

YIELD RESPONSE OF NORALTA FLAX TO NITROGEN FERTILIZERS AS AFFECTED  
BY SOIL TESTS FOR AMMONIUM- AND NITRATE-NITROGEN

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The average yield response of Noralta flax to nitrogen and phosphorus fertilizers grown on stubble in northeastern Saskatchewan from 1969 to 1972 is shown in Table 1.

Table 1. Yield response\* of Noralta flax grown on stubble to N P fertilizers 1969-72 at Melfort, Parkside and Somme (6-site years)\*\*

Phosphate Fertilizer P (kg/ha)	Nitrogen Fertilizer				
	0+	22	45	67	134
	Yield in kg/ha				
0+	0	185	335	460	597
20+	0	231	349	561	601

\* Yield less 0-0 check yield

\*\* Mean soil tests were, ammonium-N = 13 µg N/4g soil; nitrate-N = 19 µg N/4g soil; sodium bicarbonate soluble P = 11 µg N/4g soil

+ 0-0 = 899 kg/ha, 0-20 = 896 kg/ha

No significant response to phosphorus fertilizer was found within any of the trials. The check yields for nitrogen with and without phosphate fertilizer were similar, 896 and 899 kg/ha. It would appear that average nitrogen response was greater with applied phosphorus.

More site-years ideally would be required to properly account for among-site variation by soil test values. Regression analyses (Table 2) has shown that soil tests for nitrogen and phosphorus have accounted for much of the variation in yield response to nitrogen fertilizers among sites. By adding the tests for ammonium- and nitrate-nitrogen together, 77.9% of the variation in response was accounted for at the 134-20, N-P kg/ha rate as compared to 54.5% shown in Table 2.

Table 2. Regression coefficients of soil tests used to estimate yield response of Noralta flax to nitrogen and phosphorus fertilizer application

Estimate kg/ha	Fertilizer Rate, kg/ha		Intercept	Nitrate-N*	(Nitrate-N) <sup>2</sup>	NaHCO <sub>3</sub> -P**	R <sup>2</sup> %
	N	P		μg N/4g Soil		μg/g Soil	
Δ Yield	22	0	364	-18.4	.359		91.6
	45	0	795	-36.3	.475		84.2
	67	0	875	-35.0	.519		62.0
	134	0	1344	-58.7	.764		64.0
	22	20	308	14.0	-.328	-17.7	87.4
	45	20	512	-38.3	+.517	+29.6	71.8
	67	20	957	-57.1	.979	20.8	85.7
	134	20	1288	-62.4	1.043		54.5
	0	0	-575	173.7	-3.85		65.2

\* Soil test range for nitrate-nitrogen was 5.8 to 34.9 μg N/4g soil

\*\* Soil test range for phosphorus was 5.7 to 17.5 μg P/g soil

The soil test for phosphorus shows some effect on yield to N P fertilizers although response to P fertilizer was not statistically significant within the trials. Estimated yield response of flax to N fertilizer is shown in Table 3.

Table 3. Estimated yield response of Noralta flax to N fertilizer as affected by soil tests for nitrate-N

Fertilizer N kg/ha	Nitrate-N μg N/4g soil		
	10	20	30
	————— Yield increase in kg/ha —————		
22	216	140	135
45	482	261	135
67	577	382	293
134	833	477	273

In Figure 1, an indication of the variability in response is shown. Despite this variation in response, the relationship gives a good guideline for fertilizer recommendations.

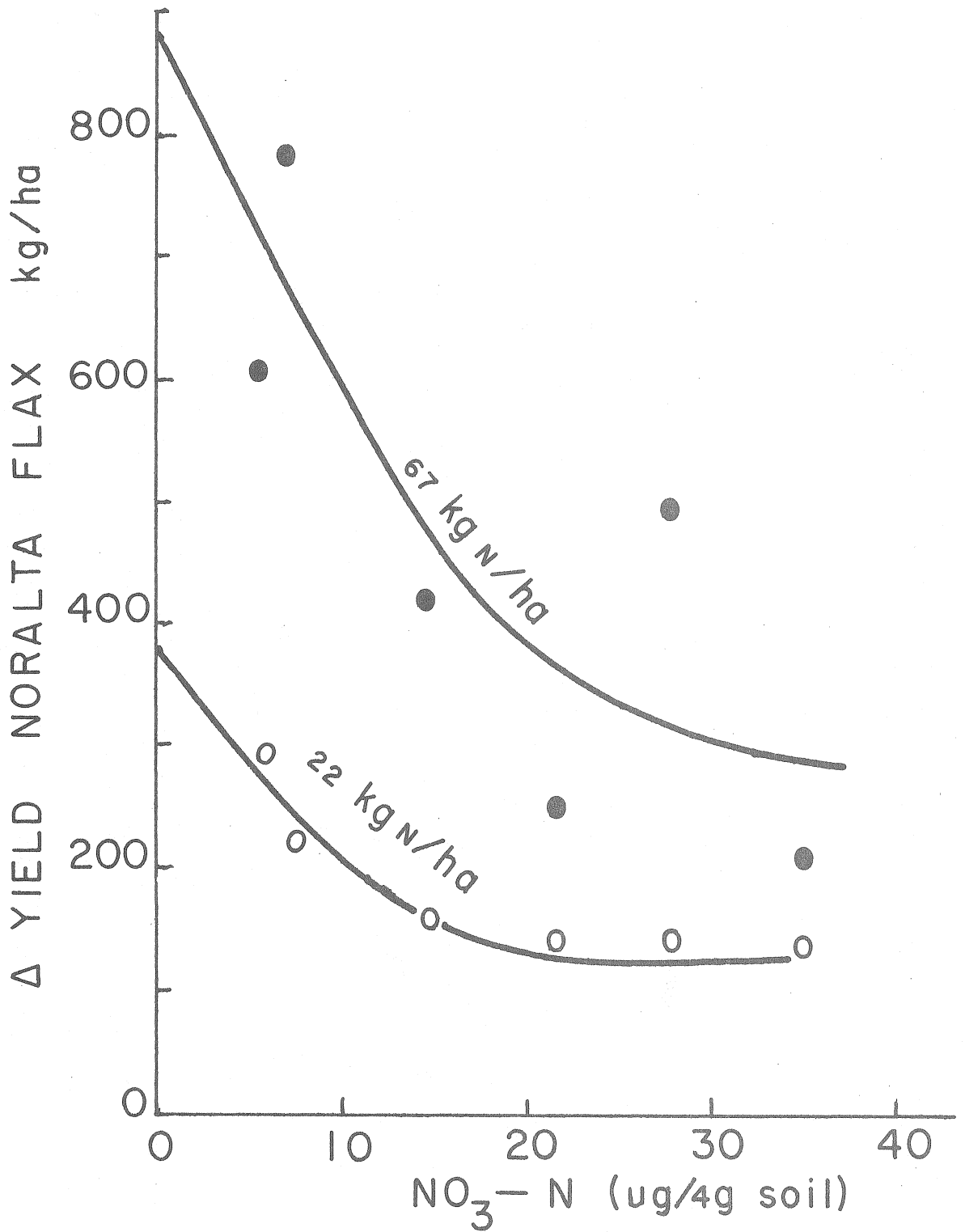


Figure 1. Yield response to nitrogen fertilizer versus soil test for nitrogen