Utilization of various screening methods to identify disease reactions of corn hybrids grown in the Texas High Plains

An updated report will be submitted once data are analyzed and fumonisin levels are estimated

Submitted to

Texas Corn Producers Board

December 15, 2017

Jason E. Woodward, Plant Pathologist
Texas Tech University

Project Duration: Year 1 of 3
Start: January 1, 2017
Finish: December 31, 2017

Preliminary Final Report
Utilization of various screening methods to identify disease reactions of corn hybrids grown in the Texas High Plains

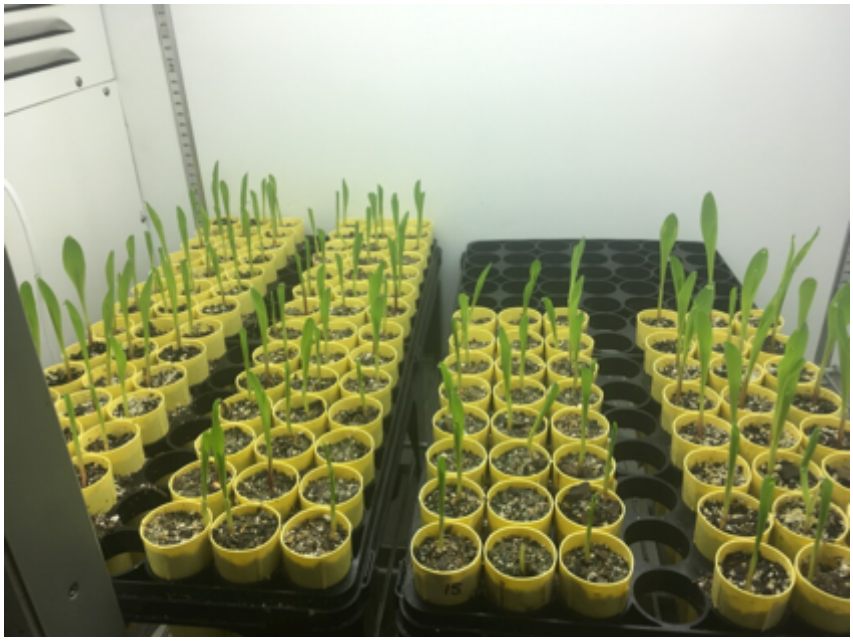
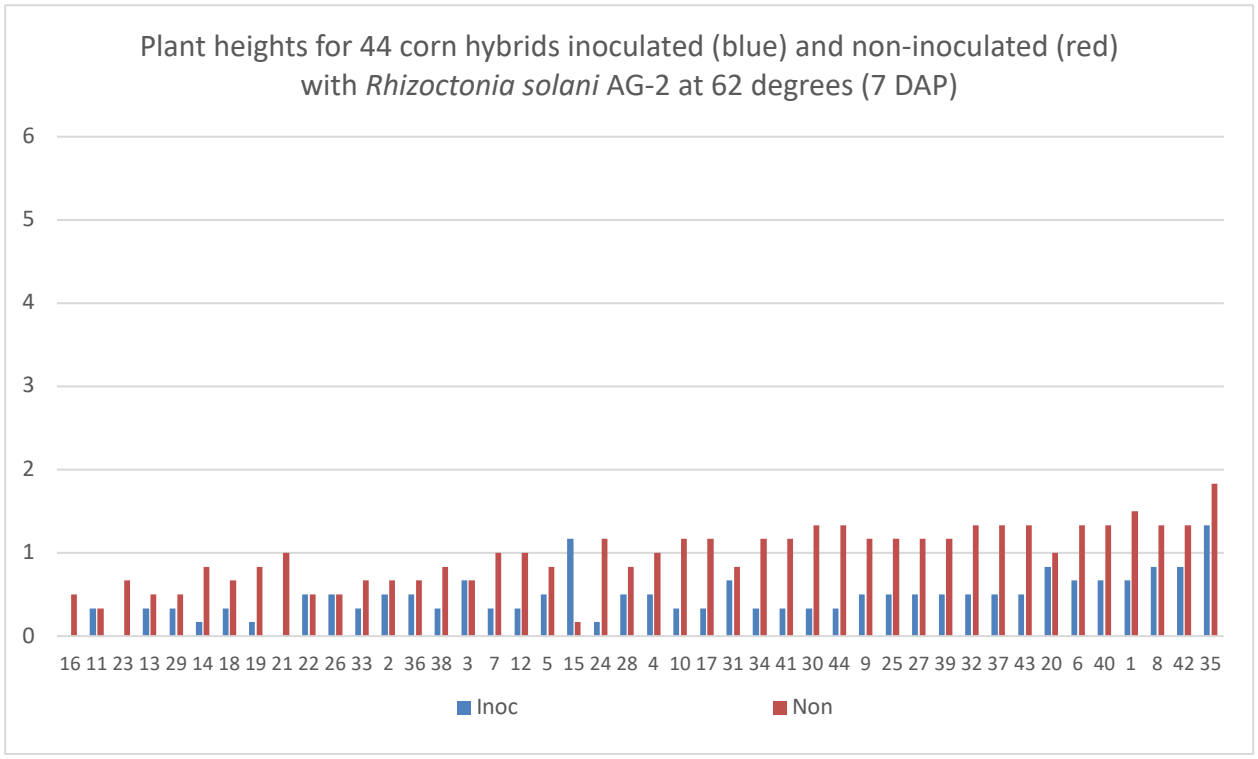


