NDSU North Central Research Extension Center
Nitrogen Fertility and Seeding Rate Interactions in Flax at Minot

This trial was designed to investigate interactions between levels of nitrogen fertility and seeding rates of flax in order to define optimal production practices with these inputs. Below are combined data from 2014, 2015 and 2016 growing seasons.

Interactions

N Fert Levels	Seeding Rate	Seeding Rate	Days to Bloom	Days to Mature	Plant Height	Test Weight	Oil Content	Grain Yield	Return on Investment
lbs N / A[a]	million	lbs/A	DAP[b]	DAP[c]	inches	lbs/bu	%	bu/A	$[c]
25	2	25	53	94	25	52.2	42.9	17.1	105
	2.5	32	54	95	24	51.4	42.8	19.3	119
	3	38	53	94	25	52.0	43.4	20.5	126
	3.5	44	53	95	25	51.5	43.9	16.9	99
75	2	25	53	94	26	52.3	43.6	22.3	124
	2.5	32	53	94	26	52.0	42.1	20.5	110
	3	38	53	94	26	50.9	43.5	23.9	132
	3.5	44	53	94	27	51.7	43.8	22.5	121
125	2	25	53	95	26	51.8	43.1	20.9	97
	2.5	32	53	96	26	51.7	43.4	26.9	137
	3	38	53	96	26	51.7	42.7	24.9	122
	3.5	44	53	95	26	51.6	42.9	25.9	127
LSD 5%	--	--	NS	NS	NS	NS	NS	NS	--

Nitrogen Fertility Comparisons

N Fert Levels	Days to Bloom	Days to Mature	Plant Height	Test Weight	Oil Content	Grain Yield	Return on Investment
lbs N / A[a]	DAP[b]	DAP[b]	inches	lbs/bu	%	bu/A	$[c]
25	53	94	25	51.8	43.2	18.5	121
75	53	94	26	51.7	43.3	22.3	130
125	53	95	26	51.7	43.0	24.6	128
LSD 5%	NS	NS	NS	NS	NS	1.1	--

Seeding Rate Comparisons

Seeding Rate	Seeding Rate	Days to Bloom	Days to Mature	Plant Height	Test Weight	Oil Content	Grain Yield	Return on Investment
million	lbs/A	DAP[b]	DAP[c]	inches	lbs/bu	%	bu/A	$[c]
2	25	53	94	26	52.1	43.2	20.2	136
2.5	32	53	95	26	51.7	42.8	22.4	150
3	38	53	95	26	51.5	43.2	23.0	152
3.5	44	53	95	26	51.6	43.5	21.7	142
LSD 5%	--	NS	NS	NS	NS	NS	2.1	--

[a] *Nitrogen fertility levels = residual soil N + lbs of actual N applied as urea (46-0-0) prior to planting (2014 and 2015) or applied in a mid-row band at planting (2016).*

[b] *DAP = days after planting.*

[c] *Gross Return on Investment: $7/bu market price - N @ $0.35/lb and $0.23/lb certified seed. This figure does not include indirect costs such as application, labor and equiment costs.*

NS= no statistical difference.

Variety = York *Previous Crop: spring wheat* *Soil Type: Williams Loam*

Conclusions: Interactions between nitrogen fertility levels and seeding rates were not detected and therefore these inputs should be managed independently. Nitrogen fertility and seeding rates did not impact agronomic or seed quality characteristics. Yields increased with increasing levels of N fertility, however, the optimal return on investment was at 75 lbs of N. Statistically significant differences between seeding rates were observed with 2.5 and 3 million seeds per acre producing higher yields than the 2 million seeding rate. These rates also produced the optimal return on investment.