

Trial Summary

Seed-Placed Fertilizer Toxicity Trial

Research Question:

Are Seed-Placed fertilizer (SPF) applications being used across Manitoba safe for canola plant stand establishment and what are the major factors influencing seed safety?

Treatments:

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

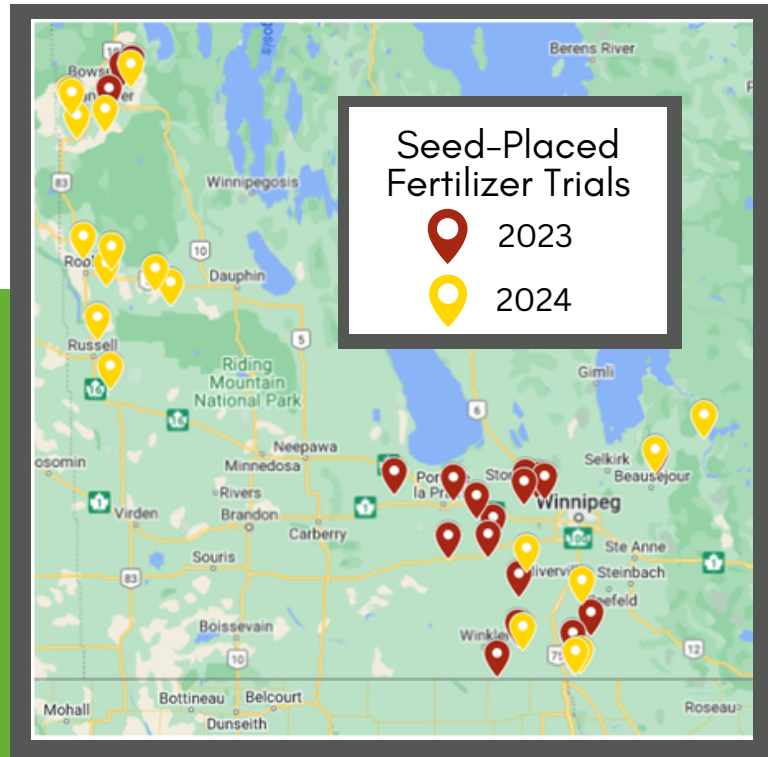
Trial Setup:

In this trial each location has one replicate of each treatment (replicated by locations). This is to allow for a wider range in testing environments (soil/rainfall), equipment (row spacing, openers, SBU), and agronomic practices (fertilizer sources and rates). This allows for the examination of the relationships between these testing factors and seed safety.

Data Collection:

Plant Counts (4 leaf), Emergence %

Background: Current recommendations for seed-safe levels of P and S fertilizers are much lower than crop uptake requirements. This paired with an increase in single pass seeding systems and low disturbance openers had resulted in farms pushing to increase seed applied fertilizer levels. Fertilizer toxicity is highly dependent on a number of environmental and management factors and their interactions that can vary with the growing season.



Seed-Placed Fertilizer Toxicity Trial

Preliminary Results (2023-2024)

After two years we have tested 39 locations across MB, which is not yet enough data points to conduct multivariate analysis to examine interactions between factors. Please note that the following is preliminary and does not account for multiple factors influencing toxicity and results should be interpreted with caution.

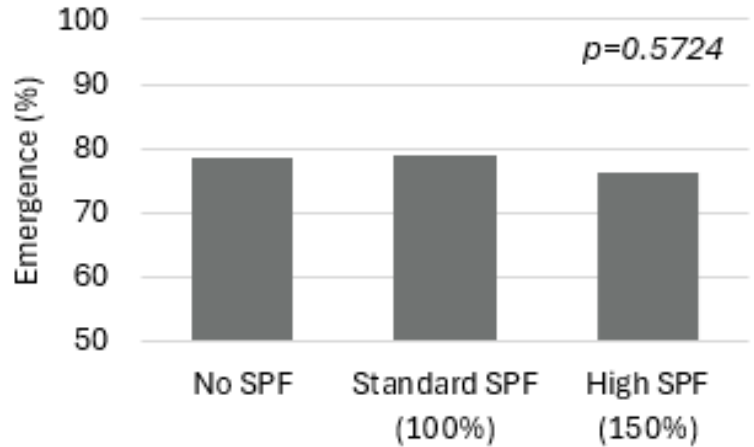
Emergence (%) = (Plants per acre at 4-leaf / seeds planted per acre) * 100
 Many farms are pushing "safe" seed-placed fertilizer rates as they move towards low disturbance and one pass seeding systems and target higher yields.

- Wet spring conditions in 2024 led to canola tolerating high rates of seed-placed fertilizer with little influence on emergence.
- There was a slight, non-significant decrease in emergence with high rates of SPF overall at all farms.

