ICM News

Evaluation of Foliar Fungicides on Soybeans in 2018

February 11, 2019

Soybean foliar fungicides were evaluated for foliar disease management and yield response across seven Iowa State University research and demonstration farms in 2018. These included the Northwest Research and Demonstration Farm (Sutherland), Northern Research and Demonstration Farm (Kanawha), Northeast Research and Demonstration Farm (Nashua), Central Iowa Research Farms (Ames), Armstrong Memorial Research and Demonstration Farm (Lewis), McNay Memorial Research

and Demonstration Farm (Chariton), and Southeast Research and Demonstration Farm (Crawfordsville).

Field experiments at each location were laid out in randomized complete block design with four replications. Plot size ranged from 25.5 to 40 ft long and 10 to 15 ft wide (4 rows 30-inch inter-row spacing). Soybean cultivar and additional details are listed in Table 1. A total of 18 fungicide products were applied at recommended rate (Table 2) with a self-propelled research sprayer at growth stage R3 (beginning pod) at all seven locations. Foliar diseases were assessed when soybeans reached at the R6 (full seed) growth stage. Septoria brown spot (caused by *Septoria glycines*) progression was assessed by measuring the height of the highest infected leaf and determining disease severity by estimating the percent of leaf area covered by the disease on 10 leaves in the upper canopy. Other foliar diseases were also assessed, including frogeye leaf spot (caused by *Cercospora sojina*). Total seed weight/plot and moisture were measured with a 2009 Almaco SPC20 research plot combine. Seed weight was adjusted to 13 percent moisture and yield was calculated.

Table 1. Research location, cultivar, planting date, planted population, fungicide application (spray) date, disease assessment date, and harvest date for seven soybean fungicide trials throughout Iowa in 2018.

Cultivar
Ames
Ames
28-N6
Armstrong
Armstrong
28-N6
Crawfordsville

Crawfordsville	
	28-N6
Kanawha	
Kanawha	
	28-N6
McNay	
McNay	
	28-N6
Nashua	
Nashua	
	28-N6
Sutherland	
Sutherland	
	28-N6

Planting date
Ames
Ames
5/17/18
Armstrong
Armstrong
5/9/18
Crawfordsville
Crawfordsville
5/23/18
Kanawha
Kanawha
5/29/18
McNay

McNay

4/30/18

Nashua

Nashua

5/20/18

Sutherland

Sutherland

5/19/18

Planted population

Ames

Ames

140,000

Armstrong

Armstrong

150,000

Crawfordsville

Crawfordsville

165,000

Kanawha

Kanawha

150,000

McNay

McNay

149,000

Nashua

Nashua

175,000

Sutherland

Sutherland
140,000

Fungicide application date
Ames
Ames
7/24/18
Armstrong
Armstrong
7/23/18
Crawfordsville
Crawfordsville
7/16/18
Kanawha
Kanawha

7/30/18

McNay

McNay

7/23/18

Nashua

Nashua

7/31/18

Sutherland

Sutherland

7/26/18

Disease assessment date

Ames

Ames

9/3/18

Armstrong

Armstrong

9/6/18

Crawfordsville

Crawfordsville

8/30/18

Kanawha

Kanawha

9/5/18

McNay

McNay

.

Nashua

Nashua

8/30/18

Sutherland

Sutherland

9/6/18

Harvest date

Ames

Ames

10/20/18

Armstrong

Armstrong

10/24/18

Crawfordsville

Crawfordsville

10/25/18

Kanawha

Kanawha

10/23/18

McNay

McNay

10/25/18

Nashua

Nashua

10/23/18

Sutherland

Sutherland

10/24/18

Table 2. Fungicide products and their application rate for seven soybean fungicide trials throughout Iowa in 2018 *All products were applied at R3 with nonionic surfactant (Induce at 0.3% v/v) unless otherwise noted. *All Group 11 fungicides are QoI's.

