

Canola Seed-Placed Fertilizer Trials

Research Question: Are seed-placed fertilizer (SPF) applications being used across Manitoba safe for canola plant establishment and what are the major factors influencing seed safety?

Treatments

1. No Seed-Placed Fertilizer
2. Standard Seed-Placed Fertilizer Rate (100%)
Farm Normal
3. High Seed-Placed Fertilizer Rate (150%)

Trial Setup: In this trial each location has one replicate of each treatment.

This is to allow for a wider range of testing environments (soil/rainfall), equipment (row spacing, opener type, seed bed utilization) and agronomic practices (seed-placed fertilizer sources, rates, blends). Allowing for examination of the relationships between these testing factors and seed safety (emergence).

Data Collection: Plant Counts (4 leaf), Emergence %



Supporting Data:

Seed Bed Utilization (SBU) is the amount of seedbed over which fertilizer has been spread and reflects the relative concentration of the fertilizer with the seed. Low SBU (<20%) will pose a higher risk than high SBU (>20%) for seed toxicity.

$$\text{Seedbed Utilization (\%)} = \left(\frac{\text{Opener Width}}{\text{Row Spacing}} \right) \times 100$$

Recommendations from Manitoba Agriculture and Canola Council of Canada indicate a maximum of 20-25 lbs. P₂O₅/ac and 10 lbs. S/ac (SBU 15, good moisture) should be applied in the seed row to limit seedling toxicity. There is currently not clear recommendations addressing seed safety of new sources of P and S fertilizers in Manitoba.

Rates of urea fertilizer (lbs. N/ac) safely applied with cereal and canola seed if seedbed soil moisture is good to excellent. (Manitoba Agriculture)

Soil Texture	1 in. spread [†]			2 in. spread [†]			3 in. spread [†]		
	(disc or knife) [‡]			(spoon or hoe)			(sweep)		
	Row spacing								
	6"	9"	12"	6"	9"	12"	6"	9"	12"
	SBU								
	17%	11%	8%	33%	22%	17%	50%	33%	25%
CANOLA SEED									
Light (sandy loam)	0	0	0	10	0	0	20	10	0
Medium (loam to clay loam)	0	0	0	20	10	0	30	20	10
Heavy (clay to heavy clay)	10	0	0	30	20	10	40	30	20



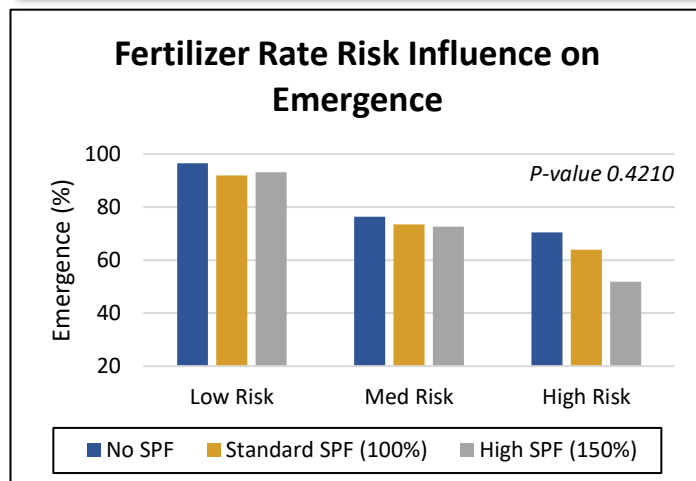
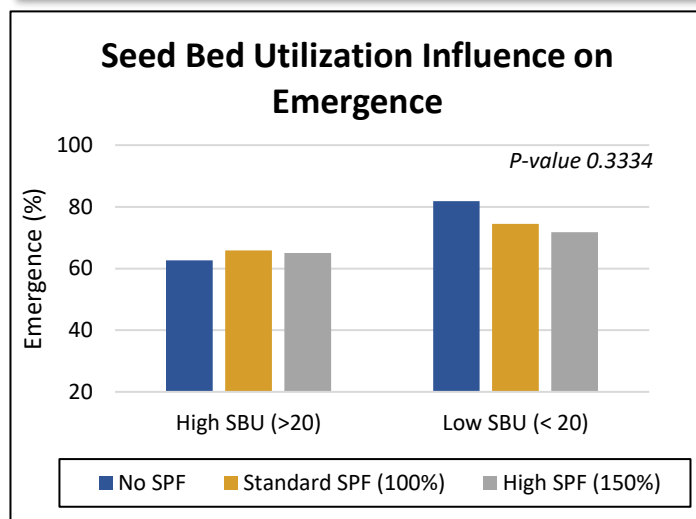
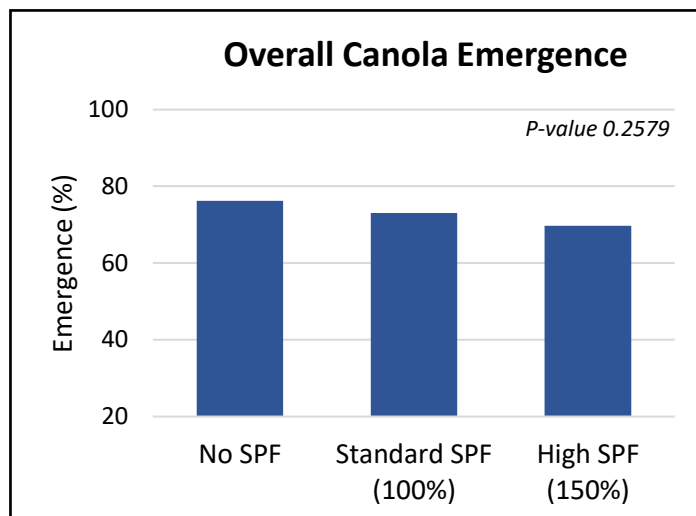
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Preliminary Results (Year 1)

