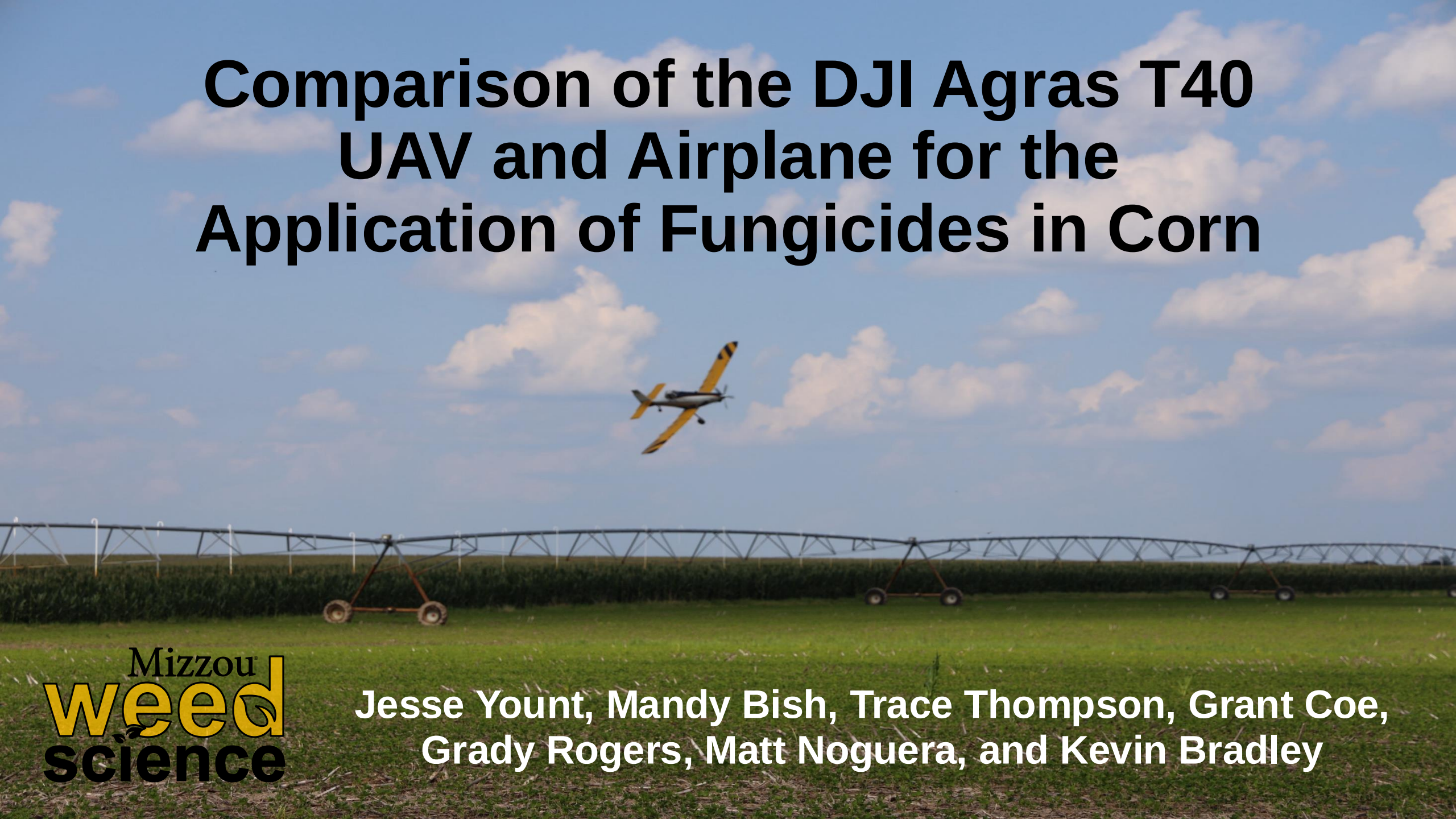
Comparison of the DJI Agras T40 UAV and Airplane for the Application of Fungicides in Corn