UTC
FRAC group
FRAC group
..
Rate (fl oz/A)*
Rate (fl oz/A)*
Aproach
FRAC group
FRAC group
11
Rate (fl oz/A)*
Rate (fl oz/A)*

6 oz/A

Aproach Prima

FRAC group

FRAC group

3+11

Rate (fl oz/A)*

Rate (fl oz/A)*

6.8 oz/A

Delaro

FRAC group

FRAC group

3+11

Rate (fl oz/A)*

Rate (fl oz/A)*

8 oz/A

Domark 230

FRAC group

FRAC group

3

Rate (fl oz/A)*

Rate (fl oz/A)*

6 oz/A

Fortix

FRAC group

FRAC group

3+11

Rate (fl oz/A)*

Rate (fl oz/A)*

5 oz/A

Lucento

FRAC group

FRAC group

3+7

Rate (fl oz/A)*

Rate (fl oz/A)*

5 oz/A

Miravis Neo

FRAC group

FRAC group

3+7+11

Rate (fl oz/A)*

Rate (fl oz/A)*

13.7 oz/A

Preemptor

FRAC group

FRAC group

3+11

Rate (fl oz/A)*

Rate (fl oz/A)*

5 oz/A

Priaxor

FRAC group

FRAC group

7+11

Rate (fl oz/A)*

Rate (fl oz/A)*

4 oz/A

Quadris

FRAC group

FRAC group

11

Rate (fl oz/A)*

Rate (fl oz/A)*

6 oz/A

Quadris Top

FRAC group

FRAC group

3+11

Rate (fl oz/A)*

Rate (fl oz/A)*

8 oz/A

Quilt Xcel

FRAC group

FRAC group

3+11

Rate (fl oz/A)*

Rate (fl oz/A)*

10.5 oz/A

Stratego YLD

FRAC group

FRAC group

3+11

Rate (fl oz/A)*

Rate (fl oz/A)*

4 oz/A

Topguard EQ

FRAC group

FRAC group

3

Rate (fl oz/A)*

Rate (fl oz/A)*

5 oz/A

Trivapro

FRAC group

FRAC group

3 + 7+ 11

Rate (fl oz/A)*

Rate (fl oz/A)*

13.7 oz/A

Viathon

FRAC group

FRAC group

3+33

Rate (fl oz/A)*

Rate (fl oz/A)*

23 oz/A

Zolera FX

FRAC group

FRAC group

3+11

Rate (fl oz/A)*

Rate (fl oz/A)*

5 oz/A

Result summary

Overall, the northern and northeastern experiment locations received more precipitation than the other sites. However, a large amount of rainfall occurred during the months of August and September in many locations. This is important to note as August is the critical month for foliar disease development. Frogeye leaf spot was observed at greater levels in all the locations compared to previous years. This might be due to a combination of Quinone outside inhibitors (QoI) fungicide resistant strains of *C. sojina*, which were confirmed throughout the state in 2017, coupled with the high rainfall in August. Septoria brown spot was also observed at all locations.

Heavy rainfall in September and October challenged timely harvest in many locations. Average yield in untreated plots was 54.9 bu/A. Yield response to fungicide was statistically significant, and the yield response ranged from 0.8 to 7.4 bu/A (Figure 1).

