Demonstrating canaryseed's week response to nitrogen and strong response to fungicide

W.E. May[1], D. Petty[2], B. Nybo[3], G.P. lafond[1], A. Kirk[4] and S. Brandt[5]

[1]Agriculture and Agri-Food Canada, Indian Head, SK; [2]Indian Head Agricultural Research Foundation, Indian Head, SK; [3]Wheatland Conservation Association, Swift Current, SK; [4] Western Applied Research Corporation, Scott, SK; [5] North East Research Foundation, Melfort, SK

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Abstract

Extensive research has been done on the effects of nitrogen and fungicides on canaryseed: however, growers still ask a lot of questions about the use of nitrogen and fungicides. With the increased amounts of nitrogen being used in other crops, growers have difficulty believing that using more nitrogen in canaryseed will not be beneficial. Growers will benefit if they don't spend money on an input that will not increase the profitability of their farm. In addition Producers will be exposed to the questions they need to ask about when and when not to apply a fungicide to their canaryseed.

There two objectives in this project were to demonstrate the week response of canaryseed to nitrogen fertilizer and to demonstrate the strong response of canaryseed, to the application of a fungicide to control septoria leaf mottle. The demonstration was set up with 6 nitrogen rates 10, 20 30 50 70 90 kg/ha and two fungicide treatments, no fungicide or fungicide (Stratego). The demo was set up as a split plot with the fungicide treatment being the main plot and the nitrogen treatment as the split plot. As expected, N had very little positive impact on canaryseed. Increasing the rate of N increased the height of the canaryseed at Scott and increased lodging at Indian Head and Scott. Grain yield increased at Swift Current and decreased at Melfort as the N rate increased. The increase at Swift Current was small. The reason for the decrease at Melfort is unknown. At Melfort the tillers per m^2 were significantly higher than at Indian Head or Swift Current; it is impossible to determine if this difference in tillering is related to the negative yield response at Melfort. The N response supports the research published and the information being distributed to farmers. Test weight declined as the N rate increased at Indian Head and Melfort. The application of a fungicide affected grain yield, disease development, test weight and kernel weight. Grain yield was increased by the application of a fungicide at Indian Head and Melfort. The application of a fungicide increase test weight and kernel weight at both Melfort and Indian Head. As expected canaryseed does not require a large amount of N fertilizer and it often benefits from the application of a fungicide.

Introduction

Extensive research has been done on the effects of nitrogen and fungicides on canaryseed: however, growers still ask a lot of questions about the use of nitrogen and fungicides. With the increased amounts of nitrogen being used in other crops, growers

have difficulty believing that using more nitrogen in canaryseed will not be beneficial. Growers will benefit if they don't spend money on an input that will not increase the profitability of their farm. In addition Producers will be exposed to the questions they need to ask about when and when not to apply a fungicide to their canaryseed.
There are two objectives in this project
I) to demonstrate the week response of canaryseed to nitrogen fertilizer
II) to demonstrate the strong response of canaryseed, on the eastern side of Saskatchewan, to the application of a fungicide to control septoria leaf mottle.

Materials and Methods
The demonstration was set up with 6 nitrogen rates 10, 20 30 50 70 90 kg/ha and two fungicide treatments, no fungicide or fungicide (Stratego). The demo was set up as a split plot with the fungicide treatment being the main plot and the nitrogen treatment as the split plot. Replication will be included to allow the results to be presented at winter meetings and differences or lack of differences among the treatments being demonstrated. The demonstration was conducted at Indian Head, Redvers, Swift Current, Melfort and Scott. However, the plots were lost at Redvers due to a spray error at at Scott due to hail. The following information was collected

1) Soil test: 0-6 inches, 6-24 inches, N, P, K, and S bulked across the test
2) Plant density, (minimum of 2-one metre of row per plot)
3) Tiller density (# of heads per unit area, 2-one metre of row per plot
4) plant height, (2 per plot)
5) Lodging,
6) Leaf Mottle rating at Flag leaf, and maturity
7) Days to maturity,
8) Grain yield,
9) 1000 Kernel weight