Figure 1. Differential expression of symptoms from corn hybrids inoculated with *Rhizoctonia solani* AG-2.



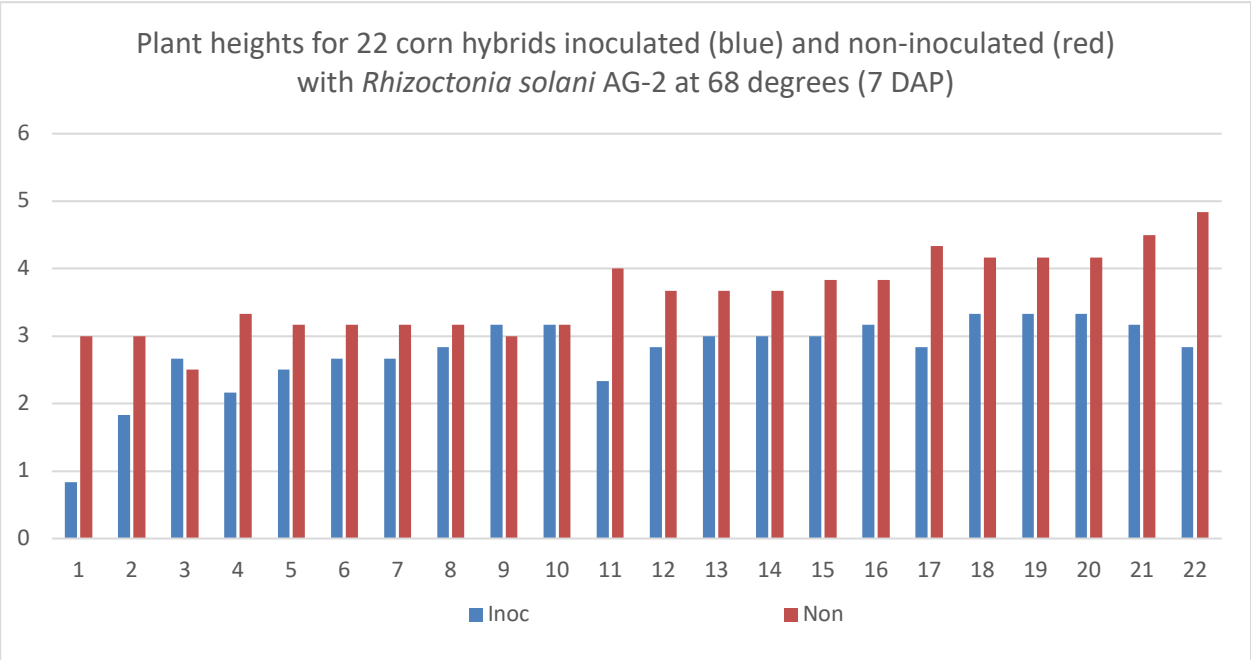
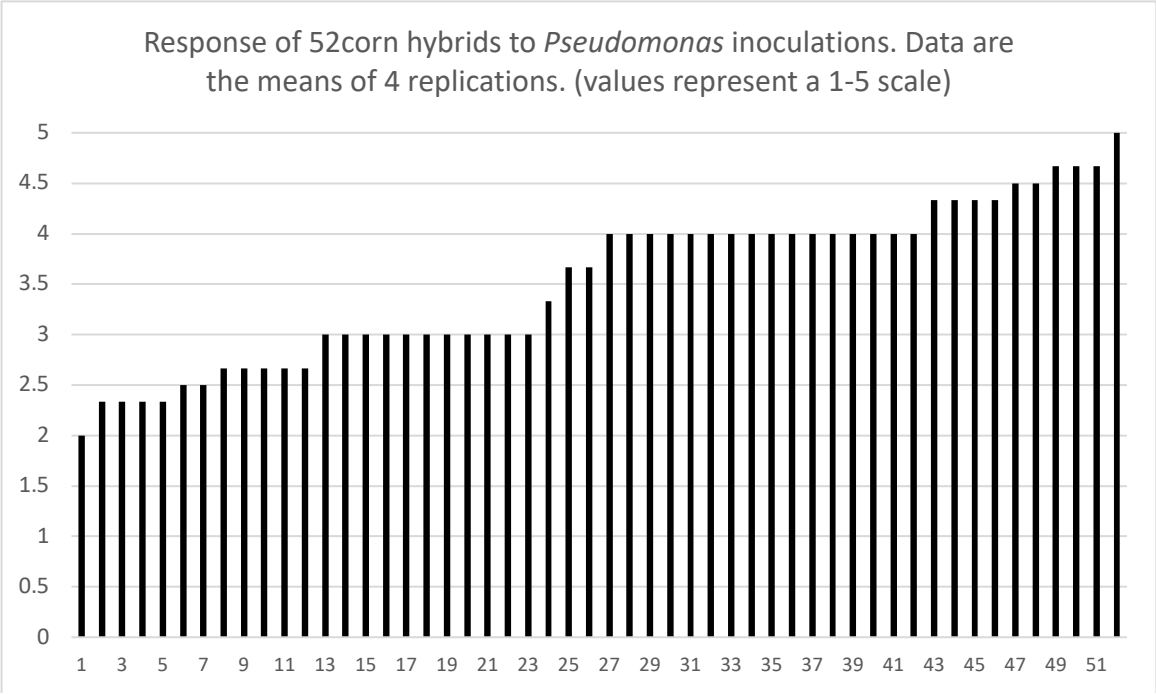