Mizzou weed science

Jesse Yount, Mandy Bish, Trace Thompson, Grant Coe, Grady Rogers, Matt Noguera, and Kevin Bradley

Introduction

- Fungicide applications must be timely and provide uniform coverage
- Unmanned aerial vehicles (UAVs) may have the potential to provide a more timely option for fungicide application
- Few studies have been conducted comparing airplane and UAVs for application of fungicides in a large field setting

Objectives

Evaluate disease severity, spray coverage, and yield following a fungicide application from a plane vs. DJI Agras T40 UAV (@ 2 and 4 GPA)

Materials and Methods

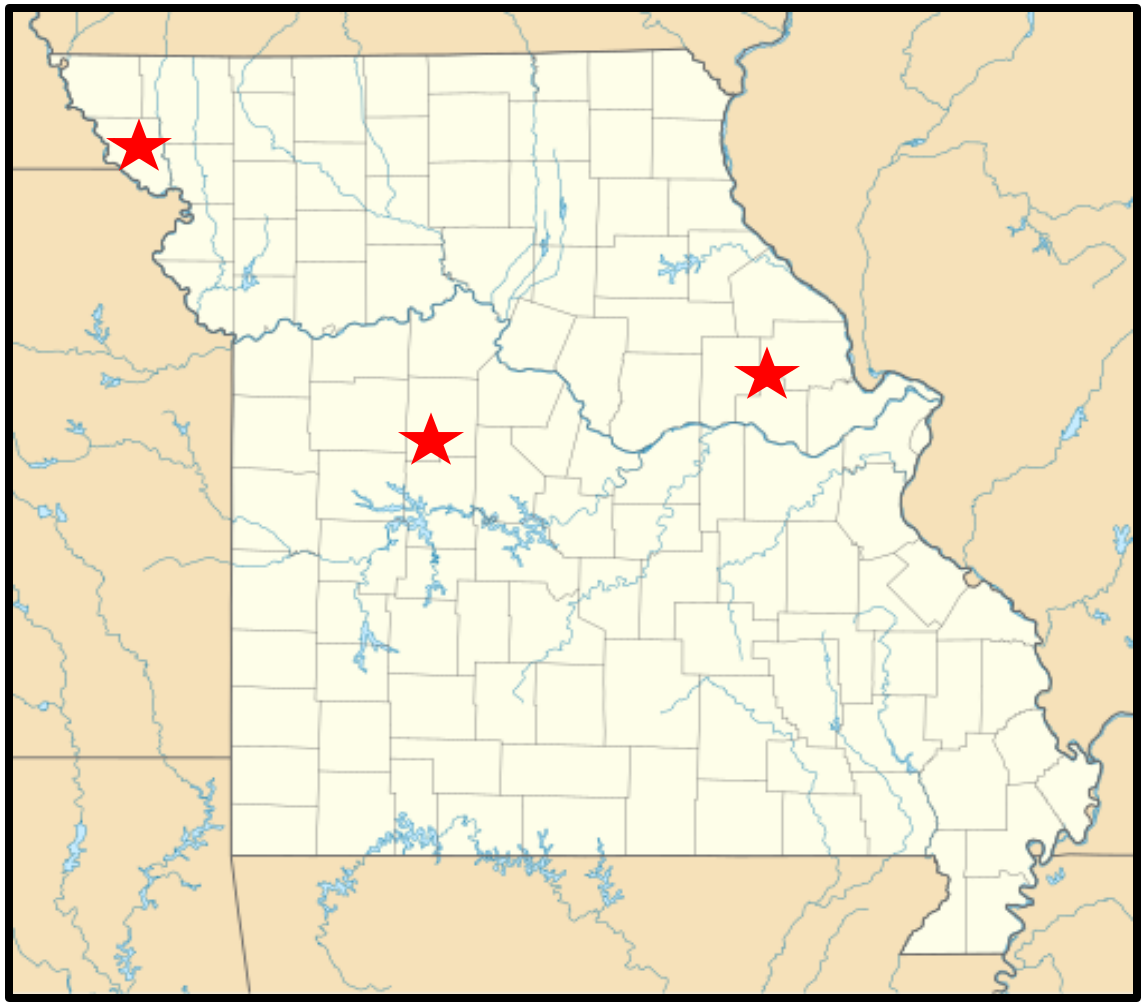
<u>Three locations:</u>

- **Green Ridge**
- **Mound City**
- **Truxton**

Individual plots:

