

## **Project Identification**

1. **Project Title:** Fungicides for Use on Forage Seed Grasses
2. **Project Number:** 20140338
3. **Producer Group Sponsoring the Project:** Saskatchewan Forage Seed Development Commission (SFSDC)
4. **Project Location(s):**  
Northeast Agriculture Research Foundation (NARF)  
2 miles south of Melfort, SK on Hwy #6 at the  
Agriculture & Agri-Food Canada Research Station  
Box 1240, MELFORT SK S0E 1A0  
Stewart Brandt  
306 752-2776 ext 234  
sbrandt@neag.ca
5. **Project start and end dates (month & year):** February 20, 2015 to January 31, 2016
6. **Project contact person & contact details:**  
Ray McVicar, Executive Director SFSDC  
2782 Aster Crescent, REGINA SK S4V 1Z9  
306 789-1958  
sfsdc05r@gmail.com

**The project was supported by the Agricultural Demonstration of Practices and Technologies (ADOPT) initiative under the Canada-Saskatchewan Growing Forward bi-lateral agreement.**

### **7. Project objectives:**

The objective of this project was to demonstrate the importance of the control of leaf diseases and their impact on forage seed yield and quality as well as forage quality. The project uses registered fungicides on established timothy and tall fescue crops. ADOPT Project # 20110331 was carried out in 2012. Not all planned sites were established in that project mainly due to extremely wet field conditions. It was felt by the SFSDC board that the project should be carried out at another site to better demonstrate the importance of fungicide use in forage seed crop production.

### **8. Project Rationale:**

In the past few years, forage seed producers in Saskatchewan have reported an increase in leaf diseases that have negatively affected their grass seed yields and quality. The main plant disease of concern on timothy is purple eyespot (*Cladosporium phlei*). Leaf and stem rusts (*Puccinia graminis*) are of concern in tall fescue.

The use of fungicides on forage grass seed crops to improve yield and quality has been used extensively and with good success in Oregon. It has been used to a much lesser degree in the Prairies, and with favourable results. We used registered products with previously completed efficacy and tolerance trials to prove their value.

Propiconazole (product names Tilt, Pivot, Propel) and Headline EC are the only fungicide registered for use on timothy. Headline EC is the only fungicide registered for use on tall fescue. Producers wanted to see efficacy of Headline EC and propiconazole fungicide applications and also if there were positive yield responses to their application.

Producers have recently seen an improvement in the quality of timothy straw after harvest in fields where propiconazole fungicide was applied. This quality improvement increases the marketability and usefulness of the straw.

## 9. Methodology:

Timothy (variety Comtal) and tall fescue (variety Festival) plots were established in 2013. In autumn of 2014, plots received fertilizer N as 46-0-0 broadcast at a rate of 40 lb/ac of N.

The plot size was 12 feet x 24 feet and the treatments were replicated four times. Plots were inspected at the time of application for crop disease symptoms.

On June 15, 2015, using a tractor-mounted plot sprayer (**Figure 3**), Headline EC (160 ml/ac) was applied at the flag leaf to early flowering stage of timothy and tall fescue and Tilt (200 ml/ac) was applied at the flag leaf to early flowering stage of Timothy.

The manufacturers of Tilt (Syngenta Canada) and Headline EC (BASF Canada) fungicides supplied fungicide products for the project.

The temperature at time of application was recorded (19 degrees C) and the weather data was recorded for the 2015 growing season (**Table 1**) at Melfort, SK.

Plots were inspected 3 days after application for signs of crop injury from application. Flag leaves and whole plants were collected from the untreated area on June 22, 2015 and were submitted to the Saskatchewan Ministry of Agriculture Crop Protection Laboratory for leaf disease diagnosis.

Plots were combined on August 10, 2015 using a small plot combine and the seed was weighed to determine seed yield. Seed samples were collected to determine seed quality. Timothy straw samples were not collected for testing due to lack of plant diseases.

## 10. Results:

Temperatures during the 2015 growing season at Melfort were quite close to long term normal (**Table 1**) for all months, with average mean temperature for the whole growing season being only 0.1°C above normal. However, rainfall patterns showed a much different trend (**Table 1**). April was dry and May 2015 was much drier than normal and dry conditions persisted until late June when significant rains occurred. A single rainfall event on July 27 (over a 6 hour period) accounted for about 140 mm of the total 150 mm received that month. Precipitation for the months of June and August was near normal, but growing season total precipitation was 19% above normal.

The impact of weather on this project was to allow the forages to break dormancy at a normal time, but shortly thereafter crops experienced some degree of drought stress. This stress increased until it was alleviated by rains in late June.

Dry conditions early in the growing season, especially in April, May and early June reduced the level of plant diseases in most crops. There were no visible signs of leaf or stem plant disease at time of fungicide application, and this was confirmed by samples submitted to the Crop Protection Laboratory, Regina SK (**Figures 1 and 2**).

