



Establishing Forages with a Companion Cash Crop

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Can an economic return in year 1 be achieved without damaging the return of future years?

Forage seed production year 1 = no economic return

- 1) Evaluating the Placement of Companion Crops for Forage Establishment and Seed Production
- 2) Demonstrating the Effects of Red and Alsike Clover Seed Crops in Rotation
- 3) Evaluating the use of Direct Seeding and Pre-Seeding Cultivation in Forage Seed Crop Establishment

Evaluating the Placement of Companion Crops for Forage Establishment and Seed Production

Objectives

- 1) demonstrating the effectiveness of alternative row companion crop planting for establishing forage seed crops
- 2) demonstrating the agronomic advantages of alternative row planting
- 3) demonstrating the economics of alternative row seeding for seed growers

Evaluating the Placement of Companion Crops for Forage Establishment and Seed Production

Treatment #	Main Crop	Companion Crop	Placement
1	Meadow Bromegrass	Alone	9"
2	Meadow Bromegrass	Alone	18"
3	Meadow Bromegrass	Wheat	9" (Same Rows)
4	Meadow Bromegrass	Wheat	18" (Alternative Rows)
5	Wheat (Canola 2018)	Alone	9"
6	Wheat (Canola 2018)	Alone	18"

Evaluating the Placement of Companion Crops for Forage Establishment and Seed Production

Plant Density	Year 1 (2014& 15)		Year 2 (2017 & 18)
	MB	Wheat	MB
Meadow Brome at 9"	26.5 A		7.8 B
Meadow Brome at 18"	28.6 A		9.6 A
Same 9" row	10.1 B	46.8 BC	6.0 C
Alternative 18" row	21.26 A	58.8 A	8.6 AB
Wheat at 9"		47.0 BC	
Wheat at 18"		53.7 AB	

