Evaluation of Quadris tank mixed with RoundUp for blackleg control

Objectives

The objectives of this research will be to determine 1) if Quadris be applied with Roundup to reduce input costs, 2) if reduced rates of fungicides will provide acceptable blackleg control 3) the impact on yield of Quadris applied to blackleg "R" and "MR" varieties, and 4) the effect of application timing on Quadris efficacy

Procedures

Field plots will be established at the North Central Research Extension Center in Minot, ND. The experiment will evaluate Quadris applied alone or with glyphosate at 6.2 fl oz, in a single or split application at various application timings (Table 1) to canola cultivars varying in their resistance to blackleg (MR and R). Quadris is currently the only foliar-applied fungicide labeled for blackleg control in canola.

	Treatment	Timing	Rate
Resistant Variety (Pioneer 45H26)			
1	Roundup	3-4 leaf	1 pt
2	Roundup + Quadris	1-2 / 5-6	1 pt + 6.2 oz / 1 pt + 6.2 oz
3	Roundup + Quadris	1-2 leaf	1 pt + 6.2 oz
4	Roundup + Quadris	3-4 leaf	1 pt + 6.2 oz
5	Roundup + Quadris	1-2 / 5-6	1 pt + 3.1 oz / 1 pt + 3.1 oz
6	Quadris[a]	1-2 leaf	6.2 oz
7	Quadris[a]	3-4 leaf	6.2 oz
MR Variety (Hyola 357 Magnum)			
8	Roundup	3-4 leaf	1 pt
9	Roundup + Quadris	1-2 / 5-6	1 pt + 6.2 oz / 1 pt + 6.2 oz
10	Roundup + Quadris	1-2 leaf	1 pt + 6.2 oz
11	Roundup + Quadris	3-4 leaf	1 pt + 6.2 oz
12	Roundup + Quadris	1-2 / 5-6	1 pt + 3.1 oz / 1 pt + 3.1 oz
13	Quadris[a]	1-2 leaf	6.2 oz
14	Quadris[a]	3-4 leaf	6.2 oz

[a]Roundup will be applied in a separate application for weed control.

The field trial will be planted in areas where blackleg has a history. All plots will be evaluated for blackleg incidence and severity, herbicide efficacy, yield and test weight.

The plots will be a randomized complete block design, with four replications. An analysis of variance (ANOVA) will be preformed on the treatments. The treatment means will be compared using Fisher's protected least significant difference (LSD) at the 95% confidence interval.

Justification

The construction of two canola biodiesel plants in North Dakota has greatly increased the interest in, and demands for canola. One way to meet the demands is to shorten crop rotation; however, the shorter the crop rotation, the greater the risk of loss due to crop disease. Blackleg, caused by *Leptosphearia maculans*, can be a devastating disease to canola in the north central region. Although raising blackleg resistant cultivars has been an effective management practice in the past, the recently discovered pathogenicity group (PG) 3 and 4 strains of *L. maculans* in Manitoba (Chen and Fernando, 2005; Fernando and Chen, 2003) and North Dakota (Bradley et al., 2005) may cause disease on some varieties currently considered blackleg resistant. Additionally, a blackleg resistant canola cultivar in Australia was overcome by the disease within 3 years of commercial production (Sprague et al. 2006). Therefore, canola growers need to consider an integrated approach to managing blackleg rather than relying solely on resistant cultivars.

Cost of production is another deterrent to canola growers. If canola growers can receive adequate blackleg control with reduced rates of fungicide, raising canola may be more attractive to some producers. Additionally, cost may be reduced even more, if a fungicide can be tank mixed with herbicides, eliminating additional application costs.

Literature Review

Fungicides have significantly reduced blackleg infection, and increased canola yield in ND (Bradley et al., 2006). Bradley et al. evaluated several fungicides for blackleg control on canola cultivars with varying degrees of susceptibility to blackleg. Canola treated with fungicide yielded 200-400 lb/A higher than untreated canola.

Literature Cited

Bradley, C. A., P. S. Parks, Y. Chen, and W. G. D. Fernando. 2005. First report of pathogenicity groups 3 and 4 of *Leptoshphaeria maculans* in canola in North Dakota. Plant Dis. 89:776.

Bradley, C., B. Hanson, C. Chesrown, L. del Rio, P. M. Porter, D. Legare, P. Raymer, and D. Phillips. 2006. Blackleg Disease of Canola: A Multi-State Research Project. Proceed. US Canola Assoc., Indianapolis, IN.

Chen, Y. and Fernando, W. G. D. 2005. First report of canola blackleg caused by pathogenicity group 4 of *Leptoshpaeria maculans* in Manitoba. Plant Dis. 89:339.

Fernando, W. G. D., and Y. Chen. 2003. First report on the presence of *Leptosphaeria maculans* pathogenicity group-3, the causal agent of blackleg of canola in Manitoba. Plant Dis. 87:1268.

Sprague, S. J., S. J. Marcroft, H. L. Hayden, and B. J. Howlett. 2006. Major Gene Resistance to Blackleg in *Brassica napus* Overcome Withing Three years of Commercial Production in Southeaster Australia. Plant Dis. 90:190-198.

Current Work
Carl Bradley, former NDSU Extension Plant Pathologist, and Scott Halley, NDSU Area Crop Protection Specialist, have been conducting separate studies evaluating several fungicides at various rates on canola varying in its resistance to blackleg. However, there has been no research on the efficacy of the fungicides on blackleg, when tank mixed with an herbicide.

Facilities and Equipment
The North Central Research Extension Center has all of the equipment necessary to establish, maintain, and harvest the proposed canola research field plots.

Project Timetable
April/May 2007: Canola will be planted and plots will be established.
May/June 2007: Fungicide treatments will be applied.
August 2007: Blackleg incidence and severity will be evaluated.
September 2007: Plots will be harvested and yield will be calculated.

Personnel Support
(See attached vitae)

Denise Markle (5%)
Crop Protection Specialist
North Central Research Extension Center, NDSU

Budget Narrative
Support for labor and fringe is requested at a total of $2200 for support of prebaccalaureate assistant. Support for materials and supplies are requested at a total of $648, for seed, fertilizer, pesticides, etc. Support for travel is listed at $152 for travel to and from plots for agronomic practices as well as presenting research at local grower meetings.

Item	**Total**
Labor	
Prebaccalaureate student $10/hour x 200 hours	2000
Fringe (10%)	200
Subtotal	**2200**
Materials and Supplies	
Fertilizer	250
Seed	150
Pesticide	200
Misc. (Plot stakes, flags, etc.)	48
Subtotal	**648**
Travel	
Travel to plots for agronomic purposes ($0.38 x 150)	57
Area grower meetings ($0.38 x 250 miles)	95
Subtotal	**152**
Grand Total	**$3000**