Results
As expected, N had very little positive impact on canaryseed (Tables 1, 2, 3 and 4). Nitrogen did not change the plant density, tiller density, maturity or kernel weight. Increasing the rate of N increased the height of the canaryseed at Scott (Table 4) and increased lodging at Indian Head (Table 1) and Scott (Table 4). There was a small increase in the disease rating at Indian Head (Table 1) with an increase N rate but not at the other three locations. Grain yield increased at Swift Current (Table 2) and decreased at Melfort (Table 3) as the N rate increased (Fig. 1). The increase at Swift Current was small. The reason for the decrease at Melfort is unknown. At Melfort the tillers per m^2 were significantly higher than at Indian Head or Swift Current; it is impossible to determine if this difference in tillering is related to the negative yield response at Melfort. The N response supports the research published and the information being distributed to farmers. Test weight declined as the N rate increased at Indian Head (Table 1) and Melfort (Table 3).

The application of a fungicide would not be expected to affect plant density, tiller density, and height since the fungicide is applied after they have been determined. The application of a fungicide affected grain yield, disease development, test weight and kernel weight. Grain yield was increased by a fungicide application at Indian Head and

Melfort (Fig. 1). At Scott the application of a fungicide lowered the disease development (Table 4). The application of a fungicide increase Test weight and Kernel weight at both Melfort and Indian Head (Tables 1 and 3).

Conclusion

As expected canaryseed does not require a large amount of N fertilizer and it often benefits from the application of a fungicide. There was no large interaction between nitrogen and fungicide application.

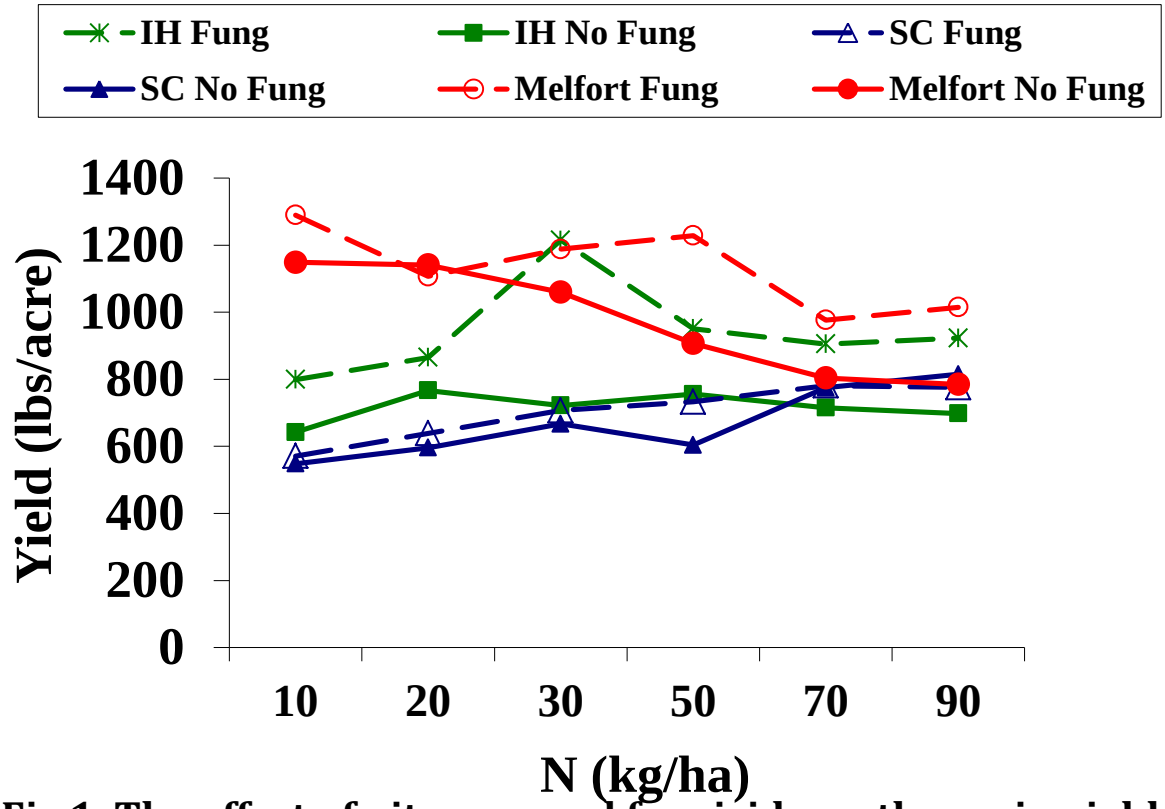

Fig 1. The effect of nitrogen and fungicide on the grain yield of Canaryseed.