The goal of this trial is to be able to use a large data set (target n=100 over 4 years) to examine relationships between emergence and the factors that influence seed toxicity in canola, such as, spring soil moisture, soil texture, SBU and seed-placed fertilizer rate and sources. After year one we saw that many farms are pushing what are considered "safe" seed-placed fertilizer rates with low SBU. Testing locations in 2023 were concentrated in the Red River Valley with plans to increase testing locations in central and western Manitoba in the following years.

$$\text{Emergence(\%)} = (\text{Plants per acre at 4-leaf stage} / \text{seeds planted per acre}) \times 100$$

- Overall, there was a slight, non-significant, reduction in emergence as seed-placed fertilizer increased from zero to the high rate of 150% of the farms standard practice.
- Locations with low SBU (<20%) included all of the sites that were seeded using planters, resulting in higher initial emergence than locations with high SBU (>20%) when no SPF was applied.
- When SBU was low (<20%) increases in SPF showed a trend of increased seed toxicity (reduced emergence) compared to when SBU high (>20%).
- Each location was categorized based on the farm's standard SPF rates as low, med, or high fertilizer rate risk based on current recommendations for seed safety.
 - High risk = N, P, and S rates are all over the recommended safe levels.
 - Medium risk = N, P, or S rates are over the recommended safe levels.
 - Low risk = N, P, and S are within the recommended safe level.
- As fertilizer rate risk increase from low to high the overall emergence trended lower.
- The largest reductions in emergence with increased SPF rates were seen at locations that fell into the high fertilizer rate risk category.



Agronomic support for this trial provided by:

- Antara Agronomy Service Ltd.
- Tone Ag Consulting Ltd.
- New Era Ag Research
- A1 Agronomy Inc.
- Field 2 Field Agronomy Inc.
- Ag Advantage Ltd. (Meadows)



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Summary of 2023 Testing Locations

Trial ID	Location	Seeding Equipment	SBU	Standard SPF Rates (lbs./ac)				SPF Source
				%	N	P ₂ O ₅	K ₂ O	
SPF_01	Katrimie	1790 JD Planter	5	12	40	0	0	10-34-0*(side-banded)
SPF_02	Sperling	JD 4530F Disc Drill	10	18	17	0	17	6-30-0/17-0-0-20
SPF_03	Beausejour	Air Planter	10	4	20	0	0	11-52-0
SPF_04	Arnaud	JD 1870 Hoe Drill	20	19	50	0	20	S15/11-52-0
SPF_05	Horndean	JD 1830	26	15	30	0	10	21-0-0-24/11-52-0
SPF_06	Rosengart	JD N542 Disc Drill	10	13	33	0	15	S15
SPF_07	Rosengart	JD N542 Disc Drill	10	13	33	0	15	S15
SPF_08	Altona	Bourgault 6500	20	15	37	0	17	S15
SPF_10	Swan River	Bourgault 3320	17	8	40	20	0	11-52-0/0-0-60
SPF_11	Swan River	Vanderstadd Drill	7.5		40	15	20	
SPF_12	Swan River	Bourgault 5810	20	27	45	0	20	11-52-0/21-0-0-24/Elemental S
SPF_18	St. Claude	JD 1890 Disc Drill	13	15	40	0	18	S15
SPF_19	Culross	Bourgault 3320 Disc Drill	10	16	50	0	13	S15
SPF_20	Elm Creek	Concord Hoe Drill	30	17	45	0	20	S15
SPF_22	Oakville	JD 1870 Hoe Drill	25	13	33	0	15	S15
SPF_23	Rosser	Bourgault 3820	10	13	20	0	10	21-0-0-24/11-52-0
SPF_24	Meadows	Bourgault 3820	10	13	20	0	10	21-0-0-24/11-52-0
SPF_25	Meadows	Bourgault 8810	20	20	30	0	18	21-0-0-24/11-52-0
SPF_26	St. Francois Xavier	JD Disc Drill	10	6	26	0	15	21-0-0-24/11-52-0
SPF_27	St. Francois Xavier	Case PD 500	13	9	41	0	0	11-52-0