Dry Bean Nitrogen Fertility Trial

Trial ID: 2023-DBN01 – R.M. of Deloraine - Winchester

Objective: Quantify the agronomic and economic impacts of nitrogen fertilizer rates in dry beans.

Summary: There were no significant yield, nodulation, or lowest pod height differences in response to different nitrogen rates at this trial. As a result, a loss in profit of $24-$82/ac occurred for 25-85 lbs N/ac fertilizer applied.

Trial Information

Treatment	0 lb N vs. 25 lb N vs. 55 lb N vs. 85 lb N
Soil Texture	Loamy Clay Loam
Previous Crop	Oats
Tillage	Conventional Tillage
Spring Soil N	88 lb/ac (0-24")
Seeding Date	May 28
Variety	CDC Blackstrap
Seeding Rate	65 lbs/ac
Row Spacing	12"
Plant Stand at V2	86,000 plants/ac
Harvest Date	August 28

Precipitation (mm)

	May	June	July	Aug	Total
Rainfall	52.9	56.4	29	28.2	167
Normal	46.9	83.7	65	57.6	253
% Norm	113%	67%	44%	49%	66%

Nodulation ǂ

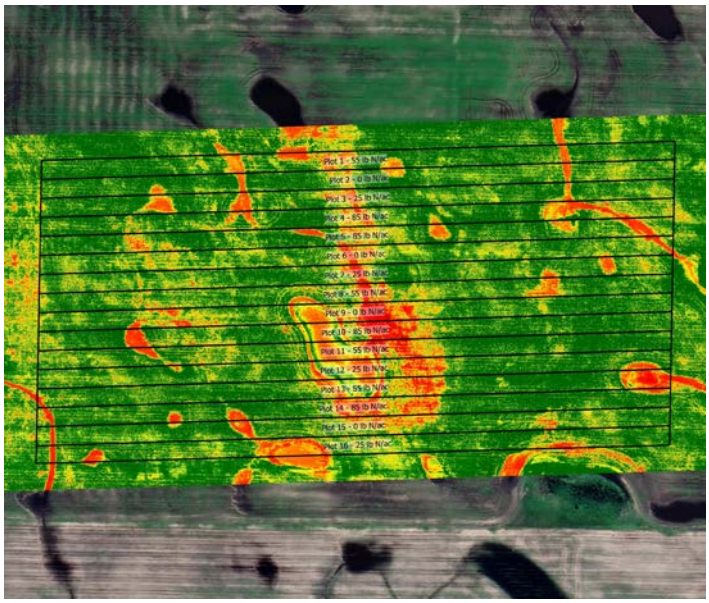
	Average total nodule number per plant at R2
0 lb N/ac	1.8 A
25 lb N/ac	3.0 A
55 lb N/ac	3.0 A
85 lb N/ac	0.8 A

ǂ Averages followed by different letters are significantly different at *p <0.05*

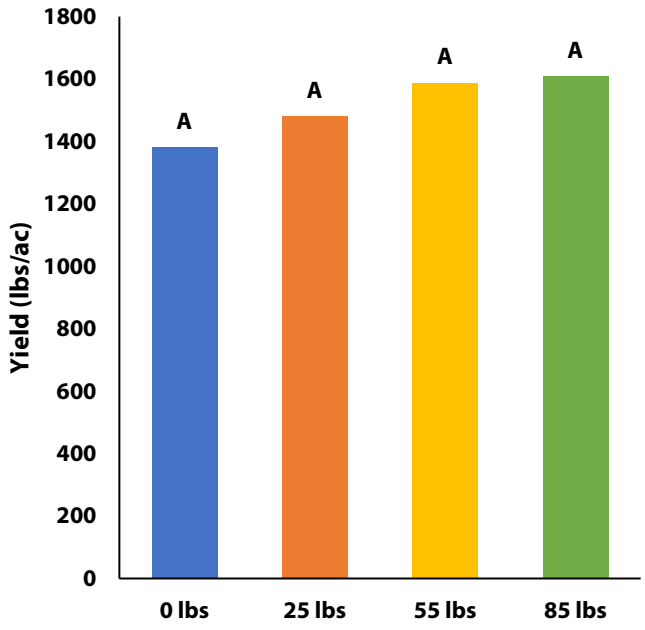
Lowest Pod Height

Treatment	Height (cm)	Height (inches)
0 lb N/ac	8.5 A	3.3
25 lb N/ac	8.6 A	3.4
55 lb N/ac	8.2 A	3.2
85 lb N/ac	7.7 A	3.0

Field NDVI Image July 14



Yield by Treatment



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Nitrogen Balance

Nitrogen Rate (lbs N/ac)	Yield (lbs/ac)	Estimated N Removal[1] (lbs N/ac)	Estimated N Uptake[2] (lbs N/ac)	Estimated N Supply[3] (lbs N/ac) (0-24")	Post-harvest N (lbs N/ac) (0-24")
0	1382 a	49	59	93	72
25	1481 a	53	64	118	146
55	1589 a	56	68	148	80
85	1611 a	57	69	178	153

[1] Estimated N Removal is 3.5 lbs/cwt of seed (Prairie Nutrient Removal Calculator 2022)
[2] Estimated N Uptake range is 3.9 - 4.7 lbs/cwt of seed (Heard 2008). Values in the table are estimated using 4.3 lbs/cwt of seed.
[3] Estimated N Supply is the combination of N supplied from residual soil nitrate-N, MAP fertilizer and N fertilizer treatments

Overall Yield & Economics

	Mean (lb/ac)	Cost ǂ	Change in Profit ǂǂ
0 lb N/ac	1382		
25 lb N/ac	1481	$24/ac	-$24/ac
55 lb N/ac	1589	$53/ac	-$53/ac
85 lb N/ac	1611	$82/ac	-$82/ac
P-Value	0.082		
CV	7.9%		
Significance	**No**	**Economic**	**No**

ǂ Based on estimated anhydrous ammonia (current conditions) cost of $1745/MT ($0.97/lb)
ǂǂ Because yields were not significantly different, there is no increased income to offset the increased cost of the nitrogen fertilizer application profit/ac declines equal to the increased cost as a result