Impact of previous crop on soybean and canola yield

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Double-Crop Soybean after Canola vs. Wheat

Year	Previous Crop	Soybean Yield (bu/A)
1989	Canola planted Jun 17	46.0 a
	Canola planted June 30	37.6 b
	Wheat planted June 30	29.8 c
1990	Canola	44.2 a
	Wheat	41.9 a
2008	Canola	43.0 a
	Wheat	36.4 b
2009	Canola	63.8 a
	Wheat	65.9 a

Murdock and Herbek, U of Kentucky

Canola / Soybean studies

- One South Carolina grower indicated that he plants soybean following canola with soybean yields showing a 10-20% advantage over soybean following wheat (Roberson 2012).

- An Alabama study in 2003 and 2004 showed that canola plant density and yield were generally higher after soybean than after corn, sorghum, cotton, or fallow (Kumar et al. 2007).

- Not all experience has shown a favorable response to a tight rotation between canola and soybean. A long-term study (1998-2007) in Saskatchewan, Canada evaluated canola yield when grown following various crops. Canola yielded lower after soybean (101) compared to spring wheat (124), dry pea (122), barley (120), flax (118), oat (114), and winter wheat (113). (The number in parentheses is the canola yield expressed as a percent of the canola on canola yield (100)), (Brandt and Kubinec).

- A long-term rotation study in Georgia (1994-1999) showed that soybean stand was 18-25% lower following canola than following small grains in all years except 1998. Soybean yields were lower following canola compared to wheat in all years, though statistically significant only in one year. False chinch bug population was higher following canola, but no seedling injury was observed. Soybean stand reduction was mainly attributed to interference of canola stubble with planter performance or possibly chemical or biological factors associated with canola stubble (Buntin et al. 2007).

Objectives

1: Determine if soybean yield is greater following canola than wheat

2: Determine if canola yield is greater following soybean than wheat

Table 1. Planned crop sequence to evaluate effect of previous crop on soybean and canola yield.

Treatment	2013	2014	2015
1	Wheat	Wheat	Soybean
2	Wheat	Canola	Soybean
3	Wheat	Wheat	Canola
4	Wheat	Soybean	Canola

Table 2. Planned crop sequence to evaluate effect of previous crop on soybean and canola yield.			
Treatment	2014	2015	2016
1	Wheat	Wheat	Soybean
2	Wheat	Canola	Soybean
3	Wheat	Wheat	Canola
4	Wheat	Soybean	Canola

Methods

- 4 locations (Minot, Langdon, Carrington, Roseau)
- Plots 30 by 30 ft
- 4 replications
- Managed for optimum growth
- LL canola, RR soybean
- Data: Yield, test weight, oil, protein, crop density, crop height, flowering date, physiological maturity, sclerotinia evaluations
- Every phase not present every year

Soybean on wheat vs canola (2015)

Minot

Rotation	Density	Height	Yield	Test wt	Oil
	sq ft	cm	bu/A	lb/bu	----%----
W-W-S	4.5 a	22.9 a	32.7 a	58.2 a	15.9 a
W-C-S	5.1 a	20.9 a	32.8 a	58.3 a	16.2 a

Langdon

Rotation	Density	Height	Yield	Test wt	Oil
	sq ft	cm	bu/A	lb/bu	----%----
W-W-S	5.3 a	38.3 a	39.5 a	57.3 a	15.9 a
W-C-S	6.3 a	37.2 a	41.1 a	57.0 b	16.1 a

Carrington

Rotation	Density	Height	Yield	Test wt	Oil
	sq ft	cm	bu/A	lb/bu	----%----
W-W-S	5.0 a	66.4 a	34.9 a	58.0 a	xx.x
W-C-S	4.7 a	58.5 b	33.5 a	58.2 a	xx.x

Canola on wheat vs soybean (2015)

