



Pulse Replicated On-Farm Independent Trials

Fenugreek Nitrogen Rate Trial

Fenugreek can fix its own nitrogen through symbiosis with specific rhizobium species. Still, fixation rates are relatively poor, providing at most about 58% of the crop's nitrogen needs—and no commercial inoculants are explicitly produced for fenugreek. Because of this limitation, growers often rely on supplemental nitrogen fertilizer, making research on optimal nitrogen rates important for sustainable, productive fenugreek management in Saskatchewan.

Objective

To assess the impact of variable nitrogen 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 and yield response.

Treatments

1) 0 lb/ac Actual N (Untreated Check)
2) 42 lb/ac N
3) 84 lb/ac N

Treatments were replicated four times, for a total of twelve plots. Apart from Nitrogen 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:

¹SED 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.

²A linear regression was used to assess the effects of varieties on the response variables. The data were also analyzed using the Mixed Model procedure in JMP, with replicate considered a random effect and Nitrogen 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.

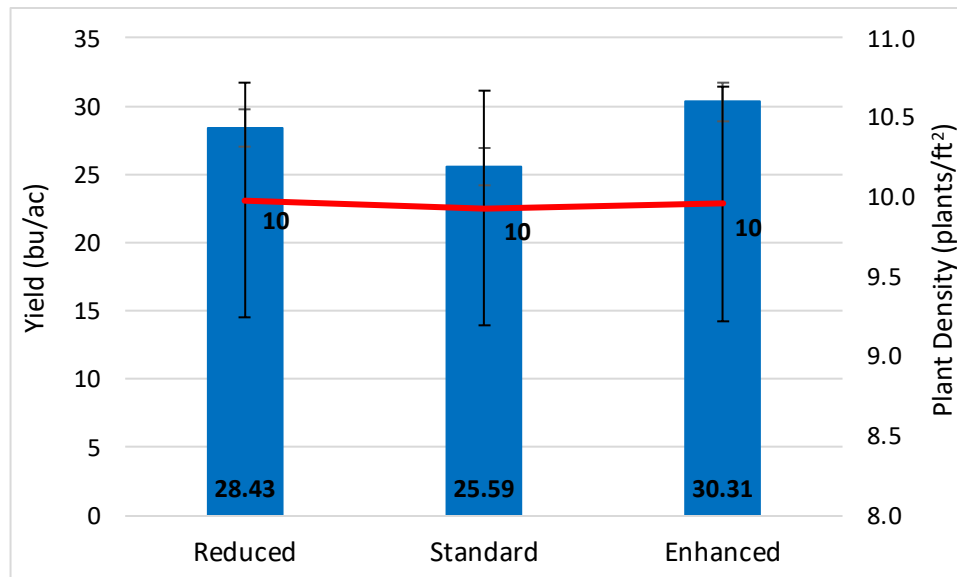
$P > 0.1$: There is a higher likelihood that the observed difference is due to random variability rather than the treatment.

2025 Combined Results

In 2025, one producer in Dodsland conducted two Nitrogen rate trials. He used the same farming practices for both trials. Nitrogen rates all established similar stand counts, averaging 10 plants per square foot, indicating no significant differences. However, yield responses differed among treatments: the enhanced rate produced the most significant yield at 30.31 bu/ac, significantly higher than the standard rate (25.59 bu/ac), while the reduced rate yielded 28.43 bu/ac and was statistically similar to both.

Trt #	Description	Nitrogen Rate (28-0-0 (UAN))	Actual Nitrogen Rate (lb/ac)
1	Reduced Rate	0 gal/ac	0
2	Standard Rate	14 gal/ac	42
3	Enhanced Rate	28 gal/ac	84

	Plant Density (plants/ft ²)	Yield (bu/ac)
Reduced	10 a	28.43 ab
Standard	10 a	25.6 b
High	10 a	30.31 a
SED ¹	0.738	1.38
p-value ²	0.998	0.038





Fenugreek Nitrogen Rate (Dodsland 1)