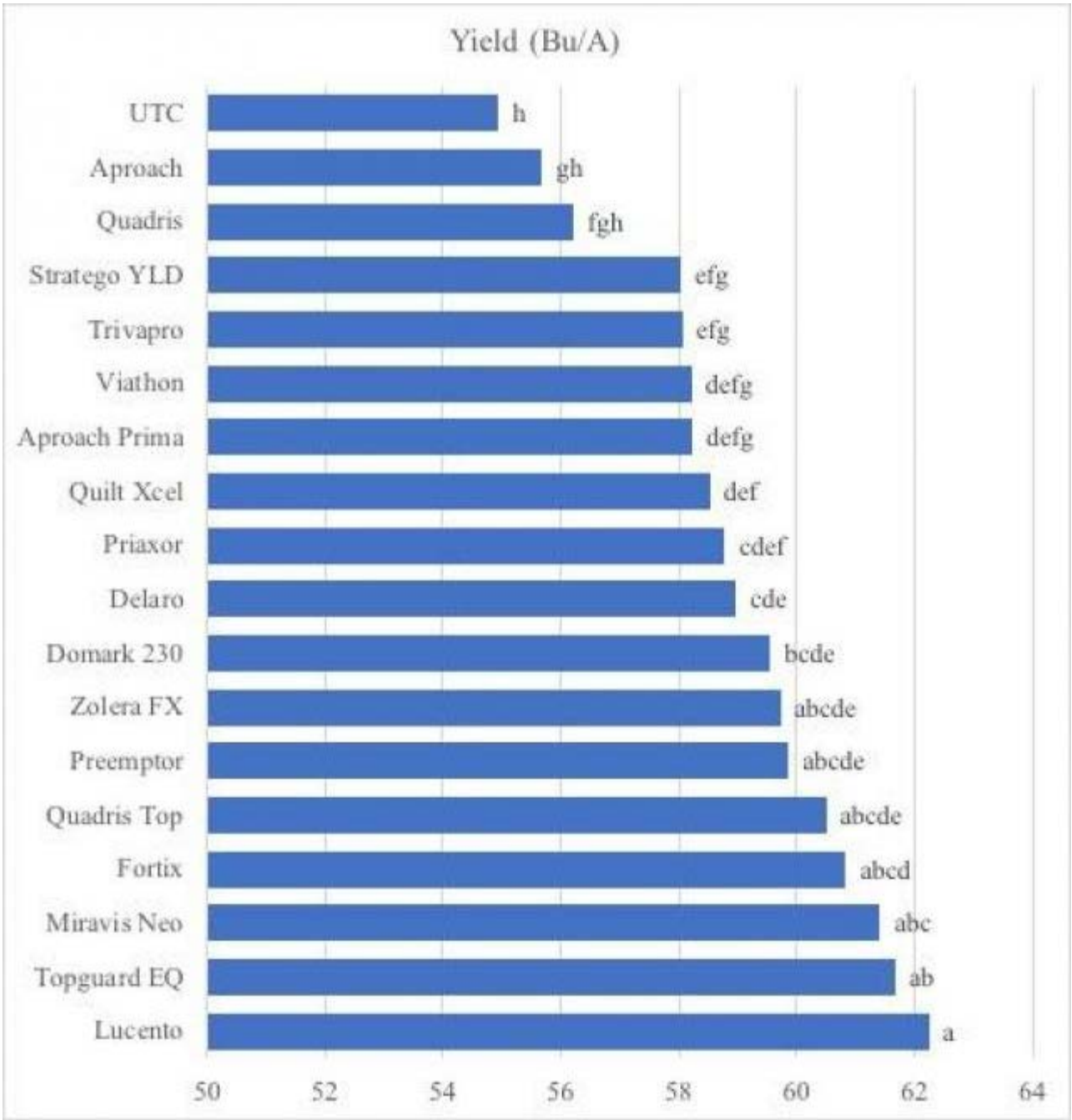

Figure 1. Soybean yield response to fungicide products combined across all seven experiment locations in 2018. Means followed by the same letter are not statistically significant from one another.

Treatment effect was statistically significant for both diseases (Figures 2 and 3). The QoI fungicides were not effective, however, the fungicides with new chemistries and with multiple mode of actions showed better performance than QoI fungicides alone for disease management and yield response.

