RESPONSE OF WHEAT TO FERTILIZER IN THE SOUTH WEST

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Fertilizer tests have been carried out on farmer's fields throughout the southwest for many years. Since 1967, incremental rates of N and P have been used on the basis for all tests. Other treatments have been added occasionally. These tests have been carried out at 6 to 15 sites for a year and up until 1972 on both stubble and fallow, since then until 1978 tests were only on fallow. Sites covered a range of soils from sandy loam to heavy clay. At all sites, three of four soil samples were taken to a depth of 120 cm at seeding time. These were analyzed for available moisture, NO_3-N, NH_4-N, P for each of the depths 0-15, 15-30, 30-60, 60-90 and 90-120 cm. The fertilizer tests were rod row tests with 4 rows per plot and 4 replicates. Rainfall was recorded near each test area.

Table 1 and 2 show