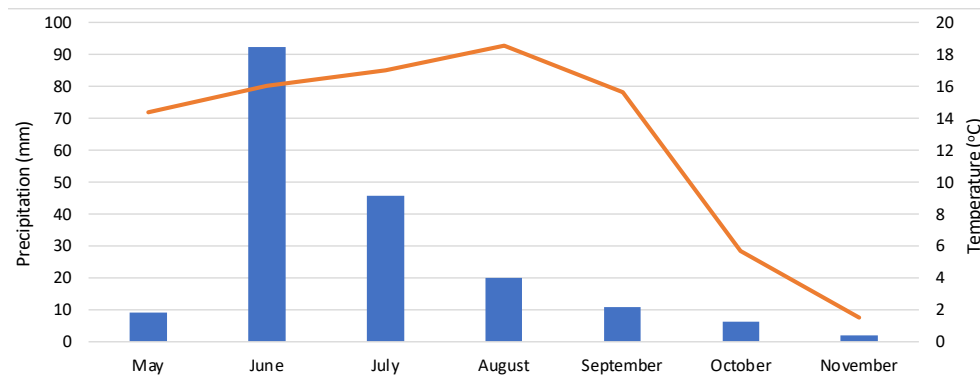
Objective: To assess the impact of variable nitrogen rates on the growth, yield, and nitrogen use efficiency of fenugreek, aiming to identify the optimal nitrogen application for maximizing productivity while minimizing environmental impact.

Trt #	Description	Nitrogen Rate (28-0-0 (UAN))	Actual Nitrogen Rate (lb/ac)
1	Reduced Rate	0 gal/ac	0
2	Standard Rate	14 gal/ac	42
3	Enhanced Rate	28 gal/ac	84

General Trial Information

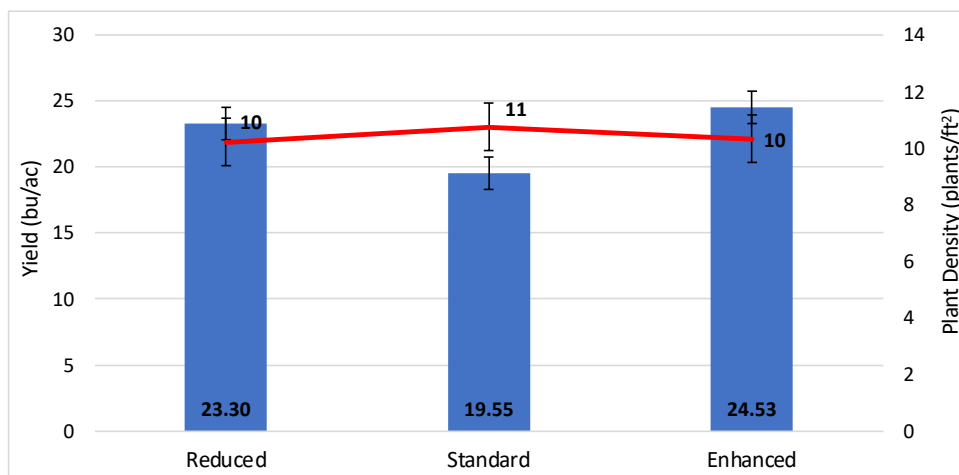
Variety	CDC Canafen
Thousand Kernel Weight (TKW)	12.12 g
Germ	88%
Seed Treatment	Vibrance® Maxx (metalaxyl, fludioxonil + sedaxane)
Inoculant	Nitragin® Gold Clover
Seeding Rate	30 lb/ac
Previous Crop	Wheat
Residual Nitrate-N	
- 0-6"	11.8
- 6-24"	3.6
Seeding Date	May 2, 2025
Seeding Equipment	JD P680, SeedMaster openers
Seeding Depth	1"
Seeding Speed	4.3 mph
Row Spacing	12"
Total Applied Fertilizer (lb/ac P-K-S)	26 – 0 – 0
Fertilizer Products	Monoammonium Phosphate (MAP), Urea Ammonium Nitrate (UAN)
Crop Protection	May 2: Voraxor® (safufenacil + trifludimoxazin) + glyphosate June 11: Davai® Q Plus (imazamox + quizalofop) September 8: Reglone® (diquat)