June 2018

Meadow Brome on 9 inch



Meadow Brome on 18 inch



June 2018

18 inch Alternative Row



9 inch Same Row



July 2018

Meadow Brome on 9 inch



Meadow Brome on 18 inch



June 2018

18 inch Alternative Row



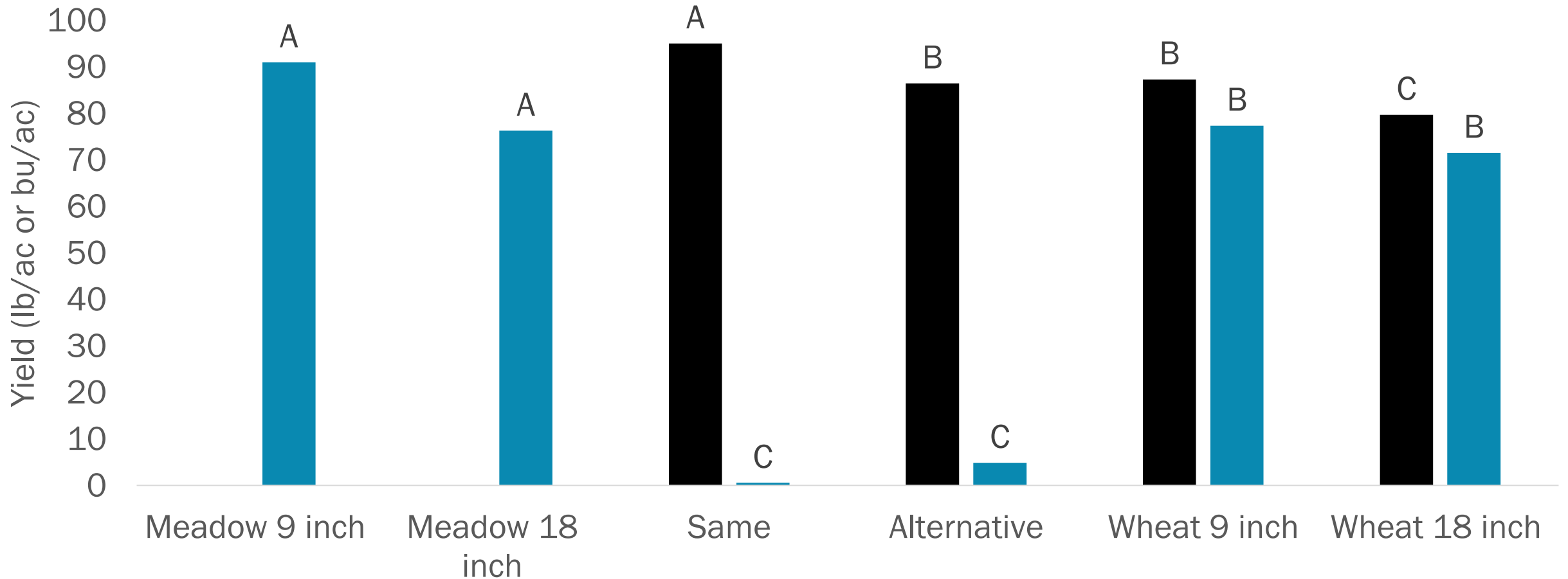
9 inch Same Row



Evaluating the Placement of Companion Crops for Forage Establishment and Seed Production

Yield	2014 - 2015		
	MB (LBAC)	Wheat (BUAC)	Canola (BUAC)
Meadow Brome at 9"	828 A		
Meadow Brome at 18"	896 A		
Same 9" row	236 B	56 A	
Alternative 18" row	289 B	57 A	
Wheat at 9"		61 A	60
Wheat at 18"		58 A	

Evaluating the Placement of Companion Crops for Forage Establishment and Seed Production



2017 $p < 0.0001$ ***
2018 $p < 0.0001$ ***

Est. Forages with a Companion Cash Crop



Evaluating the Placement of Companion Crops for Forage Establishment and Seed Production

Economics

\$2/lb for Meadow Brome; \$6/bu for Wheat

\$222 for Meadow Brome alone; \$232 for Meadow Brome + Wheat Mix; \$127 for Wheat alone

Treatment	2015	2018
Meadow Brome 9"	\$ 1,433	- \$ 40
Meadow Brome 18"	\$ 1,570	- \$ 70
Same Row 9"	\$ 576	- \$ 228
Alternative Row 18"	\$ 688	- \$ 193
Wheat 9"	\$ 239	\$ 396
Wheat 18"	\$ 221	\$ 351

Demonstrating the Effects of Red and Alsike Clover Seed Crops in Rotation

Objectives

- 1) Demonstrate the effect of cover crop on red and alsike clover seed production
- 2) Demonstrate the use of Odyssey and Viper ADV for weed control
- 3) Demonstrate the effect of short-term legume seed crops have on reduced N fertilizer requirements in wheat crop rotations
- 4) Demonstrate direct seeding of wheat into red and alsike clover residue

Demonstrating the Effects of Red and Alsike Clover Seed Crops in Rotation

	2017 Crop	2018 Crop	2019 Crop
1	Red Clover/ Clearfield Canola	Red Clover	Wheat
2	Red Clover	Red Clover	Wheat
3	Alsike Clover/ Clearfield Canola	Alsike Clover	Wheat
4	Alsike Clover	Alsike Clover	Wheat
5a	Clearfield Canola	Peas	Wheat – 0 kg N/ha
5b	Clearfield Canola	Peas	Wheat – 40 N
5c	Clearfield Canola	Peas	Wheat – 80 N
5d	Clearfield Canola	Peas	Wheat – 120 N
5e	Clearfield Canola	Peas	Wheat – 160 N

Effects of Red and Alsike Clover Seed Crops in Rotation

- **Notes:**

- 2017: clover with no cover was very weedy but with canola cover it was very clean
- May 2018: with no cover, both clovers were 7 inches tall and healthy but with cover 3.5 inches and very sparsely populated
- June 2018: Viper ADV controlling vol. canola, Alsike with no cover starting to flower
- July 2018: Red clover without cover were in full flower and much more advanced than those with the previous canola cover. All Alsike plots were much more advanced than Red clover, but same trend.