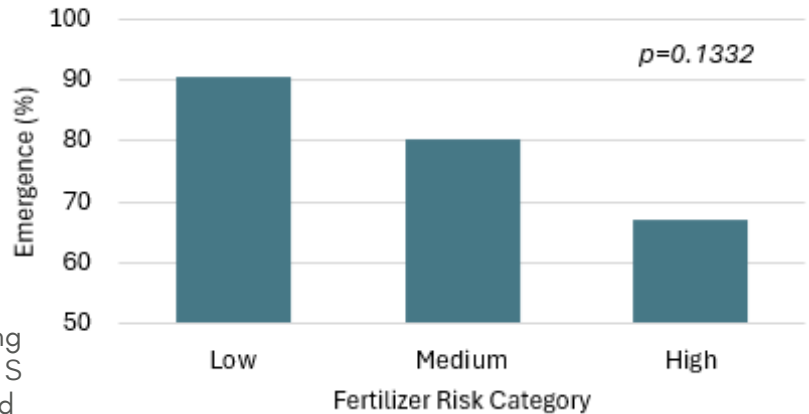
Each farm was categorized based on the farm's standard SPF Rates into the following fertilizer risk category: High Risk = N, P and S rates above recommended safe levels, Med Risk = N, P, or S rates above recommended safe levels and Low Risk = all SPF fall into recommended safe levels.

- Fertilizer risk category of a farm had a larger influence on emergence than the rate of SPF at the particular farm.

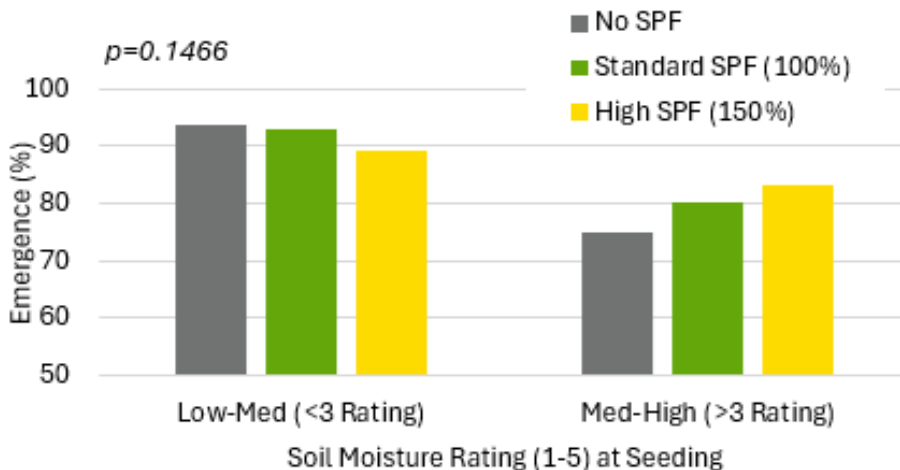
Overall Canola Emergence



Fertilizer Risk Category



Soil Moisture



- There was a general trend for emergence to be reduced with high rate of SPF when soil moisture levels were rated low-medium. When soil moisture at seeding was rated med-high there was a trend for increased emergence as SPF rates increase.

2024 Seed-Placed Fertilizer Toxicity Testing Locations

Trial ID	Location	Seeding Equipment	SBU (%)	SPF Analysis	SPF Sources	Standard SPF Rate (lbs. product/ac)	Emergence		
							No SPF	Standard SPF (%)	150% SPF
SPF_28	Lac Du Bonnet	Disc Drill – HORSCH	10	12-40-0-10	12-40-0-10	100	124.2	106.2	89.2
SPF_29	Beausejour	Air Planter – Bourgault 3820	10	4-20-0-0	MAP	39	91.2	77.2	107.0
SPF_36	Altona	JD 9330	10	10-45-25-10	MAP/AMS	170	57.8	54.1	52.7
SPF_37	Brunkild	Case IH Drill PD500	6.67	12-40-0-10-1ZN	MESZ	30	81.6	85.3	80.7
SPF_38	St. Pierre Jolys	Bourgault Disc Drill	5	50-45-0-7-1.1 Z	Urea/ESN/Rock 40	15	74.5	80.2	71.1
SPF_39	Emerson	JD N542	6.67	13-33-0-15	MES15	100	54.7	52.4	58.4
SPF_40	Emerson	JD N542	6.67	13-33-0-15	MES15	100	81.5	81.5	90.0
SPF_41	Minitonas	Seedhawk 80-10	5	29-50-0-20	MAP	180	56.6	64.1	72.6
SPF_42	Swan River	Seedhawk	6.25	11-52-0	MAP	96	72.0	87.8	86.6
SPF_43	Swan River	Bourgault 5710	30	25-33-0-15	MES15	137	65.9	92.9	98.8
SPF_44	Durban	Bourgault 3320 XTC	15.31	12-29-0-14	MES15	89	89.5	101.4	94.4
SPF_45	Swan River	Independent shank	4.17	11-50-20-30	MAP	205	69.0	79.5	100.0
SPF_48	Grandview	Bourgault 3320 XTC	7.65	11-52-0	MAP	58	66.6	76.8	75.4
SPF_49	Roblin	Seedmaster Ultra Pro II 360	7.5	11-52-0	MAP	67	125.3	130.9	105.5
SPF_50	Inglis	Bourgault 3310	7.5	11-52-0	MAP	67	64.1	76.1	69.8
SPF_51	Roblin	Seedhawk 6010	7.5	11-52-0	MAP	67	98.4	88.0	96.9
SPF_52	Russell	Bourgault 3335 PLX	7.5	11-52-0	MAP	67	70.9	77.9	84.9
SPF_53	Togo	Bourgault 3310	30	11-52-0	MAP	80	78.2	79.6	88.2
SPF_54	Grandview	Bourgault 5710	20.41	11-52-0	MAP	58	117.9	111.6	92.8