

Objectives

The primary objective of this survey study was to determine the value of foliar fungicide use in corn by:

- Evaluating corn yield response and economic benefit associated with foliar fungicide use at a large number of sites under a wide range of growing conditions.
- Identifying agronomic factors likely to influence the probability of a positive economic response from fungicide application.

Methods

- The key information collected in the study was the grain yield response of corn to the application(s) of any foliar fungicide.
- Several university trials conducted from 1999 to 2006 were included in a combined analysis with Pioneer on-farm trials.
- Only treatments where fungicide was applied between tasseling and brown silk were included.
- Very few sites included comparisons among multiple fungicides; therefore it was not possible to effectively rank the efficacy of commonly used fungicides.
- Fungicide trials conducted from 1999 to 2008 were included, however the majority of data collected was from 2006 to 2008.

Results

- The average yield response across 74 university trials and 356 on-farm trials to the application of a fungicide spray was an increase of 7.4 bu/acre (Figure 1). A positive yield response to fungicide application occurred in 80% of the trials.
- The economic viability of a fungicide application varies greatly according to the price of corn and the cost of the fungicide and application (Table 2).

Table 1. Summary of foliar fungicide survey results from trials conducted in the U.S. in 2006, 2007, and 2008

Summary Data	2006	2007	2008
Number of trials	85	224	46
Overall yield advantage	8.1 bu/acre	6.9 bu/acre	6.6 bu/acre
Positive yield response	82%	79%	78%

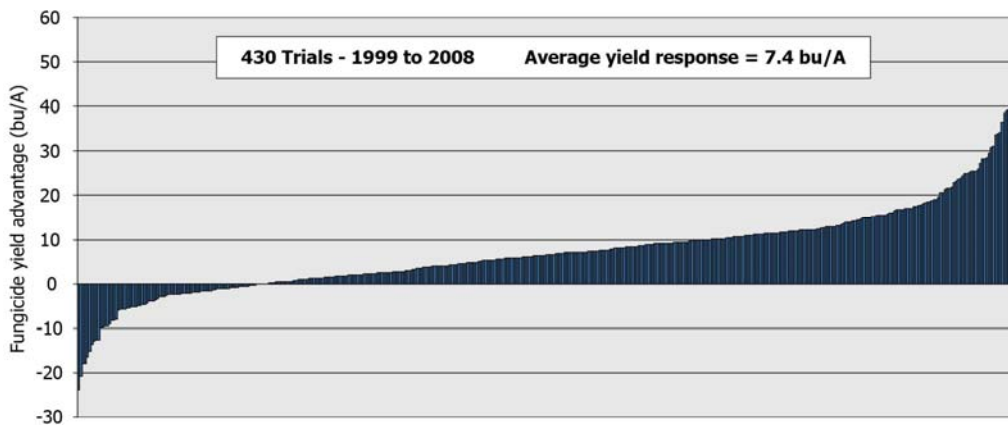


Figure 1. Corn yield response to foliar fungicide application in 74 university and 356 on-farm trials.

Table 2. Break-even yield response as a function of the cost of fungicide and application and corn price.

Corn Price	Cost of Fungicide + Application				
	\$22/A	\$24/A	\$26/A	\$28/A	\$30/A
\$2.50/bu	8.8	9.6	10.4	11.2	12.0
\$3.00/bu	7.3	8.0	8.7	9.3	10.0
\$3.50/bu	6.3	6.9	7.4	8.0	8.6
\$4.00/bu	5.5	6.0	6.5	7.0	7.5
\$4.50/bu	4.9	5.3	5.8	6.2	6.7
\$5.00/bu	4.4	4.8	5.2	5.6	6.0

Factors Influencing Yield Response

Disease Pressure

Thirty-six of the university trials included an evaluation of foliar disease severity. The presence of significant disease pressure resulted in an average yield response to foliar fungicide treatment that was over 4x greater than at sites with low severity (Figure 2).

Hybrid Resistance to Gray Leaf Spot

The probability of using a fungicide profitably is directly related to the susceptibility of a hybrid to the predominant leaf diseases. The principle foliar disease in the study area is gray leaf spot. As expected, the yield response to the application of a foliar fungicide was the highest for the more susceptible hybrids (Figure 3).

Figure 2. Yield response to foliar fungicide with and without significant foliar disease pressure (36 trials, 1999-2006).

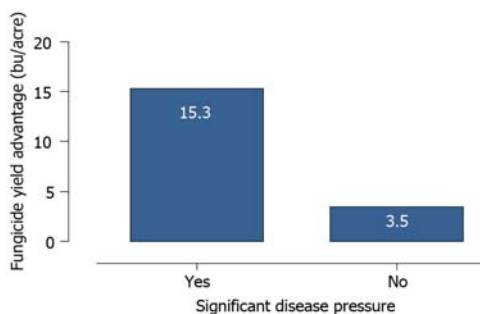
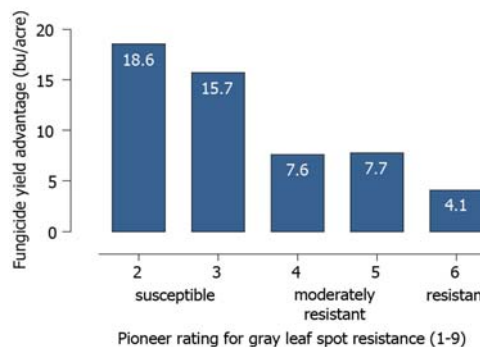


Figure 3. Average yield response of Pioneer® brand hybrids to foliar fungicide application according to gray leaf spot disease rating (300 trials, 1999-2008).

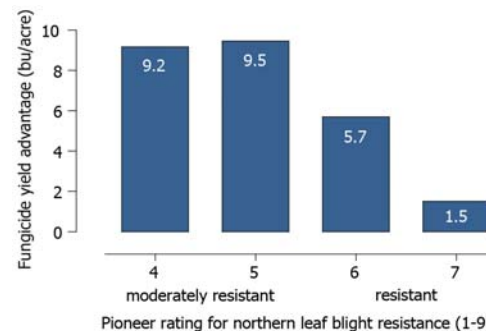


Hybrid Resistance to N. Leaf Blight



Another major corn disease in the study area is northern leaf blight. As with gray leaf spot, the yield response to the application of a foliar fungicide was the highest for the hybrids more susceptible to NLB (Figure 4).

Figure 4. Average yield response of Pioneer® brand hybrids to foliar fungicide application according to northern leaf blight disease rating (285 trials, 1999-2008).



Previous Crop and Tillage

Survey results showed an inverse relationship between tillage intensity and yield response to foliar fungicide application. Yield response was greater in corn after corn than corn after soybean in conservation and conventional tillage. In no-till and strip-till systems however, yield response was not substantially influenced by previous crop (Figure 5).



Figure 5. Average yield response to foliar fungicide application as influenced by tillage in corn following corn and corn following soybean (180 trials, 1999-2008).