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



Results

	Plant Density (plants/ft ²)	Yield (bu/ac)
Reduced	10 a	23.30 a
Standard	11 a	19.6 b
Enhanced	10	24.53 a
SED ¹	0.838	1.22
p-value ²	0.842	0.031



Economics

Treatment Description	Nitrogen Rate (gal/ac)	Nitrogen Total Cost (\$/ac) ^y	Yield (bu/ac)	Target Price (\$/bu) ^z	Revenue (\$/ac)	Net (\$/ac)	Profit/Loss (\$/ac)
Reduced	0	0.00	23.3	18.00	419.40	419.40	101.60
Standard	14	35.00	19.6	18.00	352.80	317.80	0.00
Enhanced	28	70.01	24.5	18.00	441.00	370.99	53.19

^yUrea Ammonium Nitrate price, Local Retailer, November 24, 2025 (\$520/MT)

^z2025 Fenugreek, 2025 Crop Planning Guide, Government of Saskatchewan (target price \$0.30/lb)

Summary

Reduced and enhanced plant densities produced similar plant stands (~10–11 plants/ft²), with no significant differences among treatments. However, yield differed: the enhanced density achieved the highest yield (24.53 bu/ac), significantly outperforming the standard density (19.55 bu/ac). In comparison, the reduced density (23.30 bu/ac) was statistically similar to the enhanced treatment. The significant p-value for yield (0.031) indicates treatment effects on yield but not on plant density.



✳ To review footnote references please refer to overall trial summary on page 156.



This trial was conducted with
the agronomic support of

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Fenugreek Nitrogen Rate (Dodsland 2)

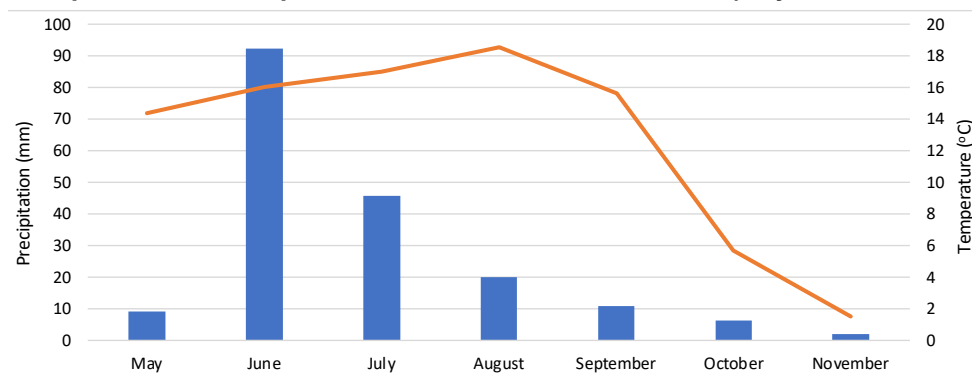
Objective: To assess the impact of variable nitrogen rates on the growth, yield, and nitrogen use efficiency of fenugreek, aiming to identify the optimal nitrogen application for maximizing productivity while minimizing environmental impact.

Trt #	Description	Nitrogen Rate (28-0-0 (UAN))	Actual Nitrogen Rate (lb/ac)
1	Reduced Rate	0 gal/ac	0
2	Standard Rate	14 gal/ac	42
3	Enhanced Rate	28 gal/ac	84