Demonstrating the Effects of Red and Alsike Clover Seed Crops in Rotation

Plant Density

	% Ground Cover
Red Clover/ Canola	58.8 B
Red Clover	93.8 A
Alsike Clover/Canola	67.5 B
Alsike Clover	83.8 A
Canola (Pea)	

Demonstrating the Effects of Red and Alsike Clover Seed Crops in Rotation

Sclerotina

	% Sclerotina Risk
Red Clover/ Canola	34.4 A
Red Clover	34.4 A
Alsike Clover/Canola	18.8 A
Alsike Clover	31.3 A
Canola (Pea)	

June 2018

Alsike Under seeded to Canola



Alsike without cover



June 2018

Red Under seeded to Canola



Red Without Cover



July 2018

Alsike Under seeded to Canola



Alsike without Cover



July 2018

Red Under seeded to Canola



Red Without Cover

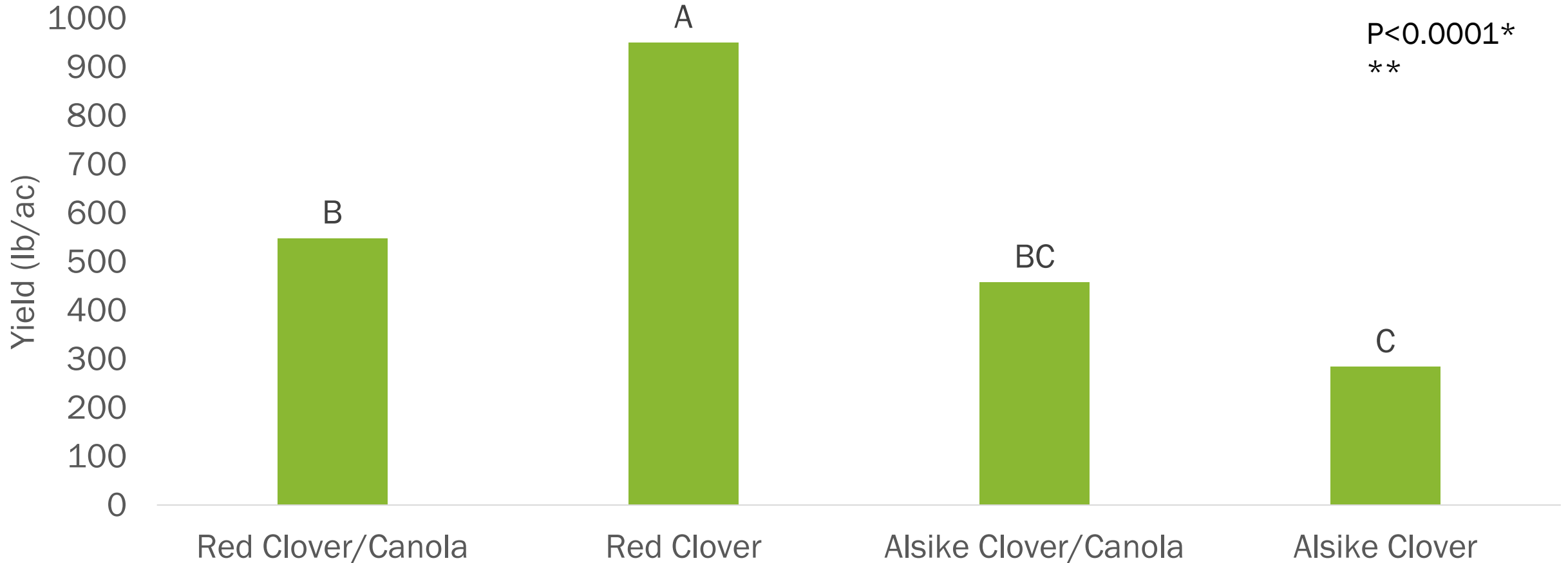


Demonstrating the Effects of Red and Alsike Clover Seed Crops in Rotation

Yield

	2017 Yield
Red Clover/ Canola	52.9 A
Red Clover	
Alsike Clover/Canola	46.6 A
Alsike Clover	
Canola (Pea)	47.8 A

Demonstrating the Effects of Red and Alsike Clover Seed Crops in Rotation



Demonstrating the Effects of Red and Alsike Clover Seed Crops in Rotation

Economics

Red Clover - \$1.00; Alsike Clover - \$1.25; Canola - \$11.50; Peas - \$ 6.50
Companion - \$423; no companion - \$ 260; canola/pea - \$453

	Clover	Canola	Total
Red Clover/ Canola	\$ 400.20	\$ 338.64	\$ 738.84
Red Clover	\$ 690.30		\$ 690.3
Alsike Clover/Canola	\$ 421.88	\$ 265.56	\$ 687.44
Alsike Clover	\$ 92.7		\$ 92.7
Canola (Pea)	\$ 555.18		\$ 555.18

Evaluating the use of Direct Seeding and Pre-Seed Cultivation in Forage Seed Crop Establishment

Objectives

- 1) Demonstrate the use of direct seeding with the use of pre-seeding herbicide
- 2) Demonstrate the agronomic advantages of early weed control for plant establishment



Evaluating the use of Direct Seeding and Pre-Seed Cultivation in Forage Seed Crop Establishment

Methodology

Treatment	Pre-seed Tillage	Herbicide
1	None	None
2	Yes	None
3	None	Roundup
	None	Express SG + Roundup

Red Clover (4 kg/ha) and Faba bean (45 plants/m²) alternative 9 inch rows