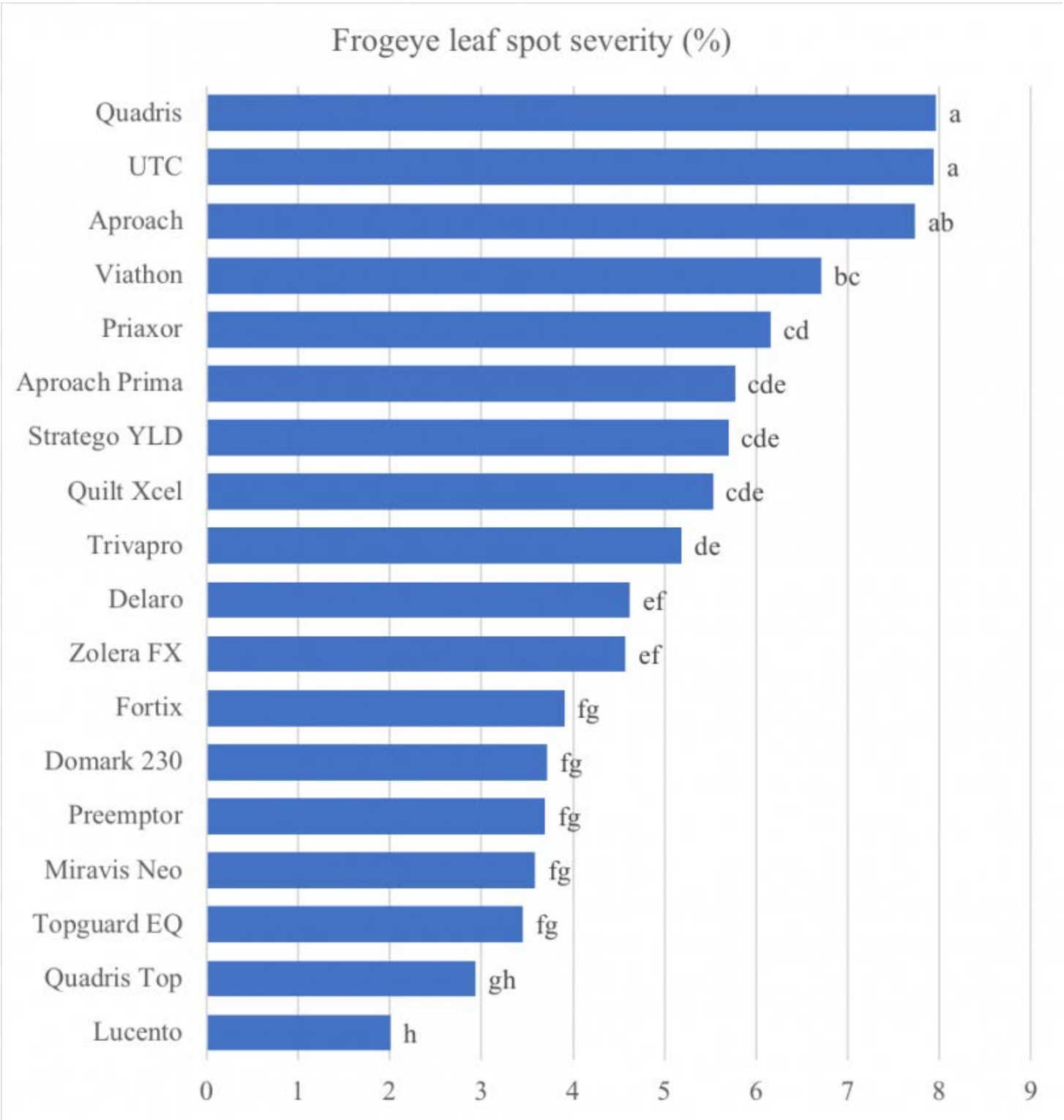

Figure 2. Frogeye leaf spot severity in upper soybean canopy in fungicide treatments combined across all seven experiment locations in 2018. Means followed by the same letter are not statistically significant from one another.

