

Annual Preliminary Summary: Fertility Management of Winter Wheat Grown After Alfalfa

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Studies to determine the effect of chloride on winter wheat after alfalfa were conducted in 1997 and will be conducted in 1999 at Carman, MB. Treatments of chloride fertilizer were added to winter wheat (cv. Kestrel) at the rates of 25 and 50 kg Cl ha⁻¹ using both KCl and CaCl and were compared to the control rotation with no Cl added. Results from the 1997 indicate chloride rate did not significantly increase the yield of winter wheat, regardless of the form it was added. (Table 1).

Studies to determine the optimum amount of nitrogen fertilizer which should be added to winter wheat (cv. Kestrel), spring wheat (cv. Katepwa), and fall rye (AC Rifle) seeded into no-till alfalfa stubble were conducted in 1997 and 1998 (fall rye in 1998 only) at Carman, MB. Results from 1997 and 1998 indicate the yield of winter wheat was higher than the spring wheat yield, regardless of the amount of fertilizer N added (Fig 1). In 1997, grain protein concentration (GPC) was higher in the spring wheat crop resulting in a similar N uptake into the seed as the winter wheat crop (data not shown). Addition of nitrogen to each cultivar did not increase the yield, GPC or N uptake of spring or winter wheat in 1997. Therefore, mineralized nitrogen from decaying alfalfa residue was adequate to produce maximum yield in the first crop after alfalfa in 1997. In 1998, fall rye yielded higher than spring wheat but lower than winter wheat after alfalfa (Figure 2). Adding 90 kg N ha⁻¹ of fertilizer N to alfalfa stubble increased winter wheat yield by 720 kg ha⁻¹ compared to the unfertilized control. Fertilizer nitrogen addition resulted in only slightly higher yields in the fall rye crop and slightly lower yields in spring wheat crop. In summary, the only situation where fertilizer N was required to maximize grain yield was the winter wheat crop in 1998. A longer growing season and higher winter wheat yield may have contributed to the higher nitrogen requirement by winter wheat compared to fall rye and spring wheat after alfalfa.

Other studies

1. Effect of alfalfa termination method (tillage vs. herbicide removal) on N response in following spring wheat crops.

Years: 1998 and 1999
Location: Carman, MB.

2. P response of crops after alfalfa.

Years: 1999 and 2000
Location: Carman and Glenlea, MB.

Table 1. The effect of adding chloride to winter wheat at Carman, MB in 1997.

<u>Chloride treatment (kg ha⁻¹)</u>	<u>Wheat yield (kg ha⁻¹)</u>
Control (no Cl added)	4181 a
25 kg Cl ha ⁻¹ as KCl	4427a
50 kg Cl ha ⁻¹ as KCl	4117a
25 kg Cl ha ⁻¹ as CaCl	4265a
50 kg Cl ha ⁻¹ as CaCl	4148a

P>F	0.5788ns
LSD	444

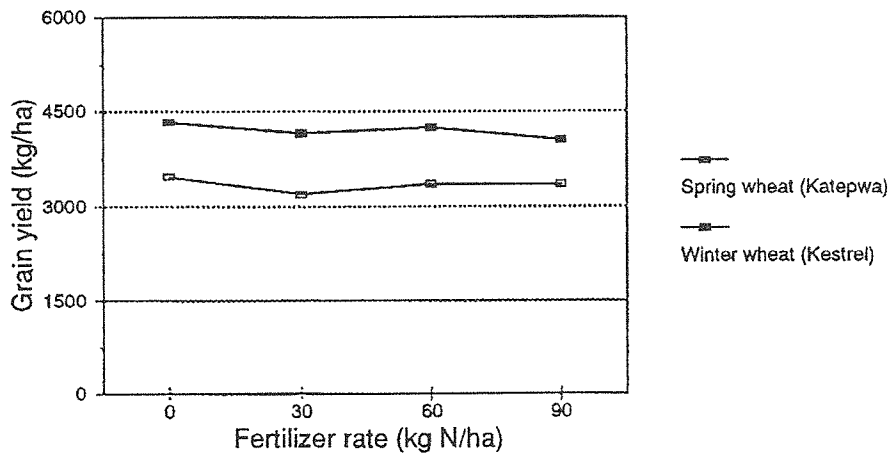


Figure 1. Yield of winter wheat and spring wheat as affected by rate of fertilizer nitrogen addition to alfalfa stubble at Carman, MB in 1997.

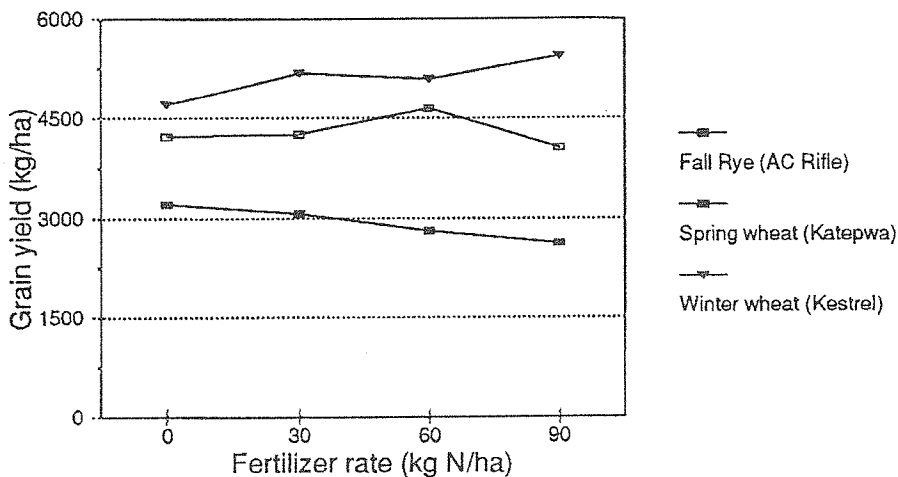


Figure 2. Yield of winter wheat, fall rye and spring wheat as affected by the rate of fertilizer nitrogen added to alfalfa stubble at Carman, MB in 1998.