

# Agricultural Demonstration of Practices and Technologies (ADOPT)

## **FINAL REPORT**

**20120424**

### **DEMONSTRATING FOLIAR FUNGICIDE OPTIONS FOR CANOLA**

**Funded by: The Saskatchewan Ministry of Agriculture under the  
Canada-Saskatchewan Growing Forward bi-lateral agreement**

**April 2016**

**Prepared by: South East Research Farm (SERF)**

## Demonstration of Foliar Fungicide Options for Canola



### Introduction:

Canola frequently responds to application of fungicides for control of *Sclerotinia sclerotiorum*. Chemical fungicides are typically applied, but there is a biological fungicide Serenade Max that is registered for use in controlling sclerotinia in canola. This trial compares biological and chemical control options for sclerotinia against an untreated control for yield and disease incidence.

Astound is a broad-spectrum fungicide with the active ingredients cyprodinil (Group 9) and fludioxonil (Group 12).

Lance is a group 7 fungicide that starves a range of fungi of oxygen. It is effective on sclerotinia and has some systemic action.

Headline is a group 11 fungicide that is registered for control of blackleg and black spot in canola. It has no effectiveness on sclerotinia. It is applied before bud stage.

Proline or prothioconazole is a group 3 fungicide with good effectiveness on sclerotinia.

Serenade Max is QST 713 strain of *Bacillus subtilis* formulated as a wettable powder that can be sprayed on at fungicide timing. While Serenade Max is listed for control of sclerotinia in Canola, company representatives were reluctant to recommend it over chemical options like Proline. The company suggests that it is best used in combination with chemical fungicides to reduce problems with herbicide resistance. It is used on a broad range of crops for a broad range of disease problems. It is suitable for use in organic cropping systems, which are not particularly applicable for canola production.

## **Materials and Methods:**

In 2013, SERF was unable to seed this project due to excessive moisture at seeding. The project was deferred to 2014. Due to another year of very difficult seeding conditions, the fungicide trial was imposed on a rented producer field at SERF. Canola had not been grown on this field since 2010 and it was seeded into red millet stubble. This Liberty Link canola was broadcast seeded and harrowed on June 8 due to wet seeding conditions through May 2014. Liquid fertilizer was applied after seeding and before emergence. Due to very high moisture conditions through June 2014, establishment of this canola trial was excellent. In late June, already wet fields were inundated with 225mm of rainfall in one weekend. The farm area was badly flooded, but two healthy areas of the rented-out portion of the SERF home quarter was selected for imposition of the foliar fungicide treatments.

The spray treatments were applied using one side of a 28 foot plot sprayer. The spray plots were 18 feet wide by 30 feet long. Headline was applied on July 16<sup>th</sup> at the 5-6 leaf stage. The remaining herbicides were applied on July 28 at the 30% bloom stage. A second Serenade Max application was made on August 4 to treatment 7.

### Treatment List

1. Check
2. 0.16 L/ac Headline (20% bloom stage)
3. 142 g/ac Lance (20% bloom stage)
4. 0.16 L/ac Headline (4-6 leaf stage) and 142 g/ac Lance (20% bloom stage)
5. 0.15 L/ac Proline (20% bloom stage)
6. 395 g/ac Astound (20% bloom stage)
7. 4.8 kg/ac Serenade Max (20% bloom stage)
8. 2.4 kg/ac Serenade Max (20% bloom stage)

Vertisan was exchanged for the double Serenade Max treatment due to lack of availability in the market of this product that year.

The plots were established in two areas of the same field. Two reps were in the north area and two were in the south area. They had had similar cropping history, but seemed to differ in disease pressure.

Disease ratings of the main stem were made on August 18<sup>th</sup> while the canola was filling pods. The percentage of infected main stems was rated by SERF staff for each plot.

Plots were trimmed to 20 foot length before harvest to reduce edge effects through the growing season. The trial was straight-cut harvested on October 20. There was losses before harvest due to shattering when rain was followed by high winds. Since the farm doesn't have a swather for canola, our canola plots are more susceptible to this risk. Plant density was determined after harvest from stubble.

