2010 ON FARM CORN FOLIAR FUNGICIDE TRIALS RESULTS

Paul Esker, Mike Ballweg, Bob Cropp Bill Halfman, Richard Halopka, Matt Hanson, Steve Huntzicker, Jon Zander and Paul Sturgis [1]

With corn prices high, the use of foliar fungicides as a means to enhance corn yield remains a topic of great debate. In our previous trial years that have included both small and large strip trials, there has not been a consistent benefit from the use of a foliar fungicides (Grau et al., 2008; Esker et al., 2009). In order to provide the most comprehensive data to stakeholders in the state, staff at the University of Wisconsin Cooperative Extension Service and UW College of Agricultural and Life Sciences have continued a coordinated effort to generate data from replicated large on-farm strip trials and small plot trials.

We used both small plot and large strip trials in our on-farm studies. Both methods have advantages and disadvantages. Some advantages of small plot research include the ability to control variables such as soil type/texture, drainage, soil compaction and pest interactions. It also allows the researcher to evaluate several different treatments in a small area. However, the value of large scale on-farm research is that the previously mentioned variables are not singled out and those results better represent "real world" scenarios. It is this combination of approaches that are important for improving the research process.

Plot Design

Large Strip Trials

Trials were conducted in Clark, Dodge, and Washington counties using cooperating grower production practices and equipment. Foliar fungicides were applied at R1 and no adjuvants were used. Field histories and additional baseline information can be found in Table 1. All plots were randomized and sized to fit within the grower's field and replicated a minimum of 3 times. Data collected included foliar and stalk disease severity ratings and grain yield. Grain moisture and test weight were also collected, however, this data was not always available for all trials on a plot basis.

Small Plot Trials

Small plot trials were conducted using the cooperating grower's production practices in Monroe (2 sites), La Crosse, Pepin and Trempealeau counties. Treatments at each site included Headline AMP (10 ounces per acre), Quilt Xcel (10.5 ounces per acre) and Stratego YLD (5 ounces per acre) applied at R1. Adjuvants were not used. Foliar and stalk health disease severity ratings, yield, grain moisture and test weight data were collected for all plots. Each plot measure 10 ft. (4 rows) wide by 50 feet long and were sprayed using a CO_2 powered backpack sprayer calibrated to deliver 23.7 gallons per acre at 36 PSI while walking at 3.0 miles per hours. Each plot was hand harvested.

[1] First author: Assistant Professor and Field Crops Extension Plant Pathologist, 1630 Linden Dr., Madison, WI 53706; Second - eighth authors, UW-Cooperative Extension County Faculty and Staff; Last Author, Independent Crop Consultant, Croptech Agronomics, LLC, Vesper.

Results for Large Strip Trials

Summary results are available in Table 2. Disease severity prior to application was <1% in all trials. The late season foliar disease severity ratings were only statistically different in the Washington County trial (14% for UTC and 4% for Quilt Xcel treated). There was almost no stalk lodging in all trials and stalk ratings were typically very low (<2). There was no evidence of an effect for foliar fungicide on grain yield in all trials. In the Washington County trial, grain moisture was higher in plots that had received Quilt Xcel (18.7% versus 18.0%).

Results for Small Plot Trials

Summary results are available in Table 2. Overall, there was no evidence of an effect of foliar fungicide on disease severity, stalk lodging, stalk rating, test weight, and grain yield. There were grain moisture differences in the Monroe 1 and Pepin County trials, respectively. In Monroe County, grain moisture was highest for plots that have received Quilt Xcel. In the Pepin County trial, the highest grain moisture was in the UTC.

Recommendations for the Use of Foliar Fungicides on Corn

Since 2007, approximately 35 small and large plot trials have been conducted. Results from trials have not shown a consistent response to the application of foliar fungicides. The best management tactic for reducing the risk of corn diseases is the use of an IPM strategy that starts with hybrid selection for resistance to specific corn diseases. In addition, growers should consider using other factors like crop rotation and residue management as part of their overall program. The best results to date (both within Wisconsin and across the region) for use of foliar fungicides is when there have been when disease severity has been higher. Furthermore, timely field scouting and an assessment of environmental conditions (relative humidity, leaf wetness and temperature) are necessary to determine if the need for a fungicide is warranted. Also, economic considerations should be made prior to an application of foliar fungicides. With prices in the $25-30 per acre range for product plus application, approximately 5 to 6 bushels per acre are necessary to cover the cost of a foliar fungicide application.

Acknowledgments

The authors would like to thank the growers for use of their fields, equipment and time. We would also like to thank the agronomists and custom applicators who assisted with field timing and operations.

Table 1. Field histories for on-farm foliar fungicide trials, 2010.