- **60’ or 90’ wide**
- **1,320 – 2,640 ft long**

4 replications of each treatment at each location



Materials and Methods

- Cooperator selected products, rate, and timing
- The same fungicide treatment and additives were sprayed by the UAV (DJI Agras T40) and airplane at each location
- Treatments were sprayed by the UAV at 2 and 4 GPA
- Plane sprayed at 2 GPA; model varied by location

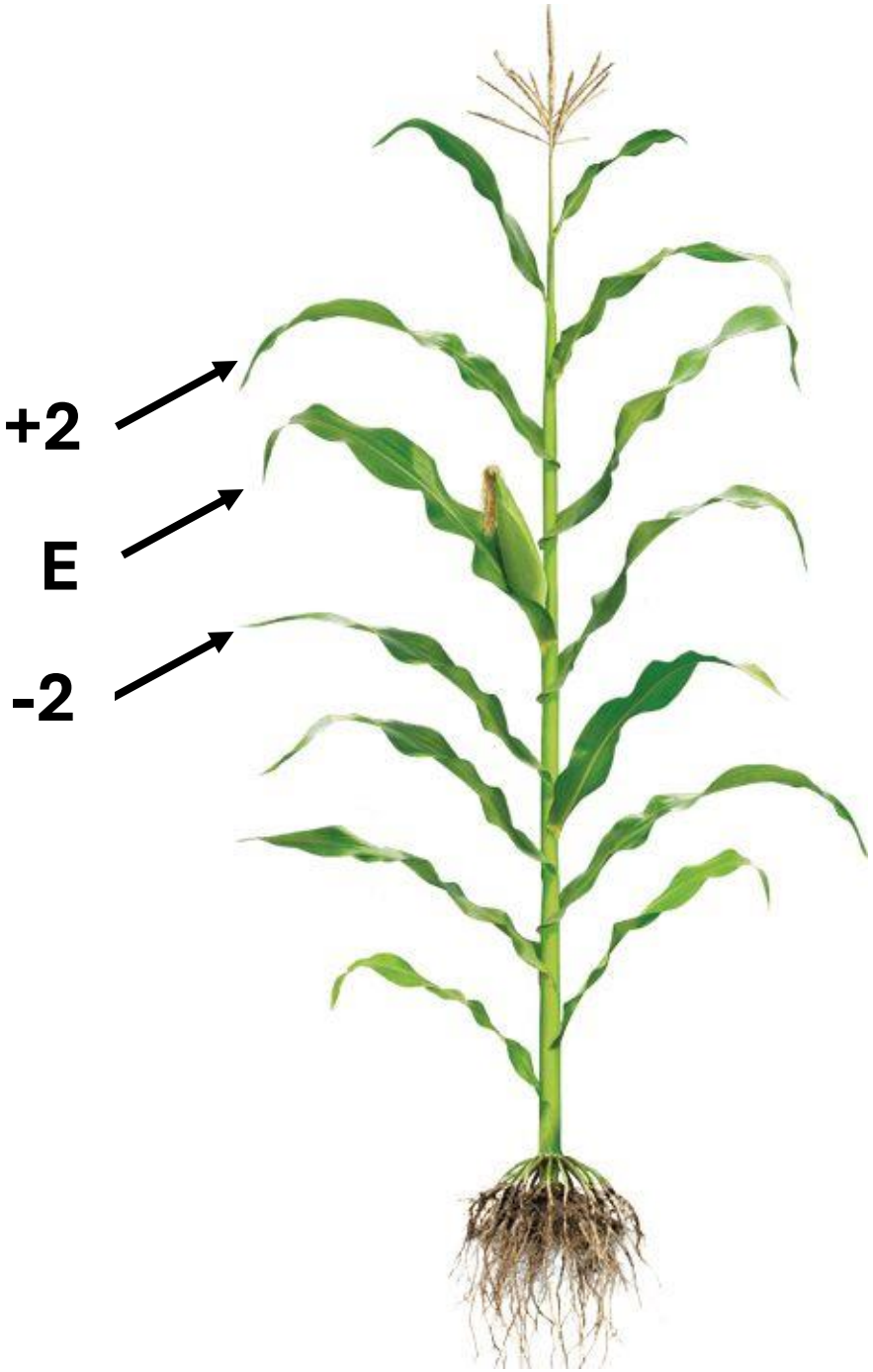
Green Ridge → 10.5 ozs Azoxyprop @ VT/R1