## Results and Discussion:

In general, the trial was effective, despite severe flooding in late June 2014. Because the trial was seeded in June and we were able to choose the trial location after establishment and flooding, the impact of the 2014 flood was minimal on this trial. Plant density was not significantly different between treatments and was sufficient generally. The mean plant density was 86 pl/m<sup>2</sup> with a standard error of 15. There was no lodging in the trial.

There were significant yield differences between fungicide treatments (Table 1, Figure 1). Only one fungicide treatment had significant yield increases over the untreated control. In this trial, Proline fungicide had the best effect for increasing yield and reducing disease incidence under moderate to high sclerotinia pressure. The others did not significantly increase yield over the untreated control.

Based on both disease incidence and yield, Headline and Lance combined was preferable to Headline alone. This is an expected response. It is surprising that the untreated control tended to have higher yield than some of the fungicide treatments. This is not due to trampling of the plots because the harvested area was not in sprayer tracks.

For disease incidence (Table 2, Figure 2), all chemical fungicides were better than the untreated control. The double application of Serenade Max was preferable to the single application for disease incidence.

Because we were straight-cutting the canola and there was significant shattering before harvest, it is likely that premature ripening of diseased plants contributed to the high yield loss in the UTC and some of the fungicide treatments. Industry information suggests that for a 40 bu./ac. Canola yield with 30% infection rate and 50% estimated yield loss:  $(40 \times 0.3) \times 0.5 = 6$  bu./ac. yield loss potential. The level of yield loss in this case was higher.

Serenade Max is a unique proprietary strain of *Bacillus subtilis* that is registered for use on Canola, but is not encouraged for conventional producers. It has a niche market in organic and horticultural applications. This organic-approved biofungicide was not as effective as chemical fungicides in controlling sclerotinia in canola when applied at flowering, even when applied twice. Since there is little or no organic market for canola, it is unlikely that this biofungicide will have much uptake among producers.

Tale 1. Canola yield for seven fungicide treatments compared with an untreated control (kg/ha).

Canola Yield (kg/ha)		P<0.001
Proline	1800.75	A
Headline + Lance	1607.25	AB
UTC	1313	BC
Astound	1119	C
Lance	1118.75	C
Serenade Max	1098.25	C
Headline	1045	C
Serenade Max 2x	1021	C

Figure 1. Canola Yield (kg/ha) for seven fungicide treatments compared with an untreated control.

