

Enhanced Efficiency Nitrogen Fertilizer Protocol

Nitrogen (N) is one of the most important nutrients for canola production in Saskatchewan. Producers have been challenged with maximizing nitrogen use efficiency while increasing yield and quality due to high fertilizer prices and government/societal pressure to minimize greenhouse gas emissions. As part of a nitrogen management plan producers have included the use of enhanced efficiency nitrogen fertilizer (EENF) products including urease inhibitors, nitrification inhibitors and controlled release nitrogen or combination products. These products have the potential to reduce nutrient loss and increase N fertilizer efficiency. Producers are interested in using an EENF to sustain or increase yield and quality on their farm but are unsure of the best practices for their growing conditions and operation and whether it is economical.

Objective:

The objective of this field scale trial is to examine different ratios or proportions of treated and untreated N fertilizer using an EENF product of choice, compared to 100% untreated N fertilizer, on canola establishment, yield, and quality under various management, soil, and weather conditions in Saskatchewan.

Project Overview:

Cooperators will implement a replicated field-scale trial in a canola field of their choice, using their own equipment and otherwise normal practices. An agronomist/trial manager will provide support throughout the season, including setting up the trial and collecting data. Statistical analysis of the data will be conducted following harvest, and a report with your results including economic analysis will be provided. Data from all on-farm trials will also be pooled to examine the results across different management, soil, and weather conditions. Results from all trials will be publicly available, however individual farm data will be kept anonymous, apart from the location of the trial (nearest town or R.M.). Collaborators will be invited to join a network of producers who are conducting on-farm research through field tours and a year-end results meeting and banquet. This program is only available to members in good standing.

Treatments:

1. 100% untreated N fertilizer
2. 25% treated with EENF product + 75% untreated N fertilizer
3. 50% treated + 50% untreated

Producers will choose the EENF product they are going to use based on their N source, typical growing conditions, and management practices. Producers will be responsible for sourcing and cost of the EENF product. The applied N fertilizer rate will be determined by the producer and their agronomist using spring soil tests, yield goals and typical management practices. The total applied N must be the same for each treatment and identical proportions of different N sources (urea, ammonia, UAN, Ammonium sulfate) must be used for each treatment. N fertilizer cannot be applied at a variable rate under this study design at this time. All other applied nutrients must be the same for each treatment but can be applied at a variable rate across the trial area. The three treatments will be replicated four times, for a total of 12 strips, and randomly arranged within blocks in the field. The location of the treatment strips will be marked with GPS and by placing tall flags in the field at time of seeding. Apart from fertility, all strips must be managed the same agronomically including seeding rate, seeding date, variety, seeding depth and pesticide application. An example randomized field plan is shown.

Rep	1			2			3			4		
Plot	1	2	3	4	5	6	7	8	9	10	11	12
Trt	1	2	3	2	1	3	1	3	2	3	1	2
Treatment Description	100% untreated N	25% treated: 75% untreated	50% treated: 50% untreated	25% treated: 75% untreated	100% untreated N	50% treated: 50% untreated	100% untreated N	50% treated: 50% untreated	25% treated: 75% untreated	50% treated: 50% untreated	100% untreated N	25% treated: 75% untreated

Data Collection:

Agronomists/trial managers will ensure that the cooperator seeds the trial according to the protocol and will complete the following in-season data collection. A data collection spreadsheet will be provided and must be used to submit all data.

1. Spring soil samples will be collected at each trial site prior to seeding and fertilizer application to assess residual soil nutrient levels (regardless of whether soil sampling was previously completed). Trial site managers will collect a minimum of 12 soil cores throughout the trial area, separated by 0-6" and 6-24" depths. A single composite sample for each depth will be submitted directly to AgVise Laboratory. Shipping information will be provided and the cost will be covered.
2. Plant density will be assessed at the 2-4 leaf stage. A minimum of 8 counts will be conducted on each treatment strip.
3. The trial should be visited regularly to collect notes, observations, and photos describing visual treatment differences in flowering, maturity, disease pressure, and plant health. NDVI imagery at key growth stage(s) would also be an asset. Photos and updates should be provided to the project lead throughout the season.
4. Yield will be determined separately for each treatment strip using a weigh wagon or calibrated grain cart scale. Cooperators will communicate with trial managers regarding the harvest date.
5. Grain samples (approximately 1 kg, bags will be provided) will be collected separately for each treatment strip for quality analysis (12 samples). Shipping information will be provided and the cost will be covered.
6. The following management and agronomic data will be recorded precisely:
 - a. Fertilizer products, rates, placement, timing
 - b. Equipment type, opener, row spacing
 - c. Canola hybrid, TSW
 - d. Crop protection: seed treatment, pesticide applications
 - e. Previous crop and residue accumulation
 - f. General notes on weed, insect, disease infestations, and notable weather events
7. Daily precipitation will be recorded using a weather station positioned at or within 0.5 miles of the trial site. If a weather station is not available, a rain gauge can be provided. Daily average temperature will be recorded from a weather station within 25 km of the trial site or the nearest Environment Canada station. Precipitation and temperature should be recorded from May 1 to August 31, regardless of the seeding and harvest dates.

For more information or to participate in the program contact:

Kaeley Kindrachuk

Agronomy Extension Specialist, SaskOilseeds

Office: 1-306-975-0273 **Cell:** 1-306-260-2531

kkindrachuk@saskoilseeds.com

Kayla Slind

Lead Research Agronomist, WARC

Office: 1-306-247-2001 **Cell:** 1-306-843-7984

Kayla.slind@warc.ca