Mound City → 8 ozs Veltyma + DRA @ R3

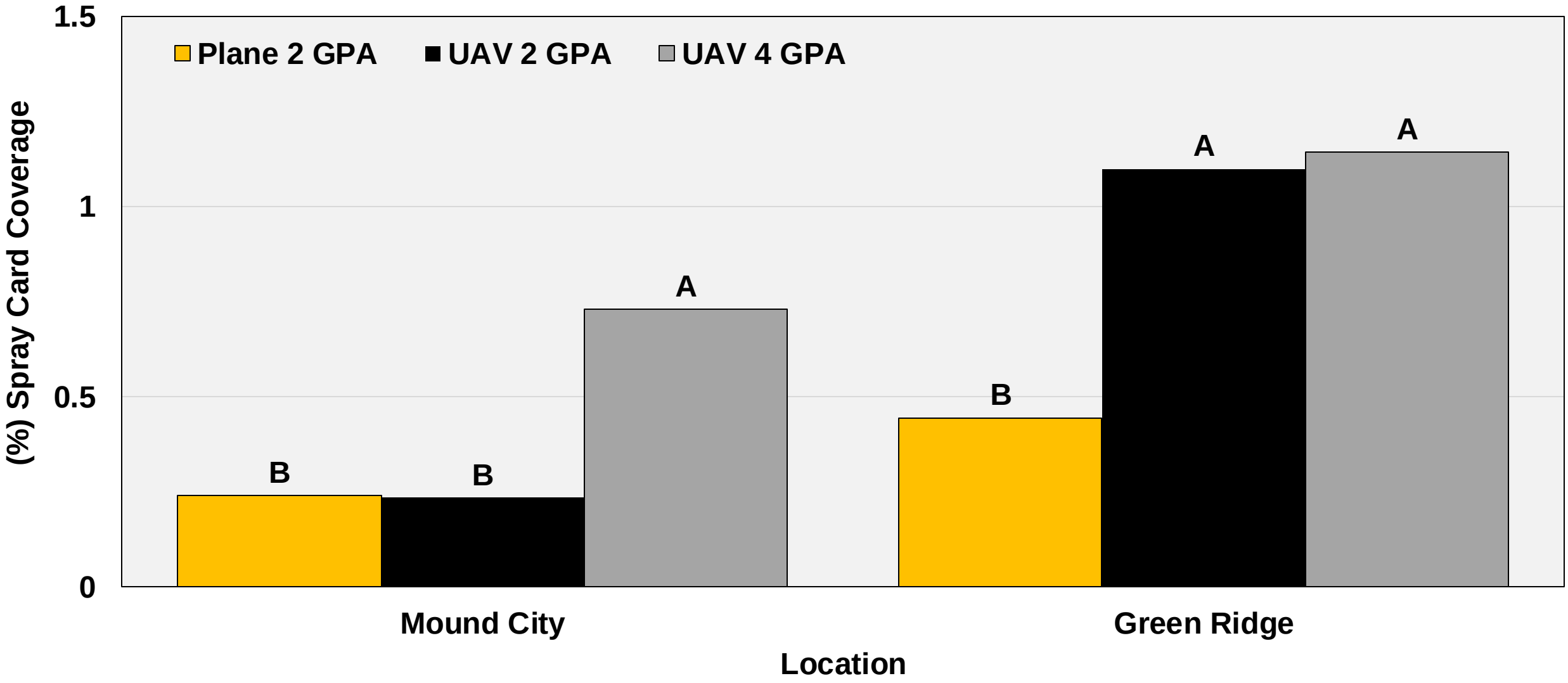
Truxton → 8 ozs Delaro + 1.5 ozs Grizzly + 3 ozs AccuDrop @ VT/R1