Plant heights for 22 corn hybrids inoculated (blue) and non-inoculated (red) with *Rhizoctonia solani* AG-2 at 68 degrees (7 DAP)
6
5
4
3
2
1
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
Inoc
Non

Figure 2. Atypical symptoms of Holcus spot following inoculation wilt *Pseudomonas syringae* pv. *syringae.*



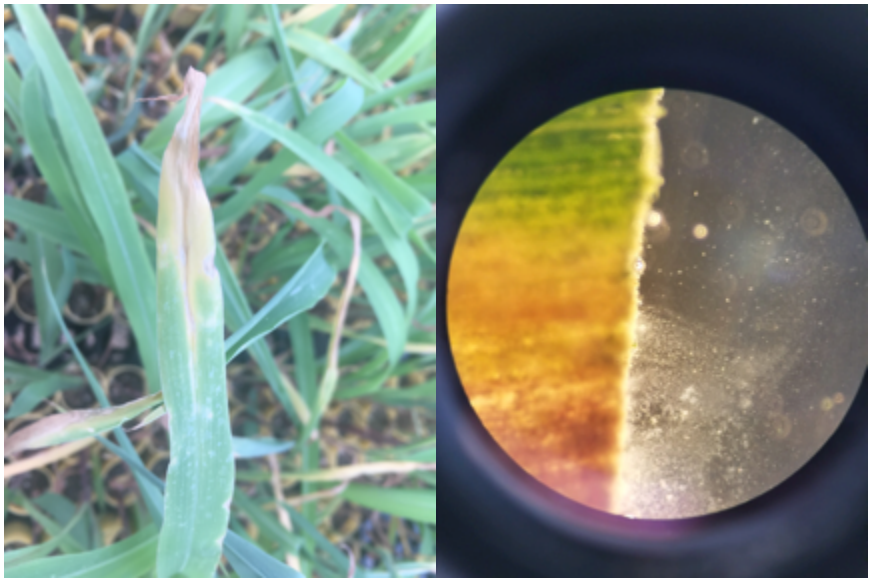


Figure 3. Symptoms of Goss's wilt following inoculation wilt *Clavibacter michiganensis* subsp. *nebraskensis* (left) and characteristic bacterial streaming from a lesion collected from a plant exhibiting symptoms of Goss's wilt (right).