At 3 days after application, there was no evidence of any crop damage from the fungicides on the timothy or tall fescue crops.

The plots were viewed by Faye Dokken, Terry Kowalchuk, Danielle Stephens and Allan Foster, Saskatchewan Agriculture on July 20, 2015 as part of a small forage crop plant disease survey (**Figure 4**) in Northeastern Saskatchewan. No symptoms of plant diseases were noted.

Dry conditions limited germination of weeds in the plots. Early drought also limited tillering of the forage grasses which in turn reduced yield potential. The heavy rains on July 27 caused damage to many annual crops, but did not appear to cause any damage to the perennial forage grasses in this trial. This is most probably because the soil was drier and more able to absorb moisture that did not run off the plot areas. Ample moisture in August promoted filling of seed that had been set on earlier.

Seed yield of timothy was unaffected by fungicides and produced relatively high yields of about 1,000 kg/ha (**Table 2**). Fungicides did not affect seed purity of timothy either. Seed samples of timothy were 99% pure seed, with no prohibited noxious weed species present, and only low and variable numbers of primary and secondary noxious weed seeds present. There were a few other weed seeds present as well as very low numbers of seeds of other crop species. However, fungicides had no significant effect on any factor measured as an indicator of seed purity.

Because no plant disease symptoms were evident visually throughout the growing season or during analysis of plant samples at the Crop Protection Laboratory, timothy straw samples were not collected for submission to the forage testing laboratory.

The tall fescue stand was weak and spotty and as a result seed yield was quite low (**Table 3**). Seed yield was unaffected by fungicide. Seed quality tests showed that the tall fescue had large numbers of primary noxious weed seeds present in the samples. These consisted mostly of cleavers, perennial sow thistle and a few Canada thistle. In addition there were large numbers of other weed species present, primarily spiny annual sow thistle, annual sow thistle, dandelion narrow leafed hawk's beard and buckwheat, and a number of other common annual broadleaf species. The presence of more weeds in the tall fescue reflected the very weak and spotty stand of this forage crop, which did not compete effectively with weeds, and provided spaces for them to emerge and become well established.

#### **11. Conclusions and Recommendations:**

Dry growing conditions in April, May and the first 3 weeks of June 2015 reduced the level of plant diseases in most crops in Northeastern Saskatchewan. There were no visible signs of leaf or stem plant disease on either the timothy or tall fescue crops at time of fungicide application, during plot rating or at harvest. Samples collected from the untreated area just following application of the fungicides and submitted to the Saskatchewan Agriculture Crop Protection Laboratory in Regina, SK confirmed the lack of plant diseases present.

No fungicide treatments showed any evidence of any crop injury following application on the timothy or tall fescue crops.

Due to the very dry conditions and lack of the presence of plant diseases, fungicides in the trial had no impact on forage seed yields. To measure advantages of using fungicides in forage seed production, the project should be carried out in different growing conditions.

#### **12. Acknowledgements:**

This project was supported financially by Saskatchewan Ministry of Agriculture through their ADOPT program. ADOPT funding for the project was acknowledged on the SFSDC website, and in Newsletter and Magazine articles listed in the Extension section above.

Thank you to DLF Pickseed, Syngenta Canada, and BASF Canada for supplying seed and fungicide for the project. Thank you to Clayton Myhre, DLF Pickseed and Al Foster, Saskatchewan Ministry of Agriculture for their cooperation in planning and carrying out this project. Thank you to the Directors and producers of the Saskatchewan Forage Seed Development Commission for their guidance in planning this project.

Special thanks to Stewart Brandt, Brett Mollison and the crew at NARF and Agriculture and Agri-Food Canada, Melfort for their advice, expertise, time and efforts to carry out this project.

**13. Appendices:**

**Table 1:** Mean monthly temperature and precipitation at Melfort, SK., for May to August 2015, and long-term normals (1981-2010).

	May	June	July	August	Average/Total
		Maximum Temperature (°C)			
<b>2015</b>	17.5	22.8	23.5	22.8	21.7
<b>Long-Term</b>	17.2	22.3	23.6	23.5	21.7
		Minimum Temperature (°C)			
<b>2015</b>	2.2	9.9	12.2	11.1	8.9
<b>Long-Term</b>	4.1	9.4	11.3	10.0	8.7
		Mean Temperature (°C)			
<b>2015</b>	9.9	16.4	17.9	17.0	15.3
<b>Long-Term</b>	10.7	15.9	17.5	16.8	15.2
		Precipitation (mm)			
<b>2015</b>	7.1	54.8	149.8	57.4	269.1
<b>Long-Term</b>	42.9	54.3	76.7	52.4	226.3

**Table 2.** Influence of Fungicide treatment on Seed Yield and Seed Purity of timothy grown for seed at Melfort in 2015.

