MANAGING SOUTHERN RUST IN THE OHIO RIVER VALLEY REGION

TRIAL OVERVIEW

Southern rust (*Puccinia polysora*) is a fungal disease that generally affects corn later in the season after silking. Southern rust may lead to reduced photosynthesis during grain fill, which can reduce levels of carbohydrates to stalks and roots due to the demand to fill ears. Corn products can vary in susceptibility to the disease. Fungicides can be applied to help prevent the spread of southern rust. Research that has been conducted in the South has focused on yield response to fungicides applied only at tassel (VT) growth stage. Southern rust severity will vary from year to year depending on environmental conditions. A study was established to help farmers maximize profitability in a systems approach to disease management using both genetics and fungicides..

RESEARCH OBJECTIVE

The objective of this study was to assess the impact of fungicide timings on disease severity, yield, profitability, and harvest intactness on corn products that vary in susceptibility to southern rust.

Location	Soil	Previous Crop	Tillage Type	Planting Date	Harvest Date	Average Yield/Acre	Planting Rate/Acre
Darmstadt, IN	Silt Loam	Soybean	Conventional	05/15/17	09/23/17	269.3	34,000
Owensboro, KY	Silty Clay	Soybean	No-till	04/12/17	09/08/17	223.7	32,000
Sacramento, KY	Silty Clay Loam	Soybean	No-till	05/16/17	10/24/17	208.6	31,500

SITE NOTES:

- Three testing locations in Indiana (1) and Kentucky (2).
- Three different corn products were planted based on their disease ratings for Southern rust: Susceptible, Moderate, and Tolerant (Table 1).
- The following treatments were applied:
    a. No Fungicide Application.
    b. Fungicide applied at VT growth stage.
    c. Fungicide applied at R2 (blister) growth stage.
    d. Fungicide applied at VT and R2 growth stages.
- Delaro™ 325 SC Fungicide was applied at 8 fl oz/acre (active ingredients: prothioconazole and trifloxystrobin)
- The Darmstadt and Owensboro locations had two replications and the Sacramento location was planted with three replications. Each location was planted in strips and harvested with a yield monitor.
- Data was averaged across locations.

Table 1. Product ratings for Southern rust and gray leaf spot (GLS).*

Corn Product Disease Tolerance	Southern Rust Rating	Gray Leaf Spot Rating
Susceptible	7	5
Moderate	5	5
Tolerant	2	4

**Rating scale: 1=excellent; 9=poor.*

UNDERSTANDING THE RESULTS

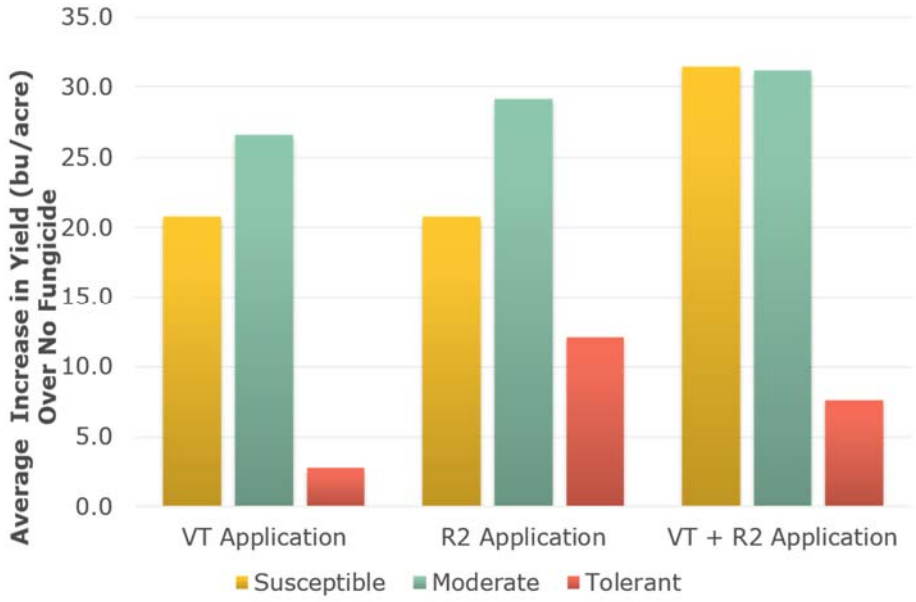

Figure 1. Average increase in corn yield with fungicide application at different timings as compared to no fungicide application in 2017.

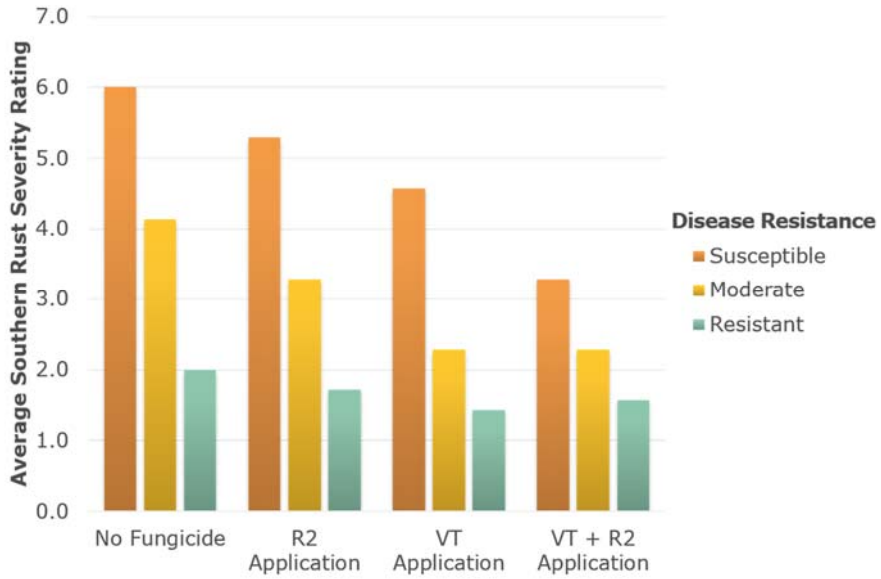

Figure 2. Average southern rust severity rating taken at the R4 growth stage.

Table 2. Return on investment (ROI) for each fungicide application timing and corn product tolerance.*

Corn Product Tolerance	ROI (VT application)	ROI (R2 application)	ROI (VT+R2 application)
Susceptible	$37.80 / acre	$37.80 / acre	$40.25 / acre
Moderate	$58.10 / acre	$67.20 / acre	$39.20 / acre
Tolerant	($21.70 / acre)	$7.35 / acre	($43.40 / acre)

*ROI calculated based on a corn price of $3.50/bu and fungicide application cost of $35/acre.

- In this study, the most profitable applications were one fungicide application on a corn product with moderate disease tolerance (Table 2). In this situation, both the combination of the fungicide and some genetic tolerance are working together versus only relying on a fungicide.
- In 2017, fungicide applications at the VT growth stage were the best timing for southern rust protection versus a single later application at R2 growth stage (Figure 2), but later applications tended to be more profitable (Table 2).

WHAT DOES THIS MEAN FOR YOUR FARM?

- It is important to be aware of the genetic tolerance for disease in the corn products chosen for your farm. A susceptible corn product under high disease pressure may require multiple fungicide applications to maximize yield potential.