

Progress Report for “Fungicide Evaluations for Control of Blackleg in Canola” funded by the North Central Canola Research Program – 2006

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Background

Blackleg, caused by *Leptosphaeria maculans*, is a reemerging disease in North Dakota. Short crop rotations and the development of more aggressive *L. maculans* strains may be partially responsible for the reemergence of the disease. Because of the growing threat of blackleg to canola in the major production region in the U.S., fungicide research was conducted in 2006. The objective of the research was to evaluate fungicides for management of blackleg.

Materials and Methods

Two experiments were conducted at each location (Langdon, ND and Minot, ND). Experiment 1 evaluated different fungicides and rates on a moderately-susceptible (MS) cultivar (see Tables for treatments). Experiment 2 evaluated Quadris fungicide at different rates (the only fungicide currently registered for blackleg control on canola in the U.S.) on a MS cultivar, a moderately-resistant (MR) cultivar, and a resistant (R) cultivar (see Tables for treatments). Fungicides were applied at the 2 to 4 leaf stage. Both sites were located in areas with natural disease pressure. To augment natural disease pressure, infected canola stubble was spread throughout the experiment, and all sites were inoculated with a *L. maculans* pycnidospore suspension within 24 hours after fungicides were applied. Blackleg severity was rated using a 0 to 5 scale in August. Plots were combined and yields were calculated. Plots were arranged in a randomized complete block design with 4 replications. Data were analyzed using the general linear model procedure (PROC GLM) in SAS (SAS Institute Inc., Cary, NC). Fisher’s protected least significant difference (LSD) test was used to compare means where $\alpha = 0.05$.

Results

Langdon. For the fungicide trial on the moderately susceptible cultivar, disease pressure was moderate, with a severity of 3.9 on the untreated control (Table 1). No significant ($P \leq 0.05$) differences among treatments for blackleg severity or yield were detected.

For the Quadris fungicide \times cultivar trial, disease pressure was also moderate with the untreated moderately susceptible cultivar having a severity of 3.7 (Table 2). Significant ($P \leq 0.05$) differences among treatments occurred for both blackleg severity and yield. Within the moderately susceptible cultivar (DeKalb 223), Quadris applied at 9 fl oz/A reduced blackleg severity compared to the untreated control. Quadris did not significantly reduce blackleg severity in the other two cultivars compared to their respective untreated controls. On the cultivar Dekalb 223, Quadris applied at 15.4 fl oz/A significantly increased yield compared to the untreated control. Quadris did not significantly increase yield compared to the untreated control in the other two cultivars compared to their respective untreated controls.

Minot. For the fungicide trial on the moderately susceptible cultivar, disease pressure was low, with a severity of 1.9 on the untreated control (Table 3). No significant ($P \leq 0.05$) differences among treatments for blackleg severity or yield were detected.

For the Quadris fungicide \times cultivar trial, disease pressure was also low with the untreated moderately susceptible cultivar having a severity of 1.4 (Table 4). No significant ($P \leq 0.05$) differences among treatments for blackleg severity were detected; however, significant differences for yield were detected. Quadris did not significantly increase yield compared to the untreated control within each cultivar; however, the more resistant cultivars (HyClass 2061 and Pioneer 45H21) generally had greater yields than the moderately susceptible cultivar (DeKalb 223).

Table 1. Effect of fungicides on a cultivar moderately-susceptible to blackleg at Langdon, ND in 2006.

