2008 MFRP Study Brief: Effect of Foliar Fungicides on Silage Quality and Yield with On-Farm Trials

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In 2007, a single field trial was established in Waupaca County, WI, to determine if there was an effect of a strobilurin fungicide(Headline®) application on silage quality and yield. In that trial, there was a 6% reduction in premature plant death, but there was no other statistical evidence of an effect of foliar fungicide applications, although there were trend results for measures such as DM tons (increased), Neutral Detergent Fiber (NDF) (lower percentage), milk per acre (increased), and stalk lodging (reduced). However, given that there were no conclusive results from the 2007 trial, further on-farm testing was conducted in 2008.

2008 Objectives

- To determine effect of foliar fungicides on corn silage yield and quality through on-farm demonstration and research plots.
- To disseminate new information regarding effect of foliar fungicides on silage corn to growers in Wisconsin and surrounding states.

2008 Materials and Methods

A combination of on-farm small plot and large strip trials were used (Figure 1, page 9). Advantages of small plot research include the ability to control variables (i.e., soil type/texture, drainage, soil compaction and pest interactions) and allows evaluation of several different treatments in a small area. However, it is often questioned if results from small plot trials represent situations in growers fields.

Therefore, conducting large scale on-farm research helps examine the situation when the previously mentioned variables are not singled out. In the on-farm trials, both approaches are considered vital and important steps to improving the ability to understand if and when the application of a foliar fungicide will be efficacious.

The large strip trials used host grower's practices (i.e., tillage, hybrids) and were replicated a minimum of two times (Table 1). Hybrids ranged in relative maturity from 93-112 days and in general, had good to excellent root/stalk strength ratings and a medium range disease package for diseases like gray leaf spot, common rust, or anthracnose stalk rot. Fungicides were applied within label rates for Headline® (6-12 oz/ac) at the R1 stage (silking) of corn development.

Small plot foliar fungicide trials were conducted in Monroe County. In that trial, a combination of products were tested, including Headline® (6 oz/ac), Stratego® (10 oz/ac) and Quilt® (14 oz/ac), applied at the R1 growth stage.

For all trials, foliar diseases were assessed in the majority of plots prior to application and again in early September by estimating the percent foliage disease from the time the trial was initiated until senescence. A stalk nudge test was conducted in early October. A plant was considered lodged if it bent prior to reaching a 45º angle or if it was lodged prior to this test and anthracnose symptoms were present.

Forage quality was obtained by testing unfermented, frozen, fresh samples from each plot and calculated using the Milk 2006 Corn Silage program, following the NIR equation used by UW Corn Agronomy corn silage variety trial program. Two statistical analyses were conducted. From exploratory analyses, three sources of variation were found: county, farm*treatment*county, and the residual error.

Figure 1. *Wisconsin counties where on-farm (small plot & large strip) foliar fungicide trials for corn silage were conducted during 2008.*

Table 1. *Corn hybrids in on-farm large strip trials.*

County	Hybrid
Chippewa	Croplan DS93 RR
Dodge	Pioneer 33T57
Jefferson #1	Mycogen F697
Jefferson #2	Pioneer 34A89
Shawano	Pioneer 37Y17
Waupaca	Pioneer 35A29
Winnebago	Golden Harvest-8535

2008 Results

Wisconsin disease levels were very low (on-farm trials < 5% severity). Primary diseases: common rust, anthracnose leaf blight and stalk rot, Northern corn leaf blight, and Northern corn leaf spot. Stalk lodging ranged 3-25%; there were no obvious differences between untreated and treated plots. From statistical analyses, there was no evidence of an effect of foliar fungicides on reducing disease levels.

Large strip trials - replication varied from 2-4 across trials; results were inconsistent with no common measures having similar

results. Only one trial had an increase in milk per acre index (Chippewa County). Small plot trials - no results due to environmental conditions.

Combined State Level Analysis. The highest variation source was observed at the county scale indicating that it becomes difficult to make “blanket” recommendations for large geographical areas.

From statistical analyses, there was no evidence of an effect of foliar fungicide treatment on: DM (tons), DM (%), silage moisture (%), crude protein (% DM), neutral detergent fiber, NDFD (% NDF), starch, ash, fat (% DM), and milk per ton. While there were some trend results ($0.20 > P > 0.10$) for wet yield (5-6% higher w/Headline), and milk per acre (8% higher in w/Headline), results were not conclusive and require further testing. As evidence, there was wide variation across the trial locations for these different measures.

Since trials began in 2007 only one trial was observed with either a higher milk per ton or milk per acre index (Chippewa Co., 2008) with the application of a foliar fungicide. Across trials, the only consistent measure found at a trend result was for milk per acre. Work is being done to understand the trend result for milk per acre index and determine if the calculation is being confounded by silage moisture.

Analyses found the highest variation source occurred at the farm (county) scale. Thus, the ability to make a single, wide scale recommendation is difficult as individual grower conditions (i.e., soil type, tillage, weed and insect management) can influence silage quality and yield. This further emphasizes the use of an integrated management program as the most appropriate approach.

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