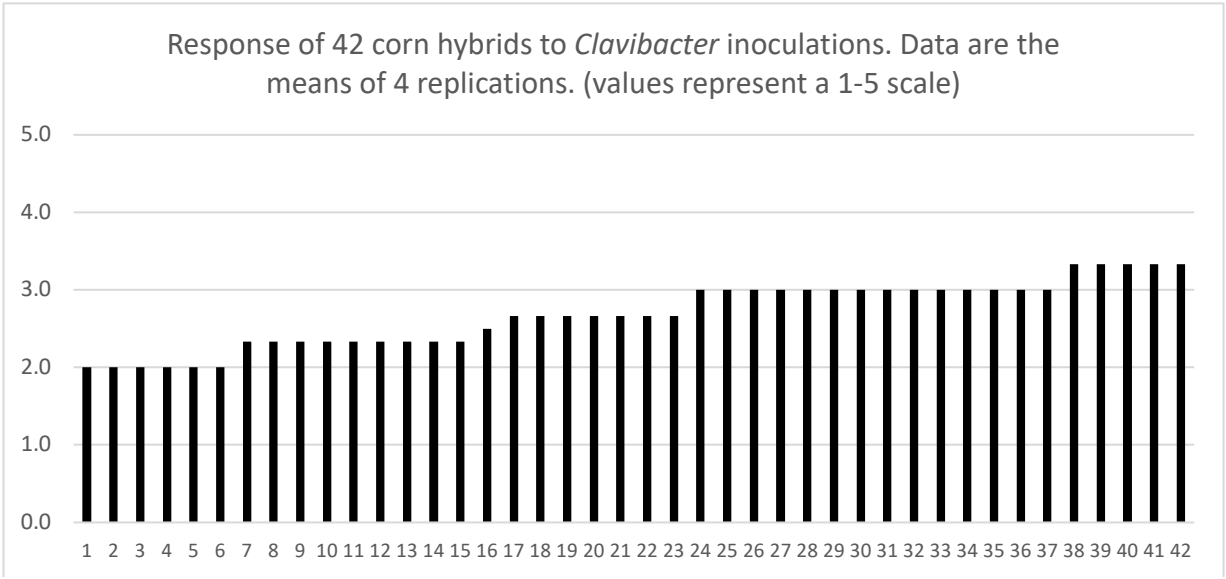
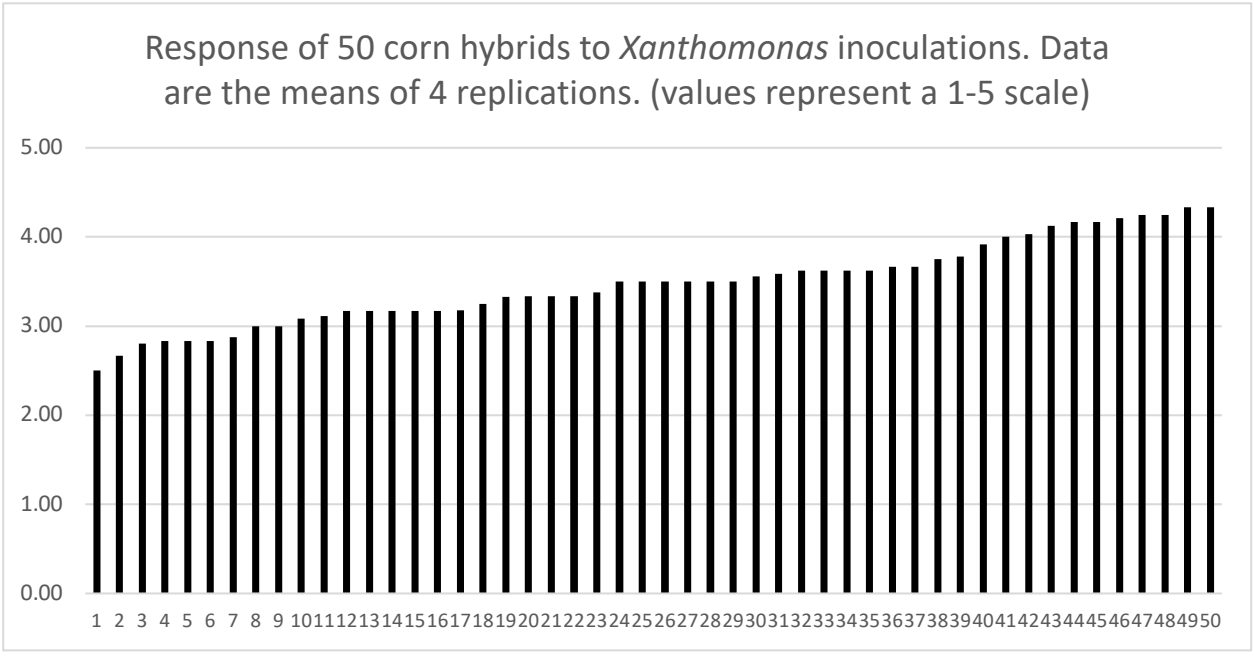
