The Effect Of Spring And Fall Application Of Nitrogen On Various Crops Grown On Melfort Silty Clay

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The application of nutrients in the fall of the year has several advantages and disadvantages to farmers.

Some advantages may be lower fertilizer prices, the time and weather may be more convenient, no extra storage is required over winter, a greater selection of fertilizer materials are available, less time loss in seeding in the spring because of less fertilizer to handle and under certain conditions some crops may yield higher from fall applied nutrients.

Some disadvantages are money invested in fertilizer is tied up for several months, crops may yield higher from spring applied nutrients, there is a greater chance of nutrient losses because of leaching, volatilization, or erosion and if a change in rotation or cropping practices takes place - e.g. summerfallow in place of a crop, nutrients would not be used as efficiently by the crop the next year, besides the delay in return on fertilizer invested.

The experiments at Melfort were set out to determine differences in yield of crops fertilized in the spring and in the fall over periods of eleven and six years. Over these periods the effect of years (differences in weather) on results can be evaluated. The N fertilizer was broadcast as ammonium nitrate in fall after October 15.

In Figure 1, yields from spring applied N is not significantly higher than yields from fall applied. The average yield of barley (Conquest and Bonanza) from spring applied N was 3596 kg/ha, from fall applied 3506 kg/ha and the control was 2712 kg/ha over an 11 year period.

However, the results (Figure 2) showed if yields were over 3500 kg/ha from fall applied N, yields from spring applied N would be less than fall applied. Conversely, if yields were less than 3500 kg/ha, spring application of N produced equivalent or higher yields. Note that N fertilizer was applied as ammonium nitrate at 67 kg N/ha in the spring and fall with monoammonium phosphate (11-48-0) and triple super phosphate as phosphate sources. The total N with the 11-48-0 source would then be 11 + 67 = 78 kg/ha.

With polish rape (Brassica campestris) (Figure 3) average yield from spring applied N fertilizer was significantly higher than yields from fall applied (11 year period). The average yield from spring applied N was 1408 kg/ha, from fall applied, 1311 kg/ha and the control was 937 kg/ha.

Results in Figure 4 show if yields were over 1500 kg/ha from fall applied N, yields from spring applied N would be less than fall applied.

Conversely, if yields from fall applied N were less than 1500 kg/ha, spring application of N produced equivalent or higher yields. Yields for this 6 year period between spring and fall applied N were not significantly different.

With Argentine rape (Brassica napus), Figure 5, average yield from spring applied N fertilizer is not significantly higher than yields from fall applied (6 year period). The average yield from spring applied N was 1522 kg/ha from fall applied, 1428 kg/ha and the control was 988 kg/ha. Results show if yields were over 2000 kg/ha from fall applied N, yields from spring applied N would be less than fall applied. Conversely, if yields were less than 2000 kg/ha, spring application produced equivalent or higher yields.

With spring wheat (Triticum aestivum), Figure 6, average yield from spring applied N fertilizer is significantly higher than fall applied over a six year period. Wheat fertilized in the fall averaged 2213 kg/ha and in spring 2677. With 11-48-0 as the phosphate source, 11 kg/ of N/ha more was added to give a fall applied N average yield of 2389 kg/ha.

With flax, Table 1, N broadcast in the fall was equivalent to N broadcast and incorporated in the spring over a three year period. In one year, the control yield was 1320 kg/ha, the fall applied N treatment yielded 1764 kg/ha and spring applied, 1679 kg/ha.

In conclusion, the results indicated that N should be broadcast in the spring for wheat, in the spring or fall for rapeseed and barley. More experiments are required to determine if fall applied N on flax produces higher yields than spring applied.

Table 1. Spring And Fall Applied N Fertilizer On Noralta Flax And Fraser Oats

Fertilizer		Noralta	Fraser
Fall (F)	Spring (S)	Flax (1973-75)	Oats (1972)
N	N-P		
Time	--------kg/ha----------	----------kg/ha----------	
F	67	0-20	1282	3455
F	67	11-20	1383	3379
S	0	67-20	1269	3974
	0	0-0	1118	2096