Minot

Rotation	Density	Height	Yield	Test wt	Oil
	sq ft	cm	lbs/A	lb/bu	----%----
W-W-C	10.7 a	72.0 a	2005 a	51.5 a	40.4 a
W-S-C	9.1 a	72.8 a	2213 a	51.7 a	39.4 b

Langdon

Rotation	Density	Height	Yield	Test wt	Oil
	sq ft	cm	lbs/A	lb/bu	----%----
W-W-C	12.4 a	56.7 a	3335 a	51.9 a	49.3 a
W-S-C	11.6 a	56.2 a	3330 a	52.1 a	48.4 a

Carrington

Rotation	Density	Height	Yield	Test wt	Oil
	sq ft	cm	lbs/A	lb/bu	----%----
W-W-C	11.1 a	104 a	2150 a	52.0 a	43.1 a
W-S-C	12.6 a	105 a	1976 a	52.2 a	43.1 a

Soybean on wheat vs canola (2016)

Minot

Rotation	Density	Height	Yield	Test wt	Oil
	sq ft	in	bu/A	lb/bu	----%----
W-W-S	6.7 a	33.0 a	33.9 a	58.7 a	xx.x
W-C-S	7.1 a	30.4 a	31.0 a	58.5 a	xx.x

Langdon

Rotation	Density	Height	Yield	Test wt	Oil
	sq ft	in	bu/A	lb/bu	----%----
W-W-S	7.0 a	37.1 a	54.8 a	57.1 a	15.0 a
W-C-S	5.5 a	38.8 a	56.1 a	57.3 a	14.8 a

Carrington

Rotation	Density	Height	Yield	Test wt	Oil
	sq ft	in	bu/A	lb/bu	----%----
W-W-S	4.0 a	29.1 a	51.3 a	55.5 a	15.7 a
W-C-S	4.4 a	29.1 a	48.5 a	56.9 a	15.8 a

Canola on wheat vs soybean (2016)

Minot

Rotation	Density	Height	Yield	Test wt	Oil
	sq ft	in	lb/A	lb/bu	----%----
W-W-C	10.3 a	38.4 a	1892 a	50.1 a	xx.x
W-S-C	11.0 a	37.7 a	1825 a	50.2 a	xx.x

Langdon

Rotation	Density	Height	Yield	Test wt	Oil
	sq ft	in	lb/A	lb/bu	----%----
W-W-C	13.4 a	48.0 a	2840 a	52.4 a	48.1 a
W-S-C	12.9 a	47.5 a	2756 a	52.6 a	48.7 a

Carrington

Rotation	Density	Height	Yield	Test wt	Oil
	sq ft	in	lb/A	lb/bu	----%----
W-W-C	9.3 a	29.6 a	2008 a	42.6 a	38.5 a
W-S-C	9.9 a	29.5 a	2105 a	43.6 a	40.2 a

Roseau

Soybean on wheat vs canola (2016)

Rotation	Density	Height	Yield
	sq ft	in	bu/A
W-W-S	**4.2 a**	**21 a**	**50.6 b**
W-C-S	**3.5 a**	**21 a**	**55.4 a**

Roseau

Canola on wheat vs soybean (2015)

Rotation	Density	Height	Yield	Oil
	sq ft	in	lb/A	----%----
W-W-C	9.3 a	41.0 a	1430 b	52.0 a
W-S-C	8.4 a	41.0 a	1817 a	49.0 b

Roseau

Canola on wheat vs soybean (2016)

Rotation	Density	Height	Yield	Oil
	sq ft	In	lb/A	----%----
W-W-C	11.5 a	43.0 a	2309 a	48.1 a
W-S-C	11.8 a	46.0 a	2546 a	48.2 a

Summary

- At three ND locations, no significant difference in yield, test weight, density, height, oil, protein, etc.
- Very little disease at any of the locations.
- In MN 2016, significantly higher S yield following C compared to S following W.
- In MN 2015 and 2016, slightly higher C yield following S compared to C following W.

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