Fungicide	Blackleg severity (0-5)	Yield (lb/A)
Untreated	3.9	1325
Pristine-12 oz/a	3.1	1192
Pristine-18 oz/a	1.4	1712
Headline- 6 fl oz/a	2.8	1554
Headline- 9 fl oz/a	2.7	1347
JAU 6476 4.3 fl oz/a	2.4	1626
JAU 6476 5.7 fl oz/a	2.1	1642
Amistar 2.25 oz/a	3.3	1346
Amistar 3 oz/a	1.9	1530
A7402T 4 fl oz/a	2.2	1513
Endura 5 oz/a	2.2	1382
Endura 6 oz/a	2.2	1433
Quadris 6.2 fl oz/a	2.6	1420
Quadris 9 fl oz/a	2.1	1418
Tilt 4 oz/a	2.4	1502
Quilt 8.67 fl oz/a	3.2	1396
Quilt 14 fl oz/a	2.2	1489
Quadris Opti 1.6 pt/a	2.2	1427
Impact	2.8	1524
<i>P</i> > <i>F</i>	0.2046	0.5017
LSD 0.05	NS	NS

Table 2. Effect of Quadris fungicide on yield of canola cultivars differing in susceptibility to blackleg at Langdon, ND in 2006.

Cultivar	Fungicide	Rate (fl oz/A)	Blackleg severity (0-5)	Yield (lb/A)
DeKalb 223	untreated		3.7	1154
DeKalb 223	Quadris	6.2	3.1	1211
DeKalb 223	Quadris	9.0	2.0	1199
DeKalb 223	Quadris	15.4	3.9	1425
HyClass 2061	untreated		2.2	1019
HyClass 2061	Quadris	6.2	2.1	1141
HyClass 2061	Quadris	9.0	1.6	1097
HyClass 2061	Quadris	15.4	1.4	1076
Pioneer 45H21	untreated		1.5	1458
Pioneer 45H21	Quadris	6.2	1.4	1418
Pioneer 45H21	Quadris	9.0	1.4	1290
Pioneer 45H21	Quadris	15.4	1.2	1411
<i>P > F</i>			0.0002	0.0037
LSD 0.05			1.2	243

Table 3. Effect of fungicides on a cultivar moderately-susceptible to blackleg at Minot, ND in 2006.

Treatment	Rate/A	Blackleg severity (0-5)	Yield (lb/A)
1. Untreated	----	1.9	1791
2. Pristine	12 oz	1.0	1893
3. Pristine	18 oz	0.8	2178
4. Headline	6 fl oz	2.1	1870
5. Headline	9 fl oz	2.0	1936
6. JAU	4.3 fl oz	2.3	1904
7. JAU	5.7 fl oz	1.0	1767
8. Amistar	2.25 oz	1.4	1885
9. Amistar	3 oz	1.1	1673
10. Endura	5 oz	1.6	1890
11. Endura	6 oz	1.8	1827
12. Quadris	6.2 fl oz	1.3	1956
13. Quadris	9 fl oz	1.2	1908
14. Tilt	4 fl oz	1.6	1981
15. Quilt	8.67 fl oz	1.3	1829
16. Quilt	14 fl oz	1.3	1736
17. Quadris Opti	1.6 pt	1.4	1864
18. Impact	7 fl oz	1.5	1898
19. Prosaro	6.5 fl oz	1.1	2117
LSD (P=.05)		NS	NS

Table 4. Effect of Quadris fungicide on yield of canola cultivars differing in susceptibility to blackleg at Minot, ND in 2006.

Cultivar	Fungicide	Rate (fl oz/A)	Blackleg severity (0-5)	Yield (lb/A)
DeKalb 223	untreated		1.4	1945
DeKalb 223	Quadris	6.2	0.7	1881
DeKalb 223	Quadris	9.0	0.7	1814
DeKalb 223	Quadris	15.4	0.7	2015
HyClass 2061	untreated		0.7	2322
HyClass 2061	Quadris	6.2	0.5	2352
HyClass 2061	Quadris	9.0	0.5	2202
HyClass 2061	Quadris	15.4	0.6	2392
Pioneer 45H21	untreated		0.5	2345
Pioneer 45H21	Quadris	6.2	0.5	2217
Pioneer 45H21	Quadris	9.0	0.3	2141
Pioneer 45H21	Quadris	15.4	0.3	2354
		LSD 0.05	NS	200