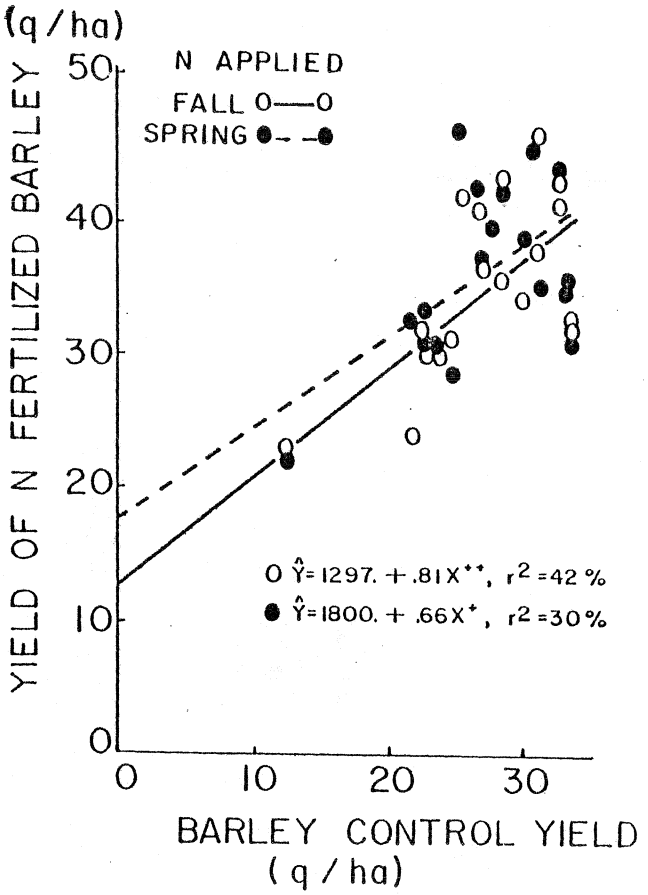

Figure 1 Effect Of Spring And Fall Applied N (67 kg/ha) On Barley (Bonanza and Conquest) Yields Related To Control Yields from 1966 to 1977.

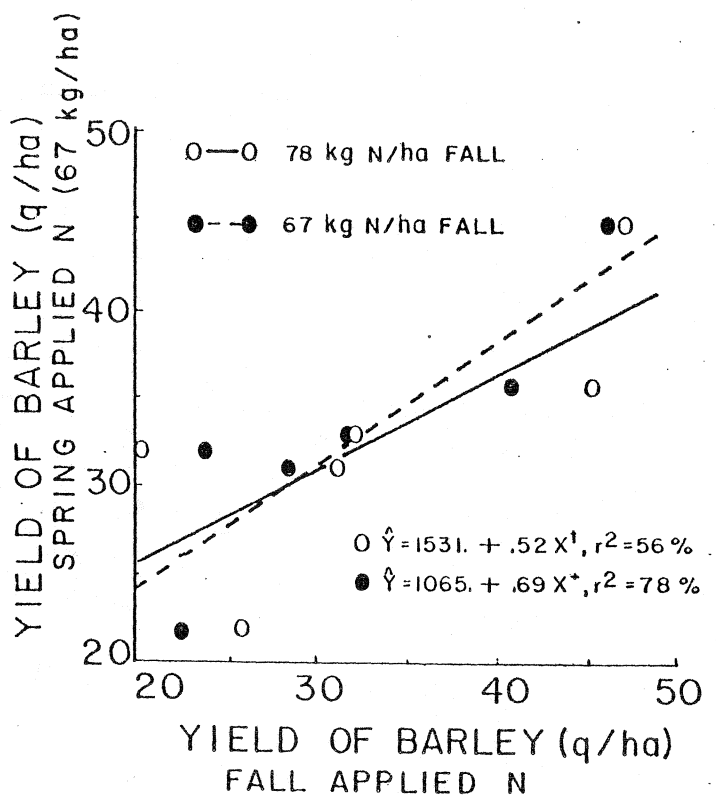

Figure 2 Yield Of Barley Fertilized With N In The Spring Related To Yield Of Barley Fertilized With N In The Fall, 1972 to 1977.

NOTE: Equations are in kg/ha, to obtain q/ha divide by 100.

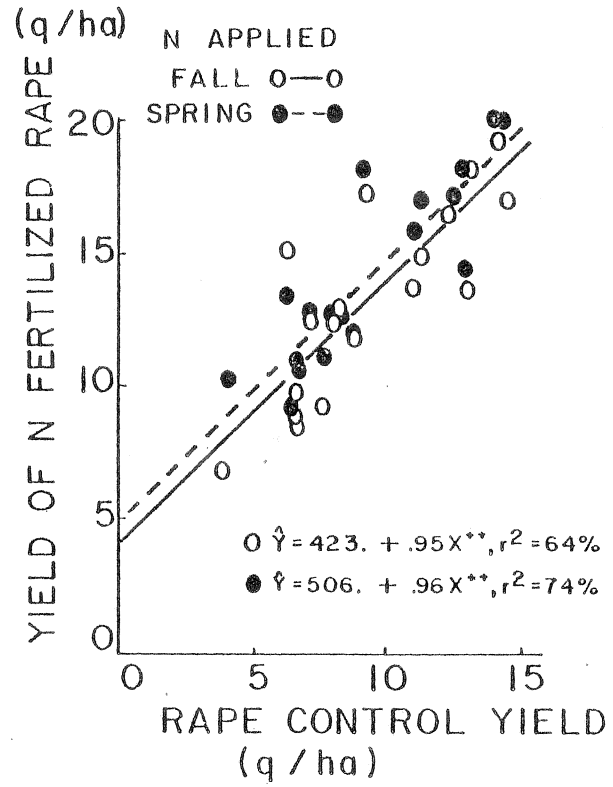

Figure 3 Yield Of Fertilized Rape (Brassica campestris) with N (67 kg/ha) Applied In Spring And Fall In Relation To Control Yields, 1966 to 1977.