Materials and Methods

- Water sensitive cards placed on top and bottom of ear leaf (E), two leaves above the ear leaf (+2), and two leaves below the ear leaf (-2) at application
- Image J software used to determine percent coverage and droplet size
- Disease severity was evaluated at application, R3, and R6

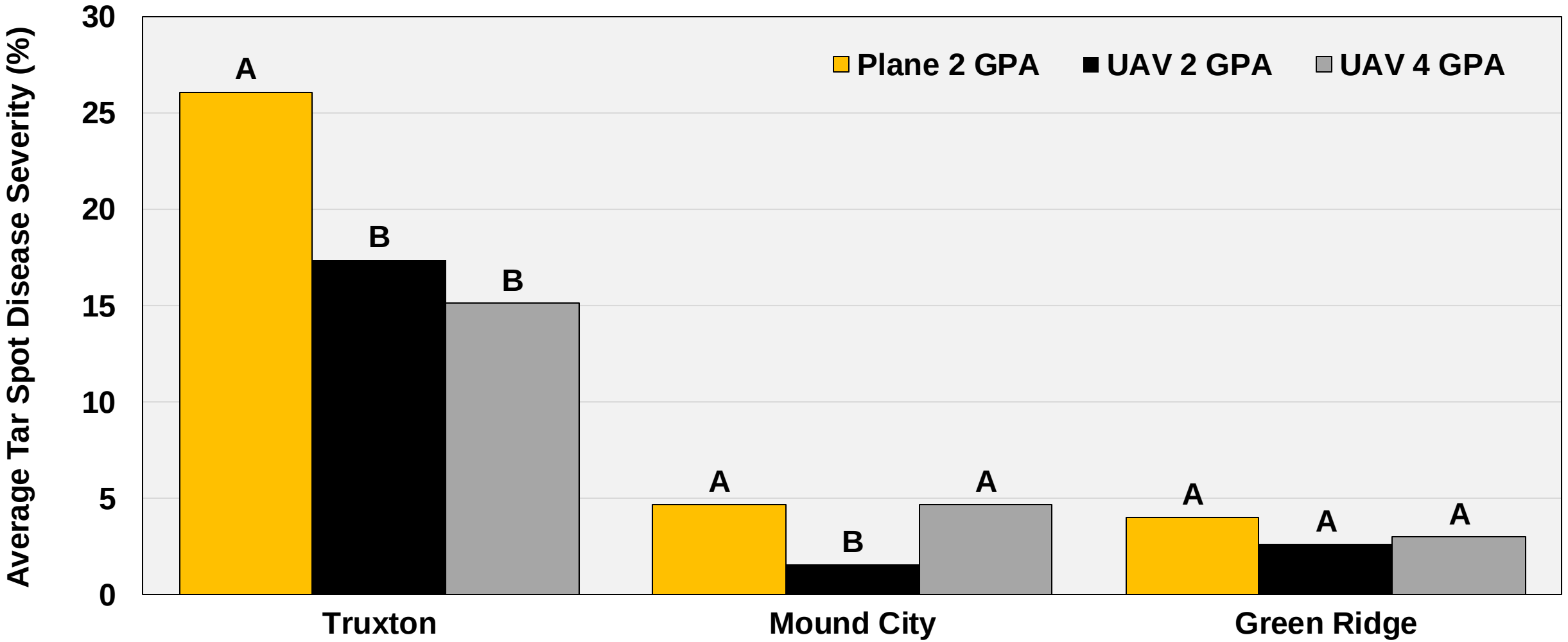


Fungicide Spray Coverage at the Ear Leaf +2 Position



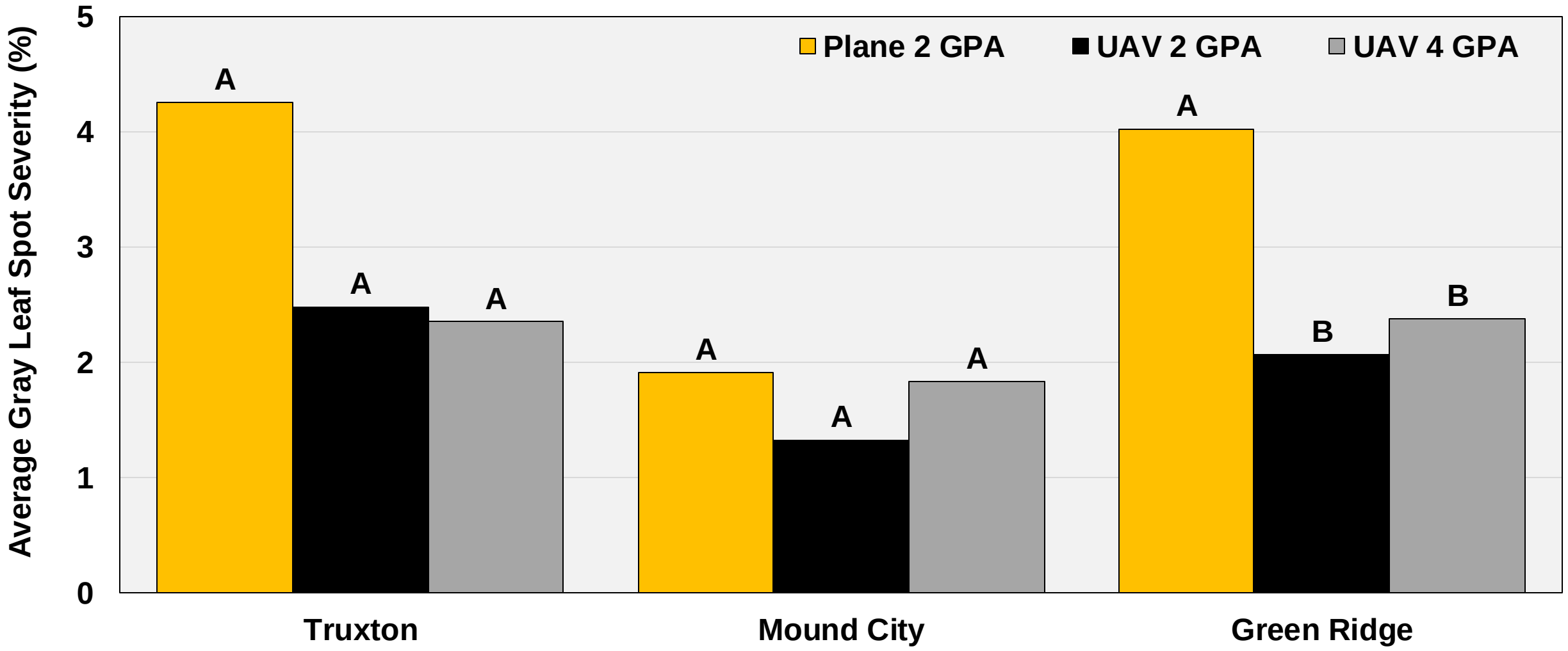
*Bars within a location followed by the same letters are not different, LSD=0.05.