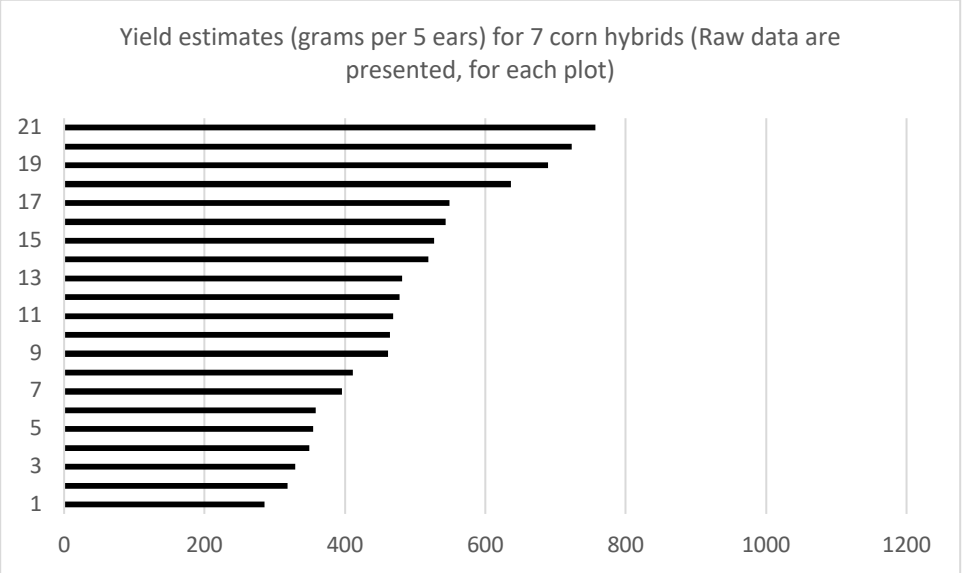
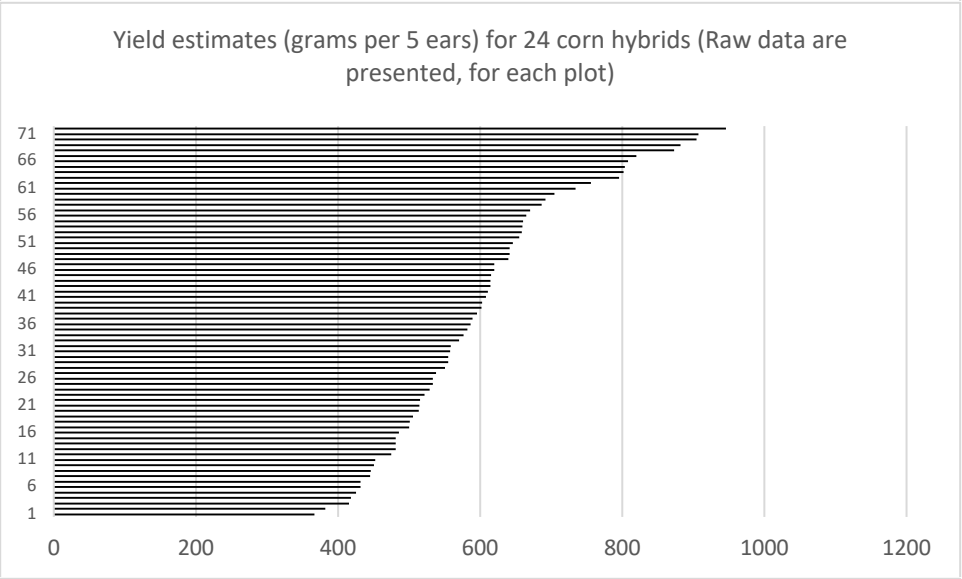


