

Searching for a Fungicide Strategy on Corn

(Middlesex SCIA 2008 Major Grant)

Purpose:

The purpose of this project was to evaluate the impact of a foliar fungicide on foliar disease severity and grain yield in corn. In addition, the project hoped to clarify hybrid differences that might contribute to differential responses to the applied fungicide.

Methods:

Trial Design

Plots were planted in the spring of 2008 such that there were alternating strips of two different corn hybrids. In August, a high-clearance applicator with a 90' boom applied fungicide in a single pass down the field. Four strip plots that received fungicide, plus two untreated strip plots on either side, result in a total of eight plots allowing for two replicates of hybrid A with and without fungicide and hybrid B with and without fungicide. Disease evaluations, yield measurements and lodging counts could then be conducted using this two-replicate plot design.

Disease Evaluation Procedure

Plots were evaluated for plant disease pressure on September 15 - 19, 2008. The evaluation procedure employed consisted of performing five disease ratings at five sample points in each plot. The sample points were obtained by walking 30 paces into a plot, evaluating five random adjacent plants in a single row and then continuing on 30 paces to the next sample point. Each individual rating was a measure of disease severity for five adjacent plants by approximating the average percent of total plant surface area infected. Observations were also recorded on the types of disease present as well as the incidence levels per plot (percent of plants affected).

Results:

On average, across 10 sites and 30 comparisons, where various hybrids were tested with and without the application of a foliar fungicide applied at or near tassel emergence, the yield increase due to the fungicide was 3 bu/ac (see Figure 1).

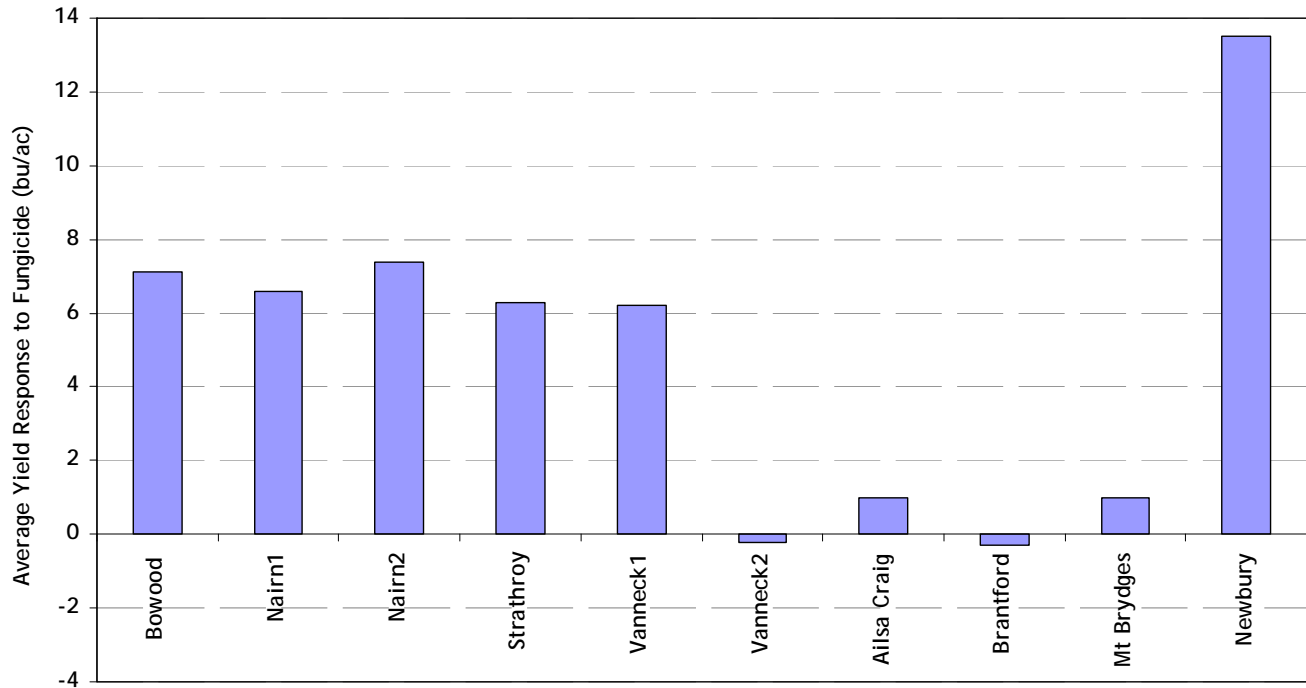
On a subset of six trials, an attempt was made to employ common "check" hybrids. These were predominantly Dekalb hybrids DKC 50-18 and DKC 50-20 which were contrasted against a range of other hybrids. These six trials were more closely monitored for leaf diseases. Disease ratings were obtained from these sites in order to be able to compare the change in disease level to the yield response. It was observed that the check hybrids had a decrease in disease severity of two percentage points and a yield response of 9 bu/ac, while the contrast hybrids had a similar decrease in disease severity of two percentage points and a yield response of only 2 bu/ac (see Table 1).

Summary:

It initially appears as though the change (i.e. improvement) in disease ratings did not correlate well with yield response. Hybrids do tend to respond differently to fungicide

applications, but it is not clear what the factors are. Ultimately, hybrid selection seems to impact the amount of yield response to fungicides but we are not sure how to predict it!

Figure 1: Average yield response to a foliar fungicide application for 10 sites in Middlesex County, 2008



Next Steps:

Hybrids do tend to respond differently to fungicide applications, but it is not clear what the factors are. The hybrid factors that require further investigation include: i) high-yielding vs low-yielding, ii) race horse vs work horse, iii) leaf disease tolerance ratings and, iv) actual pre-spray disease infection levels.

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Table 1: Disease severity ratings and yield responses to a foliar fungicide application of check hybrids vs contrast hybrids for six sites in Middlesex County, 2008

Location	Check Hybrids (Dekalb 50-18 and 50-20)						Other Hybrids					
	Disease Severity (% infection)			Yield (bu/ac)			Disease Severity (% infection)			Yield (bu/ac)		
	None	Fungicide	Change	None	Headline	Change	None	Headline	Change	None	Headline	Change
Nairn1	23	20	-4	191	206	15	17	14	-3	202	208	6
Vanneck1	14	11	-3	155	170	15	15	13	-3	167	165	-2
Strathroy	13	15	2	184	191	7	16	16	0	184	190	6
Vanneck2	19	15	-4	200	198	-3	14	11	-3	193	195	2
Bowood	8	7	-1	208	218	10	10	6	-4	214	219	5
Nairn2	11	8	-3	218	228	10	8	5	-3	204	200	-4
Average	15	12	-2	193	202	9	13	11	-2	194	196	2