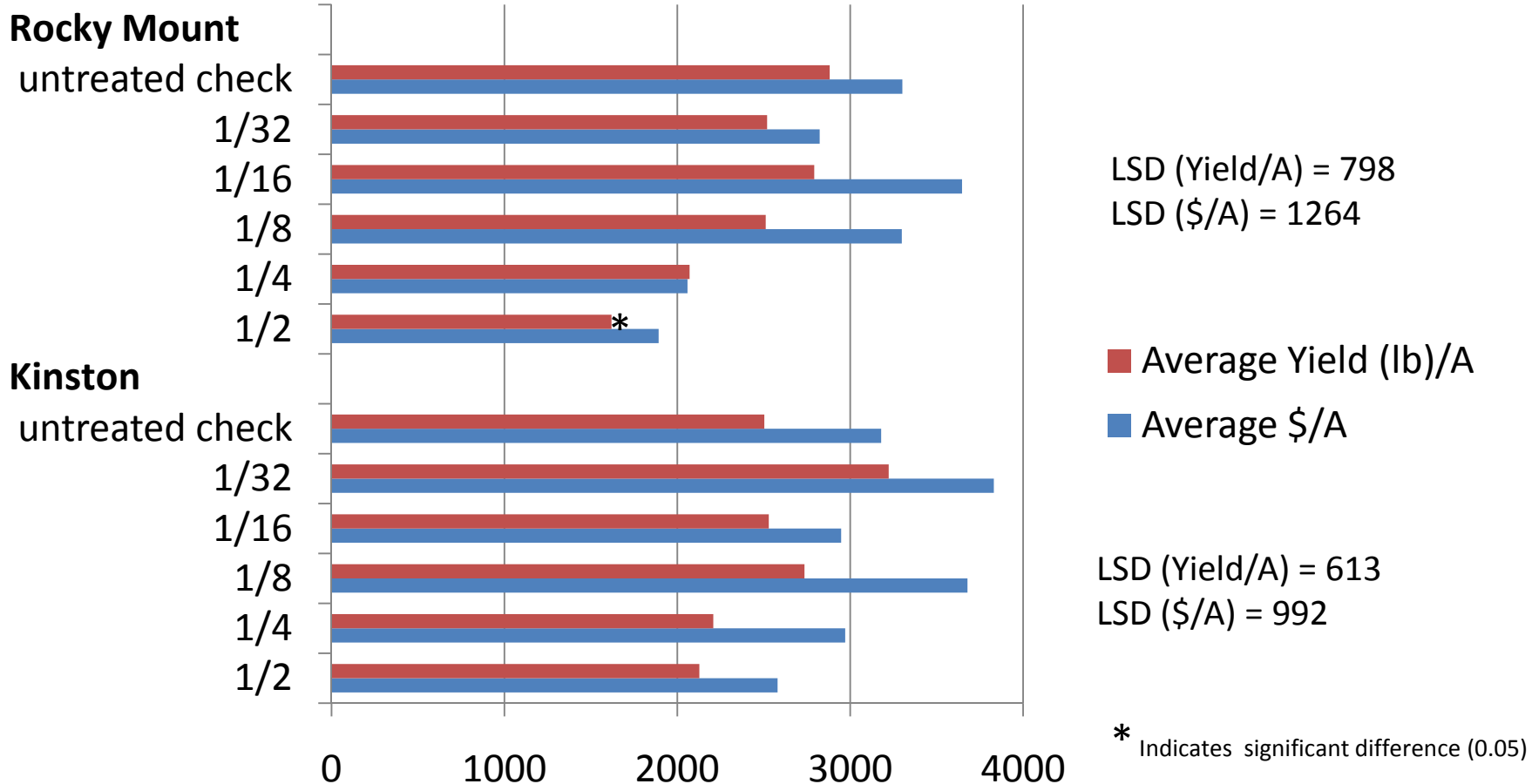
1/2 full rate



Data Collected

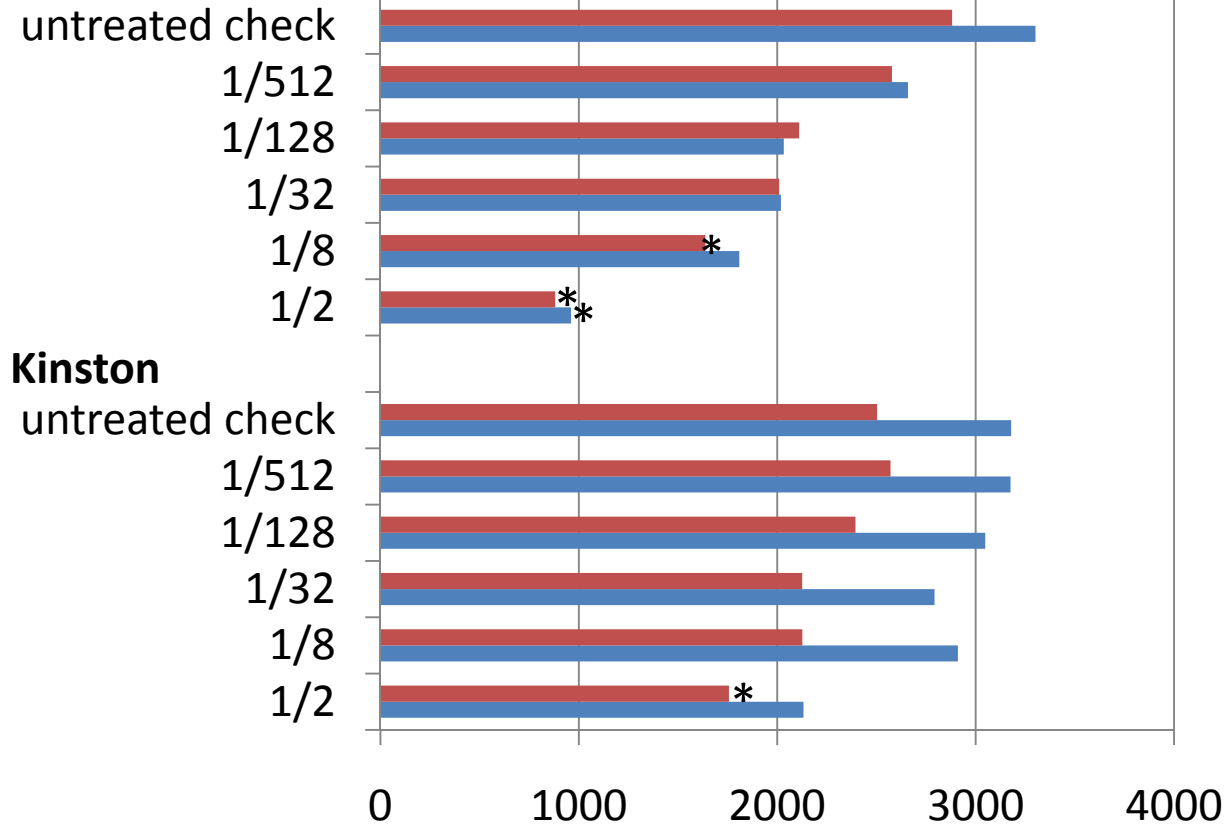
- Visual ratings
 - 7 and 14 days after treatment
- Photographs
- Cured leaf samples to analyze presence/absence of herbicide residues
 - Still waiting on results
- Yield
- Value per acre