Average Tar Spot Disease Severity at R6



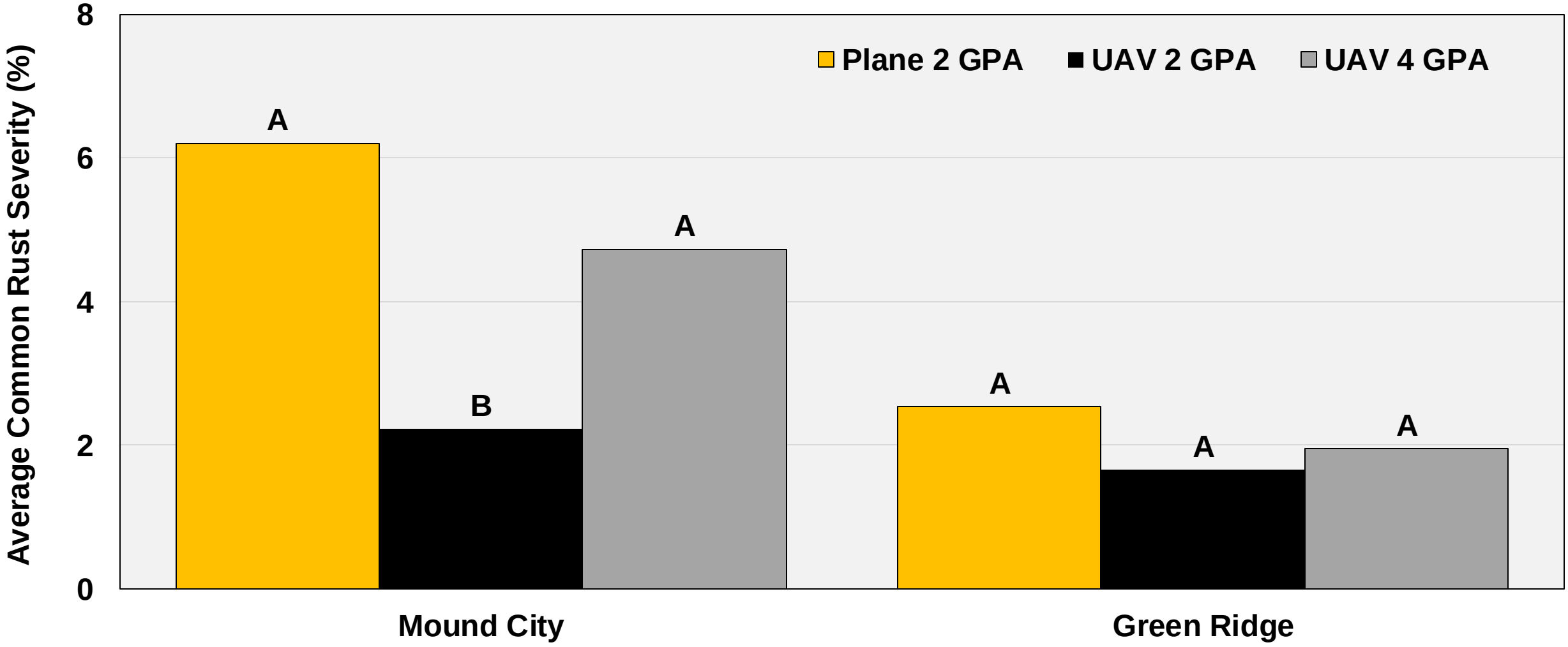
*Bars within a location followed by the same letters are not different, LSD=0.05.

