Pulse Replicated On-Farm Independent Trials

Fenugreek Nitrogen & Seeding Rate Trial

Fenugreek is an uncommon and underutilized crop in Saskatchewan and evaluating seeding and nitrogen rates will provide region-specific data to identify optimal planting densities and fertilizer needs that support productivity and efficient resource use. Although fenugreek can fix nitrogen through symbiosis with specific rhizobium species, fixation rates are relatively low—supplying at most about 58% of its nitrogen needs—and no commercial inoculants are specifically formulated for this crop. As a result, growers often depend on supplemental nitrogen fertilizer, making this research valuable for improving sustainable management practices and providing guidance to local producers as they consider diversifying their cropping systems with this high-value legume.

Objective

To assess the impact of variable nitrogen and seeding rates on the growth, yield, and nitrogen use efficiency of fenugreek, aiming to identify the optimal nitrogen application for maximizing productivity while minimizing environmental impact.

Treatments

Trt #	Description	Target Plant Population (plants/ft^2)	Actual Seeding Rate (lb/ac)	Nitrogen Rate (28-0-0 (UAN))	Actual Nitrogen Rate (lb/ac)
1	Reduced	14	18	0 gal/ac	0
2	Standard	20	27	14 gal/ac	42
3	High	27	36	28 gal/ac	84

Treatments were replicated four times, for a total of twelve plots. Apart from nitrogen and seeding rates, all plots were managed the same agronomically, including seeding rate, depth, date and pesticide application. Treatments were randomly arranged within blocks in the field.

Data Collection

- Fall or spring soil test
- Seed tests
- Field history and management practices
- Plant density
- General in-season observations
- Weather data
- Weighed yield

The following footnotes will be referred to for the individual site report for this protocol:

[1]SED is a measure of how much variability (same units as mean) you would expect in the difference between sample means if you repeated the experiment several times. The LSD is approximately two times the SED.

[2]A linear regression was used to assess the effects of varieties on the response variables. The data was also analyzed using the Mixed Model procedure in JMP, with replicate considered random and nitrogen/seed rate considered a fixed effect. Treatment means were separated using the LSD test. All treatment effects and differences between means were considered significant at $p \leq 0.05$. However, p-values of 0.05–0.1 may also be acknowledged.

$P < 0.05$: There is a 95% probability (19 out of 20 times) that the observed difference is due to the treatment rather than random variation.
$P < 0.1$: There is a 90% probability (9 out of 10 times) that the difference is due to the treatment effect.
$P > 0.1$: There is a higher likelihood that the observed difference is due to random variability rather than the treatment.

Pulse Replicated On-Farm Independent Trials

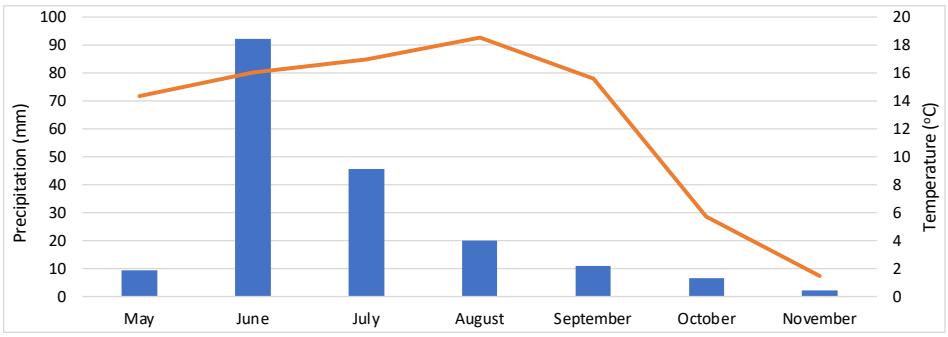
Fenugreek Seeding and Nitrogen Rates (Dodsland)

Objective: To evaluate the effects of variable seeding and nitrogen rates on the growth, yield, and overall productivity of fenugreek to determine the optimal planting density for maximum efficiency.

Trt #	Description	Target Plant Population (plants/ft2)	Actual Seeding Rate (lb/ac)	Nitrogen Rate (28-0-0 (UAN))	Actual Nitrogen Rate (lb/ac)
1	Reduced	14	18	0 gal/ac	0
2	Standard	20	27	14 gal/ac	42
3	High	27	36	28 gal/ac	84