Express SG 6 g/ac; Roundup 180 g ai/ac
Odyssey 17.3 g/ac

Evaluating the use of Direct Seeding and Pre-Seed Cultivation in Forage Seed Crop Establishment

Plant Stands

Treatment	Red Clover	Faba bean
Untreated Control	164 A	33 A
Tillage	68 B	29 A
Roundup	136 A	31 A
Express SG + Roundup	144 A	27 A

Pre-seed tillage reduce plant counts & faba bean yield due further in the dry year.

Herbicide application had no impact on plant stands or yield

Evaluating the use of Direct Seeding and Pre-Seed Cultivation in Forage Seed Crop Establishment

Weed Biomass

Treatment	POST Weeds	Grassy (kg/ha)	Broadleaf
Untreated Control	16 A	6 B	227 B
Tillage	24 A	178 A	666 A
Roundup	9 B	13 B	85 C
Express SG + Roundup	9 B	18 B	37 C

Limited weed populations due to dry conditions

Tillage resulted in higher grassy weed populations

Broadleaf weed biomass reduced with Express SG + Roundup,

Roundup alone slightly higher, slightly more in control and highest with tillage



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Evaluating the use of Direct Seeding and Pre-Seed Cultivation in Forage Seed Crop Establishment

Yield

Treatment	Red Clover (kg/ha)	Faba bean (kg/ha)
Untreated Control	288 A	2,087 B
Tillage	237 A	2,063 B
Roundup	262 A	2,483 A
Express SG + Roundup	290 A	2,321 A

Faba bean yields lowest in control and tillage only
Red clover not significantly affected by treatments – red clover resiliency for prior year effects. Numerically lower in the tilled treatment

Can an economic return happen in year 1 without damaging the return of future years?

Take Home Message

When establishing forage crops for seed, the best method both economically and agronomically is to forgo the companion crop.

If a companion crop is ideal – alternative rows produce better results than seeding in the same row.

Direct seeding is a viable option for forage establishment and best option if using a cover crop

Thank You!



Saskatchewan Forage Development Commission

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