

2011 MSU Extension Barley and Oat Fungicide Trial

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Background:

In recent years, research has shown the benefit of timely fungicide application for improved wheat production and quality. Fungal disease, especially crown rust, also impact the performance of oats in Michigan. Barley is also susceptible to foliar and head diseases. With input from Upper Peninsula farmers, a trial to determine efficacy of fungicide application on oats and barley was established at the MSU Research Center in Chatham in spring, 2011.

Varieties commonly grown by Upper Peninsula farmers were selected for the trial including Rasmussen barley and Excel oats. Blocks of oat and barley plots were laid out separately in randomized complete block design with 4 replications and planted on May 17. Plot size was 3' X 20' feet, with buffer rows between plots to allow tire space for the plot-scale sprayer.

Treatments:

Previous Crop: Spring Wheat

Site preparation: Field cultivator

Fertilizer applied: 80 lbs actual nitrogen per acre (as urea), no P or K needed

Herbicide: 1.5 pints Buctril per acre

Planting date: 5/17/2011

Seeding rate: Excel oats: 96 lbs per acre

Rasmussen barley: 120 lbs per acre

Harvest date: 8/22/11

Oat treatments applied on July 8 at Feekes stage 10.3 included:

1. Twinline fungicide at 9 oz/acre
2. Caramba fungicide at 14 oz/acre
3. Control (no fungicide)

Barley treatments applied on July 8 at Feekes stage 10.4 included:

1. Twinline fungicide at 9 oz/acre
2. Prosaro fungicide at 8.2 oz/acre
3. Caramba fungicide at 14 oz/acre
4. Control (no fungicide)

Data collection:

Visual ratings of foliar disease on flag leaf was taken by Isleib on July 15 and July 27 using a subjective 1 – 10 scale. Photographs of individual plots were also taken on these dates. Grain yield of each plot was bagged, labeled and processed by cleaning, weighing, testing for grain moisture and test weight.

Data analysis:

Plot yield, moisture and test weight information was tabulated, corrected to 14% moisture and converted to yield in bushels per acre. Statistical analysis was done using AgStats02, a simple, statistical analysis program for on-farm testing developed at Oregon State University and available on-line at <http://pnwsteep.wsu.edu/onfarmtesting/index.htm>.

Results:

Agricultural Statistics Analysis Program

Title:

Experimental Design

Completely Randomized Design (CRD) Randomized Complete Block Design (RCBD)

Level of Significance

1% 5% 10% 20%

Treatment	Replication/Block 1	Replication/Block 2	Replication/Block 3	Replication/Block 4	Treatment Mean
Twinline	117	97	126	104	111
Caramba	98	118	119	102	109
Control	112	104	100	107	106
Rep/Block Mean	109	106	115	104	109

Source	Degree of Freedom	Sum Square	Mean Square	Observed F	P value	
Total	11	991	90			
Treatments	2	57	29	0	80.00%	Not significant
Blocks	3	193	64	1	68.25%	Not significant
Error	6	740	123			
Required F	5					
Correction Factor	141,701					
Standard Deviation	11					
Coeff. of Variation	10%					

LSD	19	
Treatment Name	Mean	

Agricultural Statistics Analysis Program

Title:

Experimental Design

Completely Randomized Design (CRD)
 Randomized Complete Block Design (RCBD)

Level of Significance

1%
 5%
 10%
 20%

Treatment	Replication/Block 1	Replication/Block 2	Replication/Block 3	Replication/Block 4	Treatment Mean
Twinline	67	60	63	62	63
Prosaro	66	65	67	71	67
Caramba	72	65	65	59	65
Control	57	67	67	60	63
Rep/Block Mean	66	64	66	63	65

Analyze

Save File

New Analysis

Logout

Source	Degree of Freedom	Sum Square	Mean Square	Observed F	P value	
Total	15	262	17			
Treatments	3	54	18	1	41.35%	Not significant
Blocks						
Error	12	208	17			
Required F	3					
Correction Factor	66,693					
Standard Deviation	4					
Coeff. of Variation	6%					

LSD	6	
Treatment Name	Mean	

Visual disease ratings: (1=clean, 2=<5% disease sign on flag leaf, 3= 5-10% disease sign on flag leaf)

Oats 7/15/2011

<u>Treatment</u>	<u>Average rating over all reps</u>
Twinline	2.75
Caramba	2.5
Control	2.25

Oats 7/27/2011

<u>Treatment</u>	<u>Average rating over all reps</u>
Twinline	2.0
Caramba	2.25
Control	3.0

Barley 7/15/2011

<u>Treatment</u>	<u>Average rating over all reps</u>
Twinline	1.25
Prosaro	1.25
Caramba	1.5
Control	1.5

Barley 7/27/2011

<u>Treatment</u>	<u>Average rating over all reps</u>
Twinline	2.0
Prosaro	2.25
Caramba	2.0
Control	2.25

Discussion:

Oats and barley continue to be important feed, rotation and cash crops in Michigan, with 30,000 acres of oats and 8,000 acres of barley harvested state-wide in 2011. Current, strong commodity prices may encourage farmers in areas not well-adapted to corn and soybean production to consider producing more small grains as cash crops. Oat acreage planted in 2011 decreased approximately 50% in Michigan from 2010, presumably due to the economic opportunities presented by higher value cash crops. Oats and barley, as well as wheat, are of special interest in the northern areas of Michigan where cropping opportunities are limited by climate and soils.

Average yields of the plots were excellent, with oats averaging 109 bushels per acre and barley averaging 65 bushels per acre.

Weather played a role in the outcome of the trial. From planting date to harvest, temperatures above the 1971-2000 daily averages were experienced 59 out of 91 days (65% of the days were above average temperature). GDD₄₂ accumulation for the period of July 10 through August 22 (harvest) totaled 1177, compared to the 6 year average of 1073 (including 2011). Rainfall for the period of June 23, 2011 through August 22, 2011 was 1.94", compared to the 6-year average of 4.63" (including 2011). The total rainfall from planting to harvest date for 2011 was 6.67", compared to a 6-year average of 7.95" (including 2011). In general, the weather was warm and very dry, especially in the later stages of barley and oat development. This environment was not conducive to development of fungal disease.

The yield results of both oat and barley plots do not indicate significant differences between treatments. Coefficient of variation for both trials indicates that these results are acceptably reliable at 5% level of significance. Visual observations of disease on flag leaves did not show much difference between treatments, although the ratings of oat plots not treated with fungicide indicate a little more visual evidence of disease.

Summary:

Results of this one-year trial do not show any yield benefit from spraying fungicides on oats and barley after head emergence. The growing conditions for the trial, while excellent for oat and barley production, were not favorable for disease development. The low incidence of observed disease may not be typical for a more normal growing season. This trial should be continued for one or more years to provide results over differing environmental conditions.