Table 1. The Effect of nitrogen rate and a fungicide application on the Yield and development of Canaryseed at Indian Head in 2012

Fungicide	Nitrogen rate	Plant Density	Tiller Density	Height	Lodging	Septoria Leaf Mottle	Grain yield	Test weight	Kernel weight
	kg/ha	plant/m 2	tillers/m 2	cm	0-10	0-11	kg/ha	g/0.5 L	g/1000 K
None	10	257.1 a	420.4 a	78.4 a	1.0 f	5.0 b	714.2 c	353.8 ab	7.2 a
	20	218.6 a	440.5 a	67.1 a	1.4 ef	5.5 a	855.6 bc	356.0 ab	7.0 a
	30	235.8 a	406.0 a	72.3 a	1.7 def	5.8 a	795.7 bc	348.3 b	7.1 a
	50	233.8 a	447.0 a	71.3 a	2.5 cd	5.8 a	845.6 bc	347.2 b	6.7 a
	70	223.9 a	445.0 a	68.7 a	3.7 b	6.0 a	800.6 bc	335.8 C	6.6 a
	90	232.1 a	461.0 a	70.9 a	5.7 a	6.0 a	783.2 bc	333.2 C	6.5 a
Stratego	10	253.0 a	418.7 a	77.2 a	1.2 ef		893.9 bc	363.9 a	7.1 a
	20	251.0 a	420.4 a	76.8 a	1.4 ef		970.6 abc	358.7 ab	7.1 a
	30	220.6 a	410.9 a	67.3 a	2.1 cde		1301.7 a	359.5 ab	7.2 a
	50	226.0 a	456.4 a	69.7 a	2.1 cde		1064.0 ab	355.3 ab	7.2 a
	70	205.1 a	409.3 a	62.8 a	3.2 bc		1012.9 abc	353.8 ab	7.0 a
	90	230.9 a	447.4 a	70.5 a	5.6 a		1024.0 ab	349.2 ab	7.0 a
LSD (P=.05)		36.6	44.0	6.975t	0.10t	0.4	0.09t	9.4	0.4
Standard Deviation		25.3	30.5	4.831t	0.07t	0.3	0.06t	6.5	0.3
CV		10.9	7.1	8.4	13.6	5.4	2.2	1.9	4.1

Table 2. The Effect of nitrogen rate and a fungicide application on the Yield and development of Canaryseed at Swift Current in 2012

Fungicide	Nitrogen rate kg/ha	Plant Density plant/m2	Tiller Density tillers/m2	Height cm	Lodging 0-10	Septoria Leaf Mottle 0-11	Maturity Days	Grain yield kg/ha
None	10	220.3 a	249.9 a	74.0 a	1 a	0 a	85.3 a	615.0 b
	20	223.1 a	246.1 a	77.3 a	1 a	0 a	84.0 a	669.3 ab
	30	231.9 a	249.9 a	80.3 a	1 a	0 a	83.3 a	748.8 ab
	50	242.2 a	249.4 a	80.3 a	1 a	0 a	85.0 a	678.0 ab
	70	235.1 a	264.1 a	83.1 a	1 a	0 a	84.3 a	870.0 ab
	90	233.0 a	268.0 a	83.4 a	1 a	0 a	84.3 a	915.7 a
Stratego	10	244.4 a	248.3 a	79.8 a	1 a	0 a	83.5 a	641.7 ab
	20	238.4 a	243.4 a	73.8 a	1 a	0 a	83.5 a	718.2 ab
	30	252.6 a	247.7 a	78.4 a	1 a	0 a	83.5 a	794.6 ab
	50	234.0 a	253.7 a	81.5 a	1 a	0 a	82.8 a	823.8 ab
	70	229.1 a	272.3 a	79.1 a	1 a	0 a	83.5 a	877.3 ab
	90	253.2 a	273.9 a	80.6 a	1 a	0 a	83.5 a	872.1 ab
LSD (P=.05)		35.939	27.831	5.722	0	0	1.77	162.41
Standard Deviation		24.89	19.275	3.963	0	0	1.23	112.48
CV		10.53	7.54	5	0	0	1.47	14.63