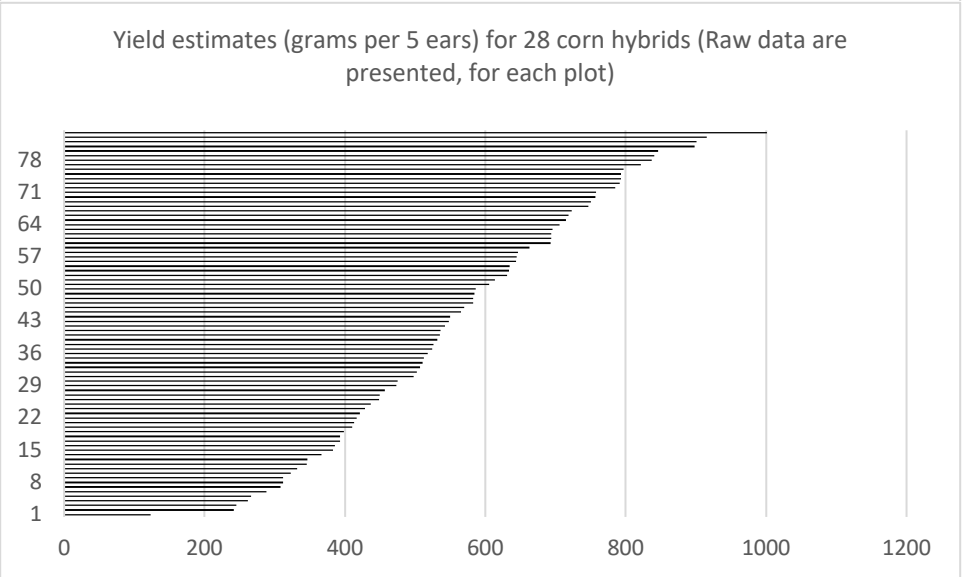
Figure 4. Symptoms of Bacterial leaf streak following inoculation wilt *Xanthomonas vasicola* pv. *vasculorum* (right).

