Fungicide timing and rate to control blackleg disease in winter canola.

Project Report to the Washington Oil Seed Commission

SUBMITTED BY:

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FUNDS REQUESTED: $4,000

PROJECT PERIOD: February 1, 2017 – January 31, 2018

INVESTIGATOR:

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JUSTIFICATION:

Blackleg is the major economic disease of canola worldwide. Blackleg was identified and confirmed in Umatilla county Oregon in March of 2015. It was observed in four fields of winter canola and was observed on canola crop residues in at eight field from the previous year. Since first confirmation of the disease, it has been observed in the several fields in 2015, 2016 and 2017. Blackleg has also been observed in Idaho. It is likely that blackleg will become a greater risk as acreage of winter canola increase in the region. Because blackleg incidence is new to the region, there is not available information on the rate and timing of fungicides to control the disease. Very good recommendations for Blackleg management exist in Canada. However, these are exclusively recommendations for spring canola and are not directly applicable to winter canola. Secondarily, there is not data on the degree to which blackleg infections is lowering yields. It is critical that information on yield loss and recommendations be fungicide application be developed. Since blackleg is a serious disease, it should be studied where the problem exists to prevent spread to unaffected areas.

More than 250,000 acres of Canola could be grown in the region and not adversely affect the market. Development of better agronomic practices will assist in increasing the acreage of winter Canola. Proper and feasible management of Blackleg will help in the effort to increase winter canola acreage in PNW.

RESEARCH OBJECTIVES:

1. Apply appropriate fungicides at first appearance of blackleg in late winter or early spring and followed by repeated applications to control blackleg and measure the benefit of control on yield.

2. Develop recommendations for fungicide applications to winter canola for treatment of blackleg disease

RESEARCH PROCEDURES: The effect of 1, 2 or 3 applications of Azoxystrobin (Quadris) (Group 11) fungicide to control blackleg was studied. A randomized complete block experiment with 4 treatments and 4 replications was used. Treatments were 1) control (no fungicide), 2) single application, 3) two applications, and 4) three applications. The experiment was conducted at the Columbia Basin Agricultural Research Center, Pendleton, Oregon on a Walla Walla silt loam, coarse loamy, mixed, mesic, hyperactive Typic Haploxeroll. Plots of Amanda winter canola were sown 15 September 2016 at 6 lb seed/acre with a 5-foot wide Hege plot, using 6-inch row spacing, JD double disk openers and press type packer wheels. Individual plot dimension was 10 X 20 feet

The label recommendation for timing and rate of Quadris is 7 oz/acre at 2-6 leaf stage. However, the timing is based on spring canola. The label permits a seasonal total application of 28 oz/acre. For this study, a rate of 7 oz/acre was used for each application with a carrier rate of 15 gallons water per acre. A backpack CO2 sprayer with 10-foot boom operated at 30 PSI was used for application. First application took place on 5 April 2017 with second and third application taking place on 15 and 25 April respectively. The crop stage at first application was early elongation (bolt). Application 2 was at mid elongation and application 3 was at initial bud formation. Blackleg lesions were observed in the plots in late February on the lower leaves of plants. We believe the infection took place in autumn of 2016.

Plot were divided in half to have two equal 5 X 20 foot plot. One plot was used for combine harvest and the other was used for destructive plant sampling. Plots to be combined were swath on 29 June 2017 with a 5-foot wide Swift Current plot swather. These plots were combined on 5 July 2017 with a Hege 140 plot combine. Header width is 5 feet with an auger and draper pick-up. Combine settings were 900 RPM for fan and cylinder speed and fully open concave spacing. Harvested seed was placed in cloth bags and later cleaned with a M2B clipper cleaner with 9/64 upper sieve and 3/64 lower sieve. Seed was then weighed and yield determined using 5-foot width and individually measured plot length. Oil content, percent protein, test weight and percent moisture were determined on subsamples using a Perten 9200 NIR grain analyzer that has a canola algorithm. After combining, the remaining 5 X 20 foot plot was sampled for incidence of Blackleg. All plants in an individual row in each plot were cut through the base with hand shearers to expose the basal stem area for presence of Blackleg. This is typical procedure for identifying Blackleg. Observation of each plant was recorded as healthy, blackleg infected or Sclerotinia infected. Percent Blackleg infected was determined comparing those infected to the total number of plants in each row.