Table 3. The Effect of nitrogen rate and a fungicide application on the yield and development of Canaryseed at Melfort in 2012

Fungicide	Nitrogen rate kg/ha	Plant Density plant/m2		Tiller Density tillers/m2		Height cm		Lodging 0-10		Septoria Leaf Mottle 0-11		Maturity Days		Grain yield kg/ha		Test weight g/0.5 L		Kernel weight g/1000 K	
None	10	247.9	a	790.5	a	100.5	a	1.0	b	0	a	118	a	1290.0	abc	325.4	abc	7.1	a
	20	239.3	a	664.4	a	104.5	a	1.0	b	0	a	118	a	1282.1	abc	325.7	abc	7.2	a
	30	241.1	a	665.0	a	102.6	a	1.0	b	0	a	118	a	1190.3	bcd	324.0	abc	7.2	a
	50	258.4	a	649.6	a	100.4	a	1.0	b	0	a	118	a	1019.1	de	319.9	bc	7.0	a
	70	238.1	a	705.6	a	101.1	a	1.3	b	0	a	118	a	902.9	e	320.4	bc	7.0	a
	90	209.8	a	706.2	a	103.3	a	2.0	a	0	a	118	a	882.1	e	319.0	c	7.0	a
Stratego	10	274.4	a	796.6	a	100.9	a	1.0	b	0	a	118	a	1449.2	a	330.4	ab	7.3	a
	20	269.4	a	666.8	a	104.9	a	1.0	b	0	a	118	a	1243.9	a-d	327.6	abc	7.4	a
	30	266.4	a	686.5	a	109.0	a	1.0	b	0	a	118	a	1334.3	abc	328.9	abc	7.4	a
	50	259.6	a	852.6	a	104.1	a	1.0	b	0	a	118	a	1380.3	ab	331.6	a	7.5	a
	70	258.4	a	709.3	a	99.9	a	1.3	b	0	a	118	a	1097.3	cde	325.5	abc	7.4	a
	90	247.3	a	818.8	a	104.3	a	1.3	b	0	a	118	a	1140.4	bcd	323.2	abc	7.3	a
LSD (P=.05)		37.2019		153.9951		6.999		0.48		0		0		161.9		6.4		0.3	
Standard Deviation		25.7647		106.6513		4.848		0.33		0		0		112.1		4.4		0.2	
CV		10.27		14.69		4.71		28.91		0		0		9.5		1.4		3.4	

Table 4. The Effect of nitrogen rate and a fungicide application on the yield and development of Canaryseed at Scott in 2012

Fungicide	Nitrogen rate kg/ha	Plant Density plant/m2	Tiller Density tillers/m2	Height cm	Lodging 0-10	Septoria Leaf Mottle flag leaf (0-11)	Septoria Leaf Mottle maturity (0-11)
None	10	163 a	506 ab	96.3 ab	1.0 e	0.0 a	7.6 a
	20	157 a	593 ab	98.8 ab	1.3 de	0.0 a	7.2 a
	30	175 a	508 ab	99.4 ab	2.0 bcd	0.0 a	7.8 a
	50	124 a	546 ab	105.0 a	2.0 bcd	0.1 a	7.5 a
	70	143 a	538 ab	105.0 a	2.8 ab	0.0 a	8.1 a
	90	164 a	660 a	103.8 a	3.0 a	0.1 a	7.9 a
Stratego	10	145 a	455 b	93.1 b	1.5 cde	0.0 a	0.0 b
	20	186 a	526 ab	96.3 ab	1.5 cde	0.0 a	0.4 b
	30	167 a	542 ab	98.8 ab	2.3 abc	0.0 a	0.2 b
	50	134 a	571 ab	101.9 ab	2.3 abc	0.0 a	0.2 b
	70	147 a	572 ab	102.5 a	2.8 ab	0.0 a	0.5 b
	90	153 a	618 ab	103.1 a	3.0 a	0.0 a	0.2 b
LSD (P=.05)		36.9	105.0	5.7	0.6	0.0	1.2
Standard Deviation		25.5	72.7	3.9	0.4	0.0	0.8
CV		16.5	13.2	3.9	18.0	234.8	21.2