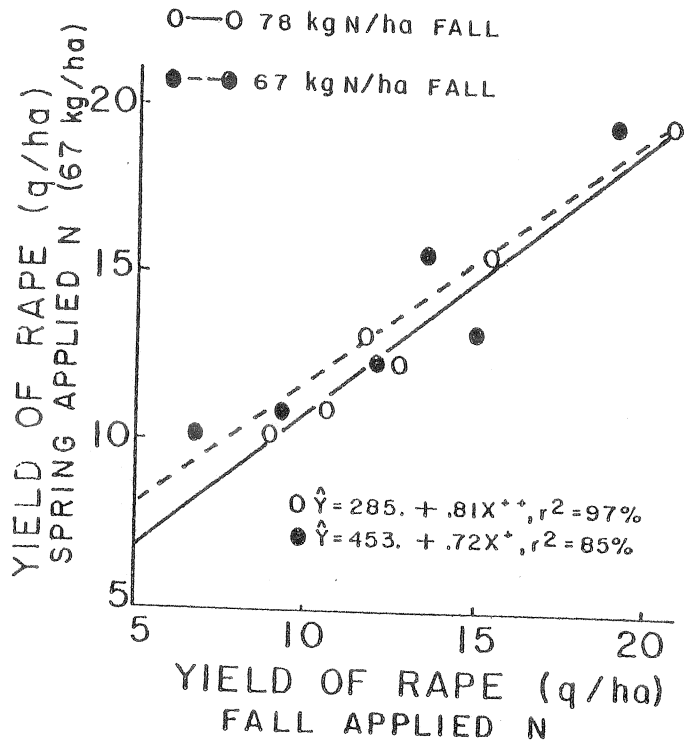

Figure 4 Yield Of Rape Fertilized With N In The Spring And Related To Yield Of Rape Fertilized With N In The Fall, 1972 to 1977.

NOTE: Equations are in kg/ha, to obtain q/ha divide by 100.

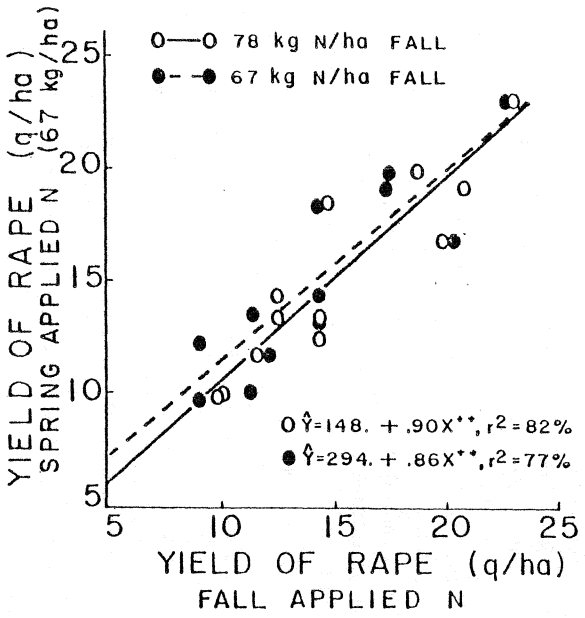

Figure 5 Yield Of Rape (Brassica napus) Fertilized With N In The Spring Related To Yield Of Rape Fertilized With N In The Fall, 1972 to 1977.

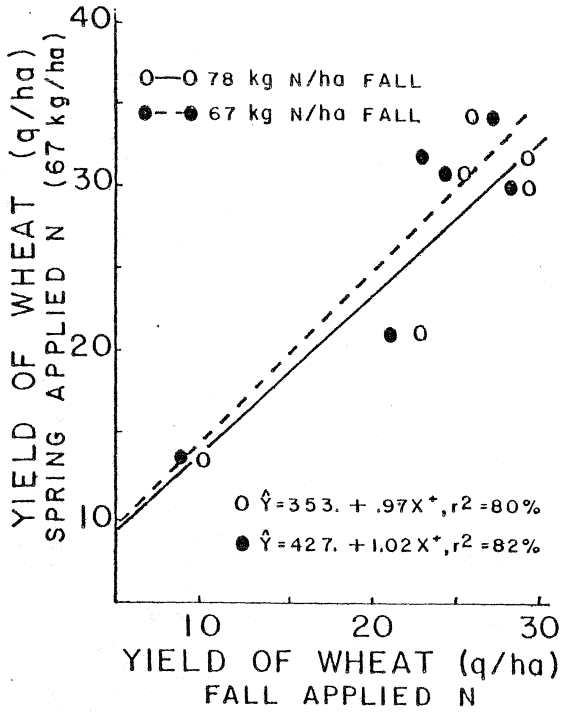

Figure 6 Yield Of Spring Wheat Related To N Fertilizer Applied In The Spring And In The Fall, 1972 to 1977.

NOTE: Equations are in kg/ha, to obtain q/ha divide by 100.