Information	Dodge	Clark	Washington	Monroe 1	La Crosse	Trempealeau	Monroe 2	Pepin
Trial type	Large	Large	Large	Small	Small	Small	Small	Small
Planting date	22 April	28 April	20 May	6 May	1 May	26 April	10 May	26 April
Harvest data	15 October	11 November	13 October	30 September	30 September	20 September	13 October	2 September
Previous crop	Corn	Grass sod	Soybean	Alfalfa	Corn	Alfalfa	Corn	Soybean
Residue @ planting	60%	5%	25%	75%	15%	NA	5%	10%
Primary tillage	Fall chisel; spring field cultivator	Moldboard plow	No-tillage	No-tillage	Chisel	Chisel plow	Moldboard plow	No-tillage
Hybrid	Jung 78555	NKII N22-C2	Croplan 3514RR	Croplan 3114VT	DeKalb 4660	DeKalb 491VT	DeKalb 46-50	Pioneer 35F40
Fungicide(s)	Quilt Xcel	Stratego YLD	Quilt Xcel	Headline AMP; Quilt Xcel; Stategо YLD	Headline AMP; Quilt Xcel; Stategо YLD	Headline AMP; Quilt Xcel; Stategо YLD	Headline AMP; Quilt Xcel; Stategо YLD	
Rate(s) (fl oz/A)	10.5	5	10.5	10; 10.5; 5	10; 10.5; 5	10; 10.5; 5	10; 10.5; 5	
Date – pre spray disease assessment	29 July	4 August	26 July	18 July	18 July	16 July	2 August	16 July
Date – post spray disease assessment	31 August	16 September	2 September	9 September	9 September	12 September	9 September	20 September

Table 2. Summary results for large strip and small foliar fungicide trials in 2010.

County	Treatment	Grain yield	Grain moisture	Test weight	Pre-spray disease[3]	Post-spray disease	Stalk lodging[4]	**Stalk rating**
		(bu/A)	(%)	(lb/bu)	(%)	(%)	(%)	(0-5)
Clark	UTC	177 a[1]	NA[2]	NA	<1	6 a	0 a	0.1 a
	Stratego YLD	182 a	NA	NA		11 a	1 a	0.2 a
Dodge (large)	UTC	200 a	NA	NA	NA	NA	NA	NA
	Quilt Xcel	203 a	NA	NA		NA	NA	NA
Monroe 1 (small)	UTC	157 a	**23.0 b**	53.3 a	<1	1 a	0 a	1.3 a
	Headline AMP	159 a	**23.6 ab**	53.7 a		1 a	0 a	0.8 a
	Quilt Xcel	163 a	**24.5 a**	53.3 a		1 a	0 a	0.7 a
	Stratego YLD	162 a	**22.6 b**	54.0 a		1 a	0 a	0.9 a
Monroe 2 (small)	UTC	151 a	23.5 a	52.0 a	<1	4 a	0 a	0.7 a
	Headline AMP	163 a	23.9 a	51.0 a		4 a	0 a	0.6 a
	Quilt Xcel	157 a	23.9 a	51.0 a		3 a	0 a	0.4 a
	Stratego YLD	154 a	23.7 a	51.3 a		3 a	0 a	0.7 a
La Crosse (small)	UTC	165 a	22.9 a	52.0 a	<1	8 a	0 a	1.0 a
	Headline AMP	163 a	24.8 a	53.3 a		6 a	0 a	0.9 a
	Quilt Xcel	157 a	24.3 a	52.5 a		7 a	0 a	1.2 a
	Stratego YLD	154 a	24.3 a	52.7 a		7 a	0 a	1.0 a
Pepin (small)	UTC	152 a	**27.2 a**	50.8 a	<1	NA	0 a	0.8 a
	Headline AMP	141 a	**25.4 ab**	51.5 a		NA	0 a	0.7 a
	Quilt Xcel	152 a	**24.3 b**	50.9 a		NA	0 a	1.1 a
	Stratego YLD	138 a	**23.5 b**	51.4 a		NA	0 a	1.0 a
Trempealeau (small)	UTC	145 a	30.0 a	51.3 a	<1	25 a	0 a	0 a
	Headline AMP	150 a	29.7 a	50.8 a		25 a	0 a	0 a
	Quilt Xcel	151 a	31.0 a	49.8 a		25 a	0 a	0 a
	Stratego YLD	141 a	29.9 a	50.3 a		25 a	0 a	0 a
Washington (large)	UTC	154 a	**18.0 b**	55.1 a	<1	**14 a**	0 a	1.7 a
	Quilt Xcel	157 a	**18.7 a**	54.9 a		**4 b**	0 a	1.1 a

[1] Means followed by the same letter within a trial are not statistically different based on Duncan's multiple range test ($P = 0.10$).
[2] NA = data not available.
[3] Disease assessments were based on a composite severity rating for all diseases (both pre- and post-spray).
[4] Stalk lodging was based on a push test of 30 stalks per plot.

References and Resources

Grau, C., P. Esker, M. Ballweg, J. Clark, D Fischer, C Hargrave, B. Halfman, S. Huntzicker, and B. Jensen, B. 2008. University of Wisconsin's corn foliar fungicide trial results. p. 60-66. *In* Proc. 2008 Wis. Fertilizer, Aglime, and Pest Management Conf., Madison, WI.

Esker, P., M. Ballweg, G. Blonde, J. Bollman, J. Clark, D. Fischer, C. Hargrave, S. Huntzicker, and B. Jensen. 2009. Summary of the 2008 strip trials for foliar fungicide use in corn. p. 51-54. *In* Proc. 2009 Wis. Crop Management Conf., Madison. WI.

Field Crops Plant Pathology, UW-Madison and UW-Extension, http://www.uwex.edu/ces/croppathology

Wisconsin Crop Manager, University of Wisconsin Integrated Pest and Crop Management, http://ipcm.wisc.edu/wcm