Average Gray Leaf Spot Disease Severity at R6



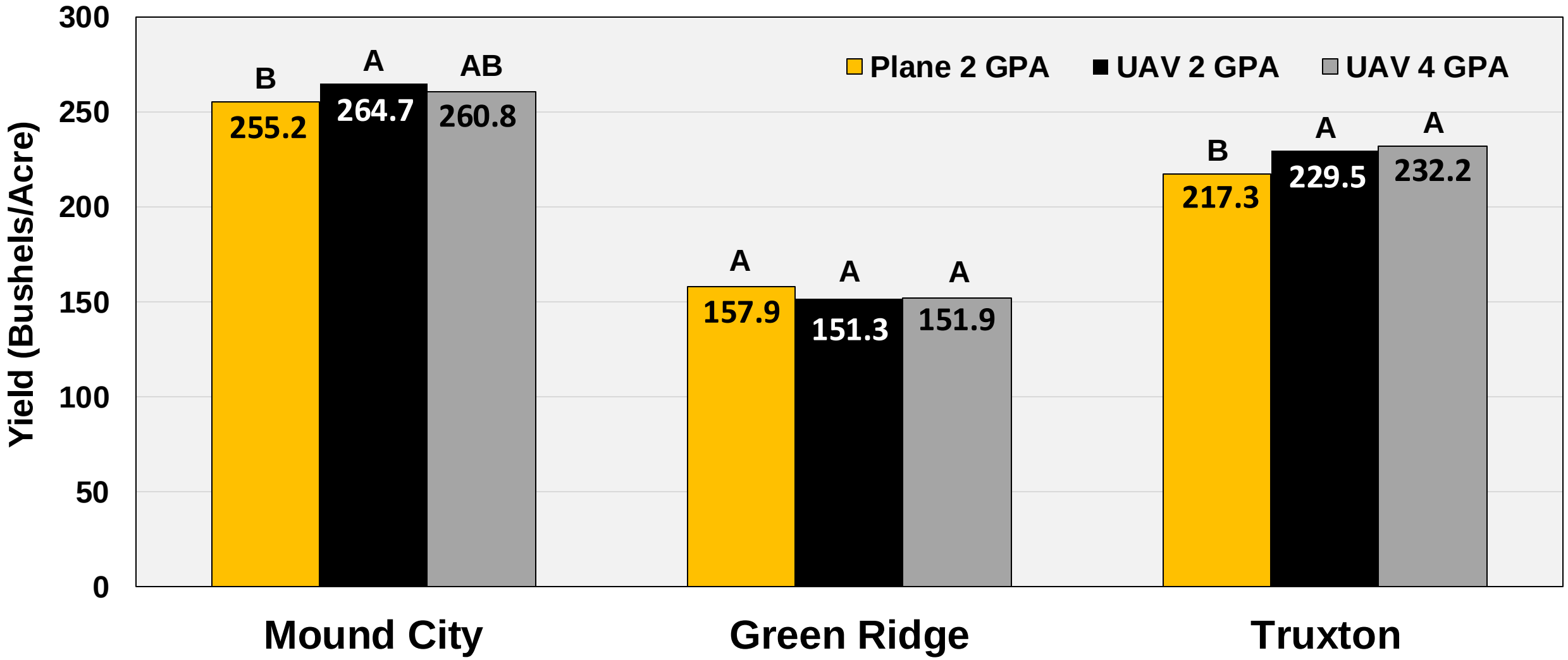
*Bars within a location followed by the same letters are not different, LSD=0.05.

Average Common Rust Disease Severity at R6



*Bars within a location followed by the same letters are not different, LSD=0.05.

Corn Yield Response to Treatments



*Bars within a location followed by the same letters are not different, LSD=0.1.

Conclusions

- Plane application resulted in less coverage than UAV 2 or 4 GPA applications at Green Ridge
- UAV 4 GPA application resulted in higher spray coverage than UAV 2 GPA or plane application at Mound City

Conclusions

- UAV applications resulted in similar or lower disease severity by R6 across all locations

- Fungicide application with UAV resulted in higher yields than with plane at Truxton and Mound City (2GPA) but not Green Ridge

Acknowledgements

- Rusty Lee
- Wayne Flanary
- Lyndon Brush
- Kurtz Aviation
- David Drewes
- Sam & Logan Dove

Missouri Soybeans

Agri Spray Drones

Brush Agronomy Consulting, Inc.

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