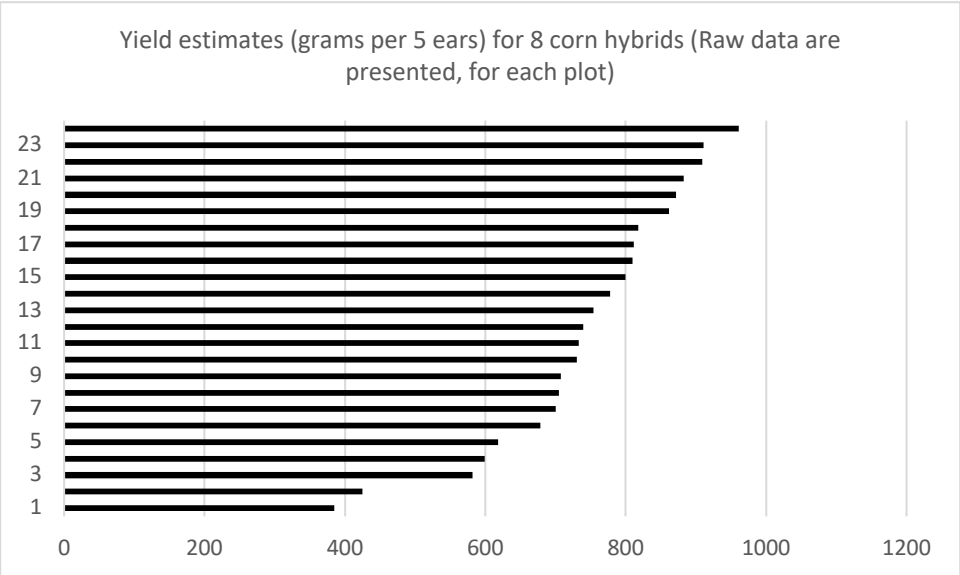


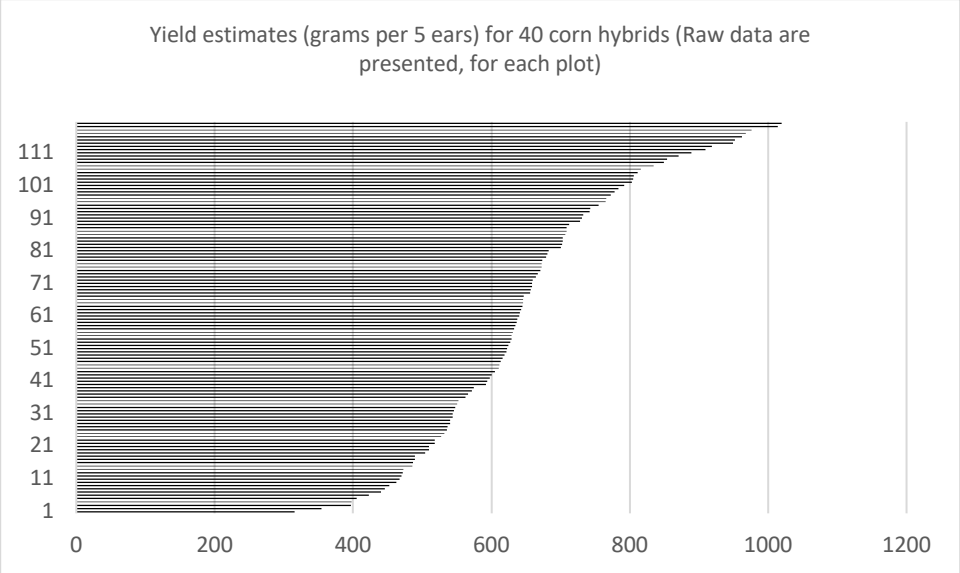
Yield results from field screening trials











Fumonisin samples from these tests are still being conducted

Abstract submitted for the annual meeting of the American Phytopathological Society

Fumonisin levels in corn from the Texas High Plains as influenced by harvest date and kernel damage. M.L. Cartwright (1), J.E. Woodward (1,2), and W. Xu (2,3).

(1) Texas A&M AgriLife Extension, Lubbock, TX 79403; (2) Dept. Plant Soil and Soil Science, Texas Tech University, Lubbock, TX 79409; (3) Texas A&M AgriLife Research, Lubbock, TX 79403.

Fumonisins are mycotoxins produced by *Fusarium verticilliodes* and other *Fusarium* spp. In 2017, abnormally high levels of fumonisin were reported in corn (*Zea maydis*) in the Texas High Plains. This issue followed periods of above average humidity and below average temperatures that persisted throughout the season. Stalks (n=100) were randomly flagged in a field planted to the hybrid 'DKC62-08RIB'. Ears were collected on 25-Sept and from adjacent plants on 2-Oct and 13-Oct. Sampling dates were prior to, during and after a period of cool, wet weather. Signs of Fusarium ear rot were <5%. After shelling, kernels from five ears were combined, ground, passed through a 20-mesh sieve and assayed with QuickScan Fumonisin Test Kits (Envirologix, Portland, ME). Fumonisin levels varied by date ranging from 1.6 to 31.0 (avg. 9.3 $\pm$ 9.0), 0.0 to 7.2 (avg. 4.5 $\pm$ 2.4) and 0.0 to 14.0 (avg. 5.8 $\pm$ 4.8) ppm for the three sampling dates, respectively. Kernels from bulk samples collected on 13-Oct were scored for damage, placed into one of four categories, ground and sieved. Fumonisin levels were determined for three 20 g sub-samples from each category. Concentrations were lowest for healthy kernels and increased as damage became more severe (R^2=0.825; P<0.05). These results support previous results regarding the positive relationship between kernel damage and fumonisins; however, additional information on the impact of weather conditions prior to harvest on accumulation of the toxin is needed.