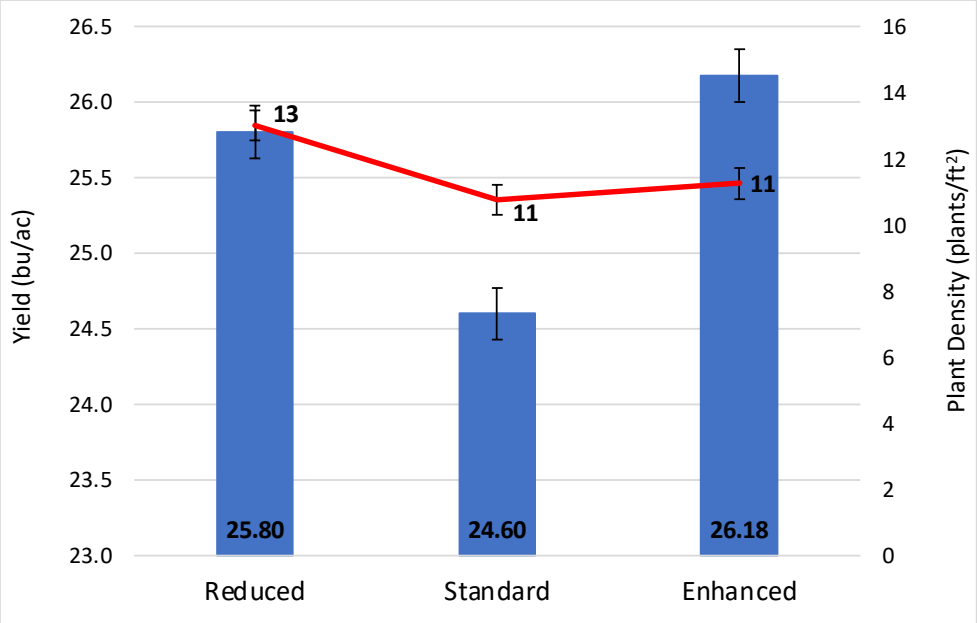
General Trial Information	
Variety	CDC Canafen
Thousand Kernel Weight (TKW)	12.12 g
Germ	88%
Seed Treatment	Vibrance® Maxx (metalaxyl, fludioxonil + sedaxane)
Inoculant	Nitragin® Gold Clover
Seeding Rate	30 lb/ac
Previous Crop	Canola
Residual Nitrate-N	
- **0-6”**	11.8
- **6-24”**	3.6
Seeding Date	May 2, 2025
Seeding Equipment	JD P680, SeedMaster openers
Seeding Depth	1 ½”
Seeding Speed	3.1 mph
Row Spacing	12”
Total Applied Fertilizer (lb/ac P-K-S)	26 – 0 – 0
Fertilizer Products	MAP, UAN
Crop Protection	May 2: Voraxor® (saflufenacil + trifludimoxazin) + glyphosate June 11: Davai® Q Plus (imazamox + quizalofop) September 20: Reglone® (diquat)

Precipitation and Temperature from local weather station (May 13 – November 14)



Results

	Plant Density (plants/ft²)	Seedlings Survival (%)	Yield (bu/ac)
Reduced	13 a	96.50 a	25.80 a
Standard	11 b	52.73 a	24.60 b
High	11 b	52.42 a	26.2 a
SED[1]	0.454	19.85	0.173
p-value[2]	0.05	0.289	0.0024



Economics

Treatment Description	Nitrogen Rate (gal/ac)	Nitrogen Total Cost ($/ac)[x]	Seeding Rate (lb/ac)	Seed Cost ($/ac)[y]	Total Costs ($/ac)	Yield (bu/ac)	Target Price ($/bu)[z]	Revenue ($/ac)	Net/Loss ($/ac)	Profit/Loss ($/ac)
Reduced	0	0.00	18	9.00	9.00	25.8	18.00	464.40	455.40	61.10
Standard	14	35.00	27	13.50	48.50	24.6	18.00	442.80	394.30	0.00
Enhanced	28	70.01	36	18.00	88.01	26.2	18.00	471.60	383.59	-10.71

[x]UAN price, Local Retailer, November 24, 2025 ($520/MT)
[y]2025 Fenugreek, 2025 Crop Planning Guide, Government of Saskatchewan (seed rate 30lb/ac; seed $15.00/ac)
[z]2025 Fenugreek, 2025 Crop Planning Guide, Government of Saskatchewan (target price $0.30/lb)

Summary

Across the nitrogen and seeding rates, apparent differences emerged in plant establishment and yield. The reduced-rate treatment (0 lb N/ac, 14 seeds/ft²) achieved the highest plant density at 13 plants/ft², significantly outperforming the standard and high rates, which both established only 11 plants/ft² despite higher seeding rates. Seedling survival did not differ statistically among treatments, though the reduced treatment showed numerically higher survival (96.5%). Yield was significantly affected (p = 0.0024), with the reduced (25.80 bu/ac) and high (26.18 bu/ac) treatments yielding more than the standard rate (24.60 bu/ac). Overall, higher nitrogen and seeding rates did not translate into better stand establishment, and moderate to high yields were maintained even at the lowest nitrogen rate.

To review footnote references please refer to overall trial summary on page 163.

This trial was conducted with the agronomic support of

MNP AgINTELLECT