Glufosinate



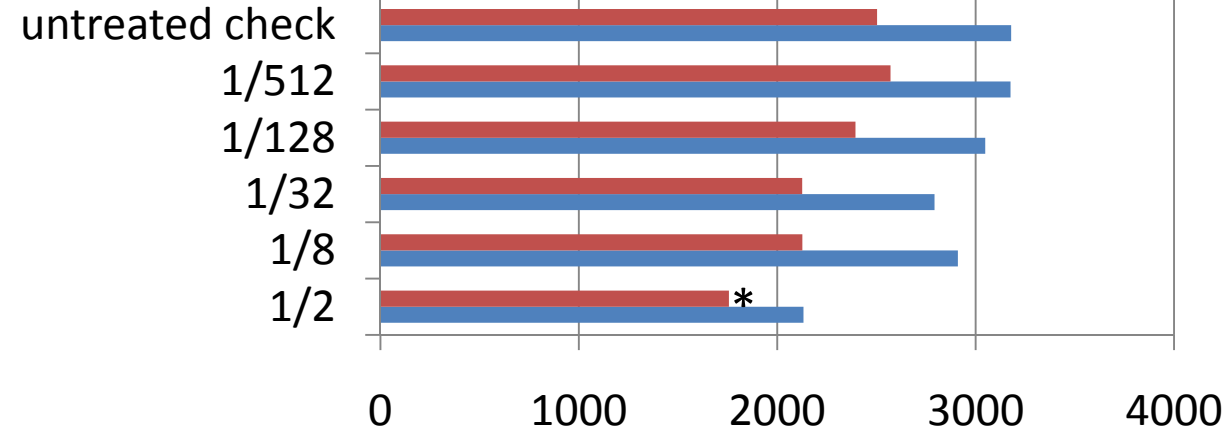
Dicamba

Rocky Mount



LSD (Yield/A) = 674
 LSD (\$/A) = 1046

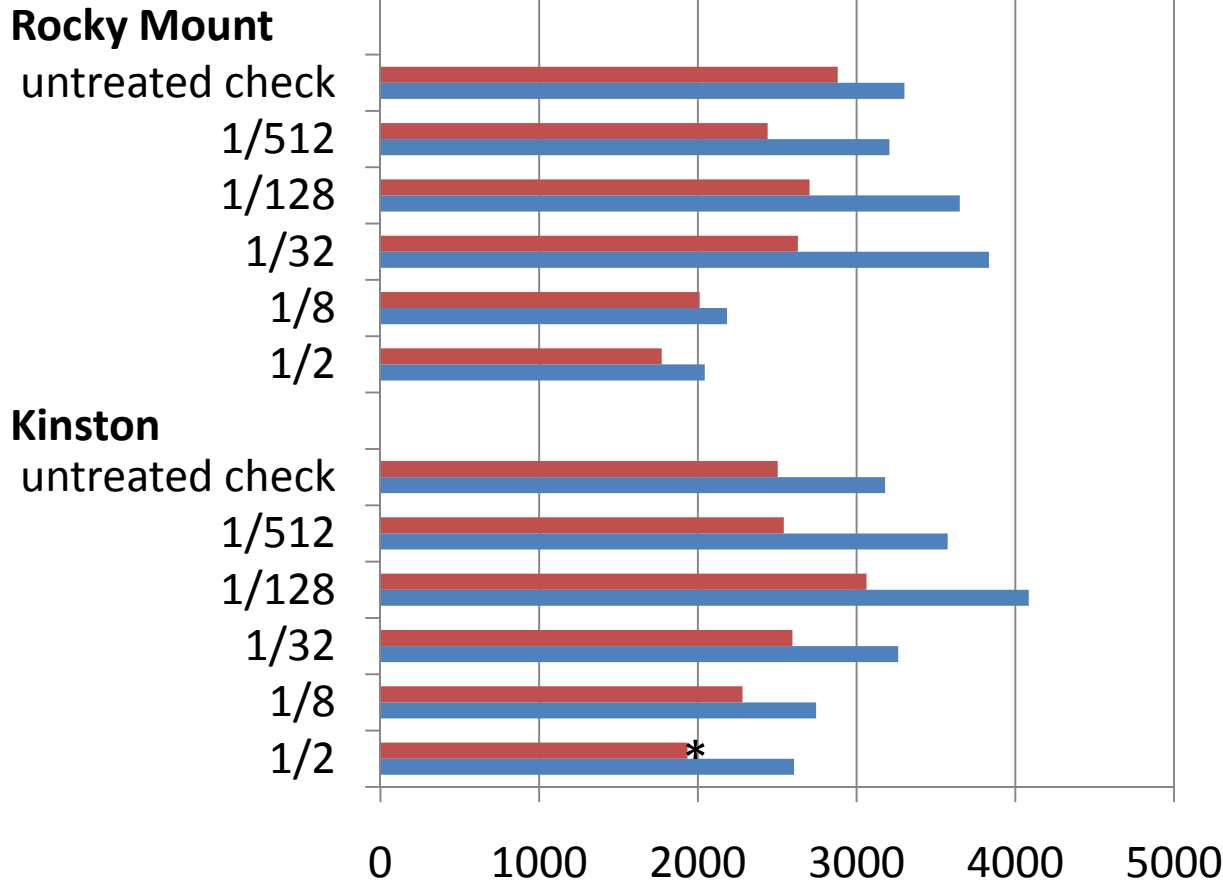
Kinston



LSD (Yield/A) = 574
 LSD (\$/A) = 857

* Indicates significant difference (0.05)

2,4-D



LSD (Yield/A) = 852
 LSD (\$/A) = 1182

■ Average Yield (lb)/A
 ■ Average \$/A

LSD (Yield/A) = 485
 LSD (\$/A) = 752

* Indicates significant difference (0.05)

Conclusion

- Across locations the 1/2 rate of dicamba resulted in a significant yield loss
- Rocky Mount
 - Dicamba
 - 1/2 rate resulted in a significant value per acre loss
 - 1/8 rate resulted in a significant yield loss
 - Glufosinate
 - 1/2 rate resulted in a significant yield loss
- Kinston
 - 2,4-D
 - 1/2 rate resulted in a significant yield loss

Future Research

- Repeat in 2010
 - In-season residue samples to correlate with injury and predict recovery
- This information will provide a basis to diagnose and predict lasting effects of drift from these three herbicides

Acknowledgements

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Questions?