		Treatment		
		<u>Check</u>	<u>Headline EC</u>	<u>Tilt</u>
Seed yield	Kg/ha	1021	988	1064
	% pure seed	99	99	99
Noxious Weeds	Prohibited	0	0	0
	Primary <sup>1</sup>	0	1	1.5
	Secondary <sup>2</sup>	0	0	10
Other Weeds	Total <sup>3</sup>	75	27	257
Other Crops	Total <sup>4</sup>	4.5	4	13

<sup>1</sup> Primary noxious weed seed included perennial sow thistle. <sup>2</sup> Secondary noxious included night flowering catchfly. <sup>3</sup> Other weeds were primarily cinquefoil and narrow leafed hawk's beard and a few other common annual broadleaf species as well as dandelion. <sup>4</sup> other crops seeds were slender wheatgrass and alsike clover.

**Table 3.** Influence of Fungicide treatment on Seed Purity of tall fescue grown for seed at Melfort in 2015.

		Treatment	
		<u>Check</u>	<u>Headline EC</u>
Seed yield	Kg/ha	233	178
	% pure seed	80	72
Noxious Weeds	Prohibited	0	0
	Primary <sup>1</sup>	503	1615
	Secondary <sup>2</sup>	20	43
Other Weeds	Total <sup>3</sup>	1604	1189
Other Crops	Total <sup>4</sup>	47	17

<sup>1</sup> Primary noxious weed seed included cleavers, perennial sow thistle and Canada thistle. <sup>2</sup> Secondary noxious included night wild oat and stinkweed. <sup>3</sup> Other weeds were primarily spiny annual sow thistle, annual sow thistle, dandelion narrow leafed hawk's beard and buckwheat, and a number of other common annual broadleaf species. <sup>4</sup> Other crops seeds were ryegrass and alsike clover.

**Figure 1.** Crop Protection Laboratory, Regina SK report on timothy June 2015.

 <p>Government of Saskatchewan</p>	<p><b>Crops and Irrigation Branch Crop Protection Laboratory</b></p>	<p><b>Ministry of Agriculture</b></p>
<p>July 13, 2015</p>		<p>346 McDonald Street REGINA Canada S4N 6P6</p>
<p>Northeast Agricultural Research Foundation Box 1240 MELFORT SK S0E 1A0</p>		<p>Phone: 306-787-8130 Fax: 306-787-8803</p>
<p><b>Re: Sample #15-063 (Timothy)</b></p>		
<p><b>Diagnosis: No Pathogen</b></p>		
<p>The timothy sample was submitted to the Crop Protection Laboratory. Submitter wants the laboratory to check for any plant disease from different parts of the sample.</p>		
<p>Laboratory observations revealed yellowish-brown discoloration on the leaf. Leaves and root samples were cultured for disease. There was no pathogen (disease causing organism) cultured from the root and leaf cultures.</p>		
<p>However, yellowing of leaves observed is likely physiological. Physiological leaf spots do not require fungicide treatment because they are not pathogen-borne and their impact is minimal on yield. Physiological leaf spot is favored by wet, cool spring and summer conditions. Warm sunny days in combination with rain can also favor the development of the symptoms</p>		
<p>Sincerely,</p>		
		
<p>Cecilia Peluola PAg. PhD Supervisor Crop Protection Laboratory Crops and Irrigation Branch</p>		

**Figure 2.** Crop Protection Laboratory, Regina SK report on tall fescue sample. June 2015.

 <p>Government of Saskatchewan</p>	<p><b>Crops and Irrigation Branch Crop Protection Laboratory</b></p>	<p><b>Ministry of Agriculture</b></p> <p>346 McDonald Street REGINA Canada S4N 6P6</p> <p>Phone: 306-787-8130 Fax: 306-787-8803</p>
<p>July, 2015</p> <p>Brett Mollison Northeast Agriculture Research Foundation Box 1240 MELFORT SK S0E 1A0</p> <p><b>Re: Sample #15-062 (Tall Fescue)</b></p> <p><b>Diagnosis: No Disease</b> Tall Fescue samples were submitted to the Crop Protection Laboratory. Submitter wanted to check for disease and the state of health of these samples. Leaves, stems and heads appeared healthy. In order to ascertain the state of health of the plant, root sample were cultured for any associated pathogen (disease causing organism).</p> <p>Laboratory observation found no disease on the fescue submitted. Root cultured did not confirm any pathogen on this submission.</p> <p>Sincerely,</p>  <p>Cecilia Peluola PAg, PhD Supervisor Crop Protection Laboratory Crops and Irrigation Branch</p>		



**Figure 3.** Tractor-mounted plot sprayer at NARF. Source: SFSDC



**Figure 4.** Dokken, Stephens, Foster – SK Agriculture. Forage crop disease survey. July 2015. Source: SFSDC