2009 Demonstration Report

THE LEARNING CENTER

at Scott, Mississippi

Effects of Multiple Stresses on Corn Yields

Farming is full of stress, both for the producer and the crops in the field. To investigate how MidSouthern corn yields can be affected by various stresses and combinations of stresses a study was conducted at the Monsanto Learning Center in Scott, MS during 2009.

Study Guidelines

The objective of this study was to evaluate the effect late fertility, late irrigation, late herbicide application, and/or low plant population stress has on corn yield in the MidSouth. For the trial, a 119 RM corn product was selected and planted on April 8, 2009. In each plot a single stress or a combination of multiple stresses were introduced. (Table 1). A check plot with no stress was also established for comparison. Table 1 explains how the stresses were applied to the corn plots in the trial and Table 2 presents the different combinations of stresses applied to each plot.

Crop Stress	Application Method
Late Fertilizer Application	Nitrogen fertilizer applied one week late
Late Irrigation	Irrigation initiated one week late
Late Herbicide Application	Steadfast® applied at V8 stage (V6 is labeled application timing)
Low Plant Population	Planted at 28,000 seeds/A (Remaining plots were planted at 36,000 seeds/A)

Table 1. Method used to apply stress(es) to the corn plot.

	Yield @15% (bu/A)	Single or Multiple Stress Combination
1	171	Low Population
2	164	Late Fertilizer Application
3	192	Late Herbicide Application
4	170	Low Population + Late Fertilizer Application
5	169	Low Population + Late Fertilizer Application + Late Herbicide Application
6	188	Low Population + Late Herbicide Application
7	193	Late Fertilizer Application + Late Herbicide Application
8	210	No Stress (Check Plot)
9	155	Late Irrigation
10	150	Low Population + Late Irrigation
11	148	Low Population + Late Irrigation + Late Fertilizer Application
12	139	Low Population + Late Fertilizer Application + Late Herbicide Application + Late Irrigation
13	178	Late Irrigation + Late Fertilizer Application
14	177	Late Irrigation + Late Fertilizer Application + Late Herbicide Application
15	169	Late Irrigation + Late Herbicide Application

Table 2. Field map of stresses applied to each plot.

to pg. 2

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from previous page

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Results

The check plot with no stress out-yielded all other plots in the trial which received either a single or multiple stresses. Averaging across all stress factors, a single stress reduced yield by an average of 39 bu/A when compared to the no-stress check plot. The plot receiving all four stresses, low population, late irrigation, late fertilizer and late herbicide applications produced the lowest yield with a 71 bu/A reduction when compared to the no stress check plot (Chart 1).

When comparing the stress factors against each other, late irrigation resulted in the highest yield loss with a 51 bu/A reduction compared to the no stress check plot. A late herbicide application resulted in the smallest loss with a still considerable loss of 35 bu/A when compared to the no-stress check (Chart 2).

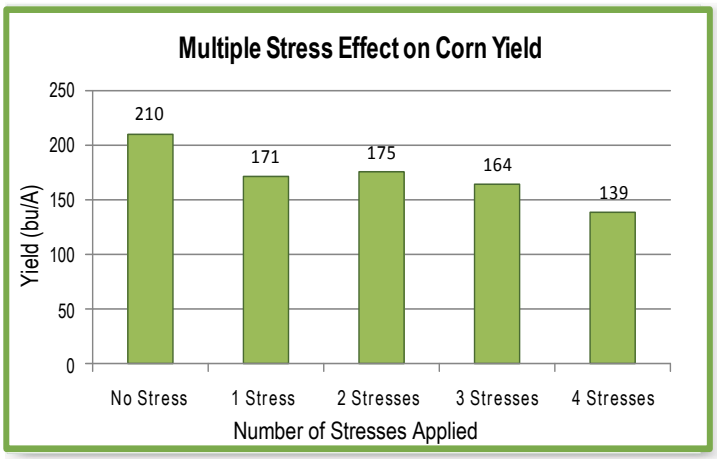

Chart 1. Average corn yield based on the number of stresses introduced per plot.

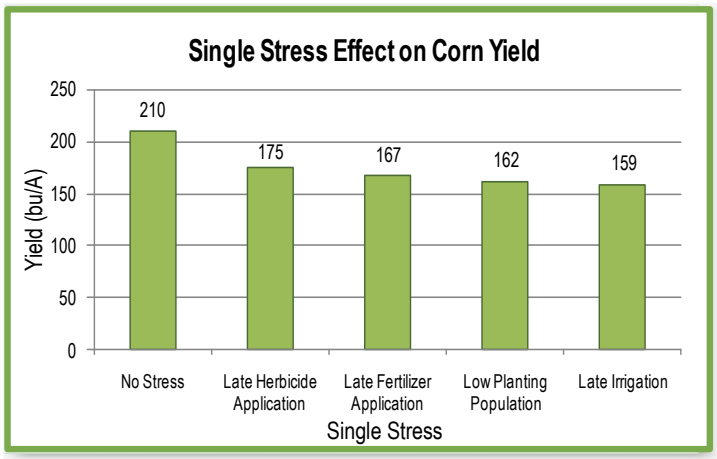

Chart 2. Corn yield results from the introduction of a single stress.

Conclusion

This study looking at the effects of stress on corn yield reinforces the fact that corn is susceptible to various types of stress with an end result of reduced yield potential. Due to the location and environmental condition of this trial, late irrigation impacted the final harvest yield the most; however, stress related to low plant population, late fertilizer and herbicide application also resulted in a large reduction in yield. The introduction of just one stress will reduce yield, and each additional stress will typically compound yield reduction even further. The key to a successful corn crop in the MidSouth is to eliminate as much stress as possible to attain a uniform productive corn crop.

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