General Trial Information

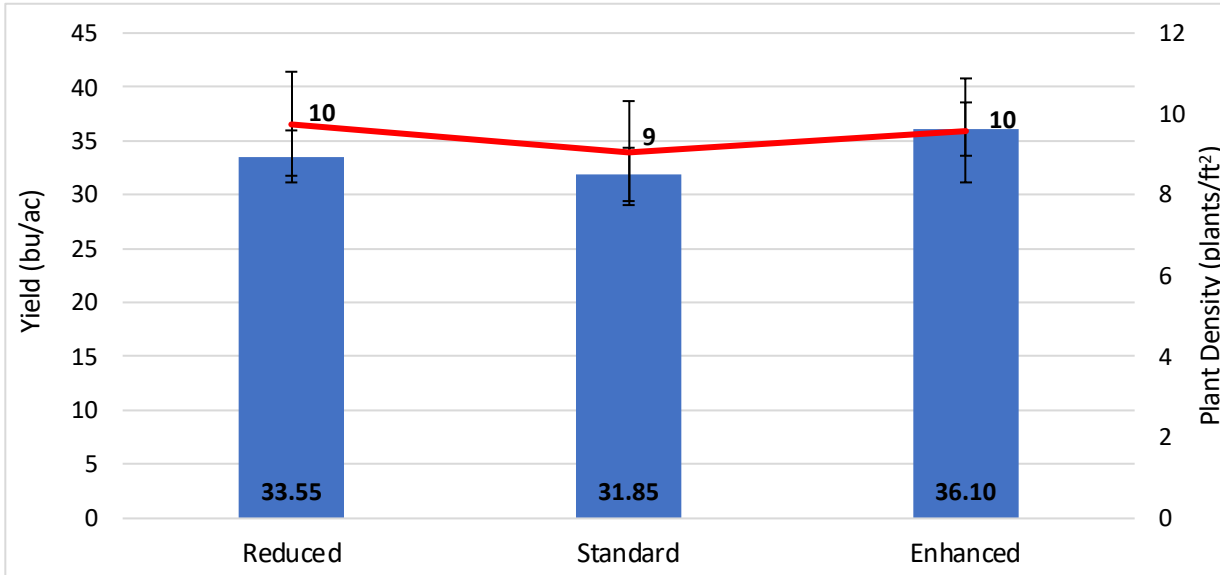
Variety	CDC Canafen
Thousand Kernel Weight (TKW)	12.12 g
Germ	88%
Seed Treatment	Vibrance® Maxx (metalaxyl, fludioxonil + sedaxane)
Inoculant	Nitragin® Gold Clover
Seeding Rate	30 lb/ac
Previous Crop	Wheat
Residual Nitrate-N	
- 0-6"	11.8
- 6-24"	3.6
Seeding Date	May 2, 2025
Seeding Equipment	JD P680, SeedMaster openers
Seeding Depth	1.5"
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® (safufenacil + trifludimoxazin) + glyphosate June 11: Davai® Q Plus (imazamox + quizalofop) September 8: Reglone® (diquat)

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



Results

	Plant Density (plants/ft ²)	Yield (bu/ac)
Reduced	10 a	33.6 a
Standard	9 a	31.85 a
Enhanced	10 a	36.1 a
SED ¹	1.279	2.461
p-value ²	0.846	0.322



Economics

Treatment Description	Nitrogen Rate (gal/ac)	Nitrogen Total Cost (\$/ac) ^y	Yield (bu/ac)	Target Price (\$/bu) ^z	Revenue (\$/ac)	Net (\$/ac)	Profit/Loss (\$/ac)
Reduced	0	0.00	33.6	18.00	604.80	604.80	65.60
Standard	14	35.00	31.9	18.00	574.20	539.20	0.00
Enhanced	28	70.01	36.1	18.00	649.80	579.79	40.59

^yUrea Ammonium Nitrate price, Local Retailer, November 24, 2025 (\$520/MT)

^z2025 Fenugreek, 2025 Crop Planning Guide, Government of Saskatchewan (target price \$0.30/lb)

Summary

Plant density did not differ among treatments, with all producing about 9-10 plants/ft² ($p = 0.846$). Yields were also not significantly affected: the standard rate produced lower yields (31.85 bu/ac), followed by the reduced rate (33.55 bu/ac), with the enhanced rate yielding the highest at 36.10 bu/ac. Overall, adjusting nitrogen rates did not significantly affect plant density or yield.

✳ To review footnote references please refer to overall trial summary on page 156.



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