

*Corn and Grain Sorghum Promotion Board
2013 Report
January 7, 2014*

Title: Management of southern rust with emphasis on threshold-based crop protection.

Principle Investigator: Travis Faske and Terry Kirkpatrick

Status: First of three years (2013 to 2015)

Goal: Develop practical guidelines for a threshold-based fungicide program for southern rust of corn. Identify a simple bioassay to evaluate host-pathogen interactions and determine the importance of a perennial host in overwinter survival of the rust pathogen.

Objectives:

1. Evaluate rust severity thresholds for timing of a fungicide to manage southern rust and assess the potential impact on production.
2. Evaluate the effectiveness of a seedling bioassay to determine host-pathogen interactions and fungicide insensitivity.
3. Determine the importance of eastern gamagrass in the overwinter survival of *Puccinia polysora*.

Objective 1: Southern rust were observed a low level of disease severity (<1%) late in the season (late dent) in corn plots near Altheimer. Fungicides applied at R1 had no effect on rust development, but provided an opportunity to evaluate the “plant health” effects of fungicides. Ten fungicides were applied at R1 (7/19/13) and harvested in mid-September (9/12/13). No other foliar disease was observed other than common rust, which was also a low level of disease severity. Numerically, the average yield across all fungicide treated plots produced 10 bu/ac higher yield than non-treated control (Fig. 1). Alternately, in a similar trial with no foliar disease the average yield for all fungicide treated plots was 1 bu/ac less than the non-treated control. These data support the inconsistency of the “plant health” benefit in the absence of disease. For 2014, trials will be established later to ensure rust development to test our hypothesis on the threshold-based crop protection.

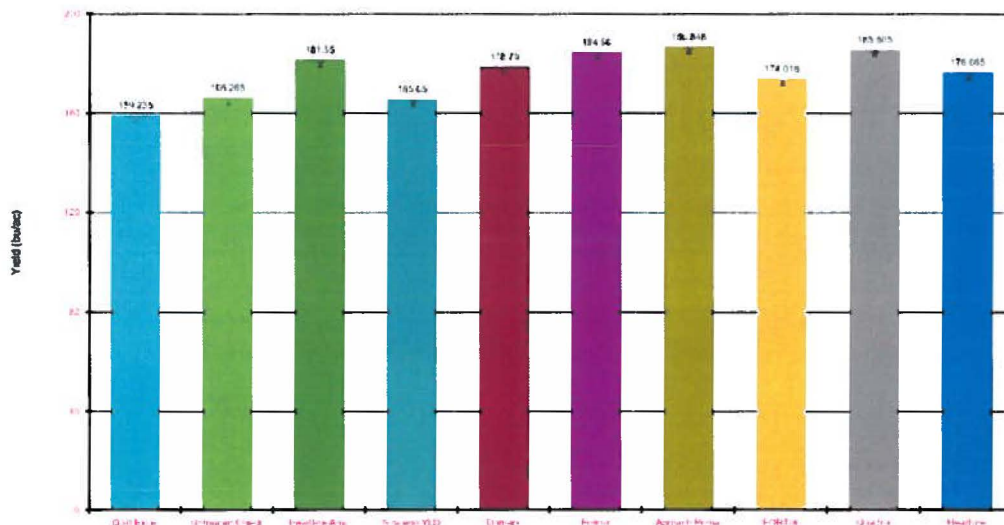


Figure 1. Average yield of corn hybrid Armor 1262 treated with fungicides at R1 growth stage in the absence of disease.

Objective 2: Corn seedlings were successfully inoculated and produced rust pustules on corn leaves (Fig. 2). Corn seedling at 5 to 6 true-leaf stage were inoculated with 100 μ l spore suspension, spores from 5 pustules mixed in 300 μ l water, into the whorl of a seedling and incubated at 100% RH for 3 days. Rust developed 14 d after inoculation on 60% of inoculated plants with several pustules per leaf (Fig. 2). This technique will be modified in the spring with spores preserved on corn leaves infected with rust stored in the lab.



Figure 2. Several southern rust pustules on corn seedling.

Objective 3: No natural infection of gamagrass was detected in the field in 2013. Currently, trials are underway to use technique described in objective 2 to infect mature plants of eastern gamagrass.