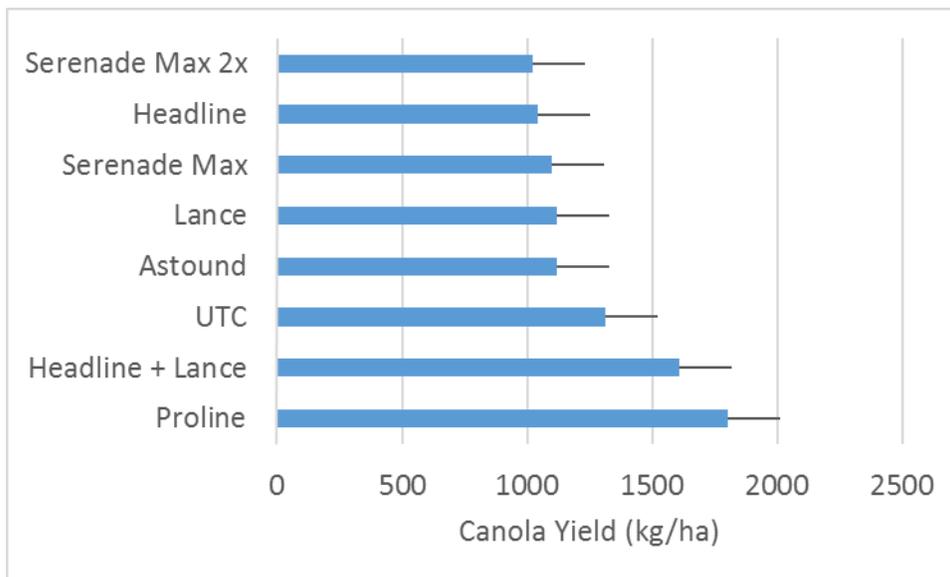
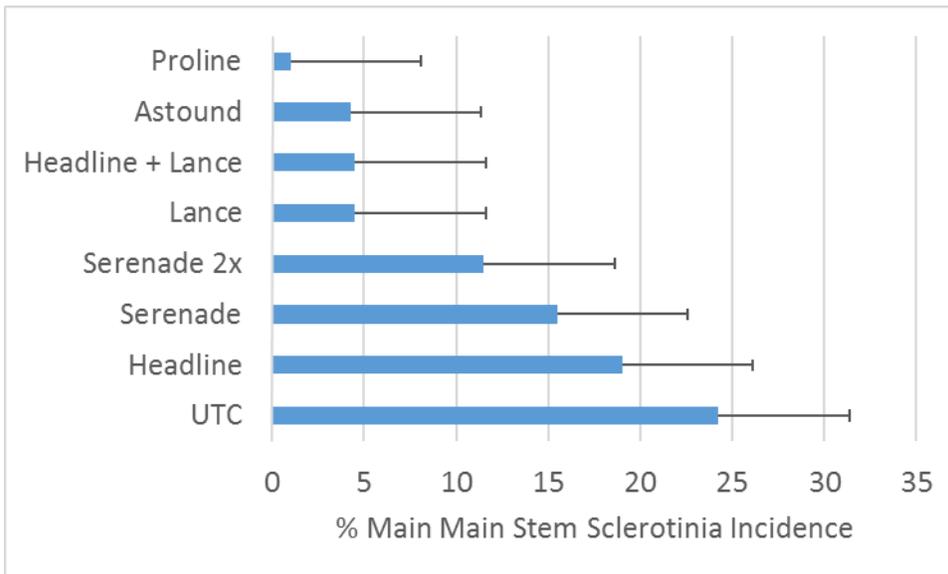


Table 2. Disease incidence (DI) (% of main stems with lesions) for seven fungicide treatments compared with an untreated control. P<0.05

Treatment	DI	p<0.05
UTC	24.25	A
Headline	19	AB
Serenade	15.5	ABC
Serenade 2x	11.5	ABC
Lance	4.5	BC
Headline + Lance	4.5	BC
Astound	4.25	BC
Proline	1	C

Figure 2. Canola disease incidence for seven fungicide treatments compared with an untreated control.



## **Conclusions and Recommendation**

The application of a chemical foliar fungicide like Proline was more effective in reducing disease incidence and increasing yield than the biofungicide Serenade Max. In 2014 in Redvers, the use of Proline chemical fungicide was very effective in reducing yield loss due to sclerotinia. Sclerotinia is an important economic disease of canola, and producers have no certainty that the cost of a fungicide application will be warranted. Better risk forecasting models are needed to reduce unnecessary applications and encouraging effective applications in high-risk seasons.

## **Abstract**

Seven fungicide treatments were compared with an untreated control in Redvers in 2014 in a replicated trial. Proline application resulted in the best response for both disease incidence and yield compared with the untreated control. Serenade Max showed some reduction in disease incidence, but did not increase yield significantly. Lance, Lance with Headline, and Astound reduced disease incidence, but did not seem to increase yield. Headline alone was ineffective in reducing sclerotinia incidence and preventing yield loss.

## **Supporting Information**

A simplified procedure for disease assessment was used for this trial due to the unexpected resignation of technician Ted Wiley and a summer student in August. Rather than doing destructive sampling, an estimated percentage for main stem infection was recorded. Fortunately, this resulted in good quality disease data.

The trial was discussed at the July 23, 2014 SERF field day, which was attended by 50 people, however most of the spray treatments had . Results will be included in the 2016 SERF Annual Report. Data will be combined with other Agri-ARM sites as much as possible, given that there are some different treatments.