RESULTS AND DISCUSSION: Application of Azoxystrobin had a significant effect on incidence of Blackleg. Percent Blackleg infection, yield and oil content are presented in Table 1. Two confidence levels 95% (P 0.05) and 85 % (P 0.15) are shown on the

table. The first application of 7 oz/acre of azoxystrobin on 5 April reduced Blackleg infection from 41.7 to 16.7 percent. The second application on April 15 did not change the incidence of Blackleg. The reason for this is not known, but we speculate that the first application was still active after 10 days so the second application had little effect. Addition of the third application reduced incidence of Blackleg to 6.6 percent.

The effect of azoxystrobin on yield was not significant at 95 % confidence but was significant at 85 percent confidence. When azoxystrobin was not applied yield was 3516 lb/acre. One or more applications of the product resulted in yields between 4069 to 4083 lb/acre a difference of about 550 lb/acre. This difference is not statistically significant at 95% but it is at 85%.

Azoxystrobin application had no effect on oil content of winter canola at either level of confidence.

Table 1. Effect of azoxystrobin application on percent Blackleg infection, yield and oil content of winter canola at CBARC, Oregon, 2017

Azoxystrobin Application	Blackleg infection %	p 0.05	p 0.15	Yield lb/acre	p 0.05	p 0.15	Oil Content %	p 0.05	p 0.15
None	41.7	A	A	3516	A	B	45.3	A	A
7 oz*	16.1	BC	BC	4069	A	A	45.2	A	A
7 oz* + 7 oz**	20.2	B	B	4075	A	A	45.7	A	A
7 oz*+ 7 oz**+ 7 oz***	6.6	C	C	4083	A	A	45.2	A	A
LSD		18	11		746	519		2	1.2

Application date * 5 April, ** 15 April, *** 25 April

Results of this study are very encouraging; however, this is a single year experiment at one location. The results do warrant further study. We attribute the high yields of this trial to an exceptional year for available water and moderate temperatures during the season, especially during flowering. It is surprising to us that with an infection rate of 41% in untreated plots that yield was not reduced more. This could be the result of the very favorable season for winter canola or a modest level of virulence in the Blackleg strain that is present or both. We observed a level of 5 to 8% Sclerotinia in this experiment (data not shown). The level was not correlated with azoxystrobin application. We conducted a separate satellite trial on Sclerotinia, where treatments were no azoxystrobin or 15 oz/acre at early flower (recommended rate and timing for control of Sclerotinia). Respectively, the levels of Sclerotinia were 7 and 9 percent and not statistically different. We feel confident that Sclerotinia did not affect the results of the Blackleg trial.

BUDGET:

SALARIES	
0.05 FTE Academic Research Assistant (0.57 OPE)	$1,500
OPE (benefits)	$855
Total	$2,355
SERVICES/SUPPLIES	$1,045
TRAVEL	$300
TOTAL	$4,000

BUDGET JUSTIFICATION:

Mr. Alan Wernsing 1 calendar month Salary of $1,500 is requested for biological technician. Fringe benefits are set by the University $855

Total salary and benefits requested = $2,355

Material and supplies = $1,045

- Combine Rental fee (@ $50/hour) 2 hour = $100
- Land rental fee = $400
- Bags, labels stakes, soil analysis, other supplies = $545

Travel (Mileage rates are set at $0.565/mile traveled)

- Local mileage for supplies and travel to local meetings 530 miles = $300