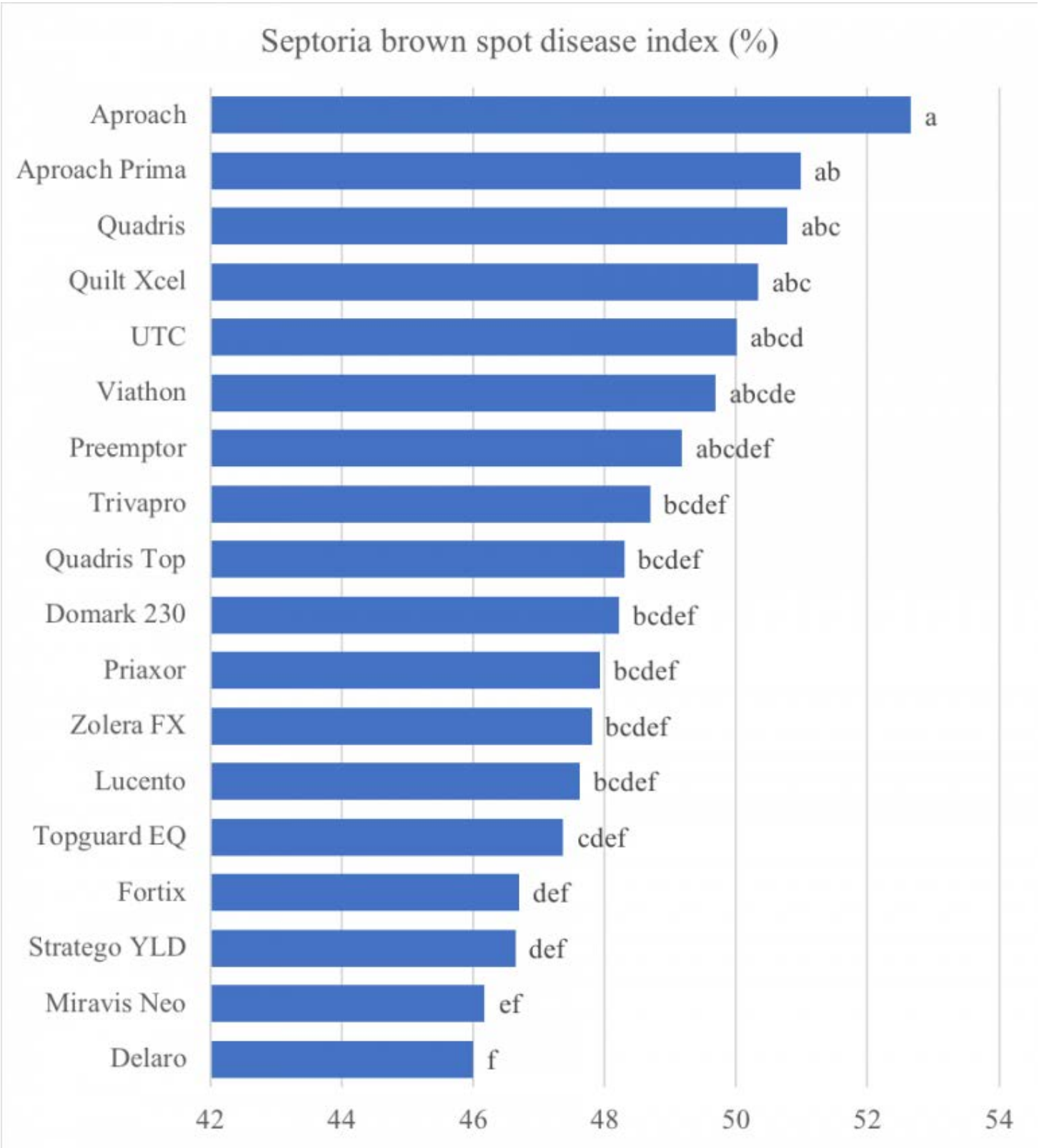

Figure 3. Septoria brown spot disease index (%), which is a combination of how high the disease was observed in the plant canopy and disease severity at the maximum height of disease, for fungicide treatments combined across all seven experiment locations in 2018. Means followed by the same letter are not statistically significant from one another.

Management recommendations

Fungicides with solo QoI active ingredients had limited efficacy against frogeye leaf spot and provided less yield benefit compared with fungicides with multiple chemistries, especially some of the newer chemistries. *C. sojina* strains resistant to QoI fungicides have been confirmed throughout Iowa. An integrated method of disease management that does not depend only on fungicides should be employed to maximize disease management to preserve efficacy of existing fungicides. Other disease management practices such as crop rotation, planting of disease-resistant cultivars, and application of fungicides with multiple modes of action should all be used as tools for effective soybean disease management.

Category: Plant Diseases

Crop:

Soybean

Tags: Soybean | fungicide | septoria brown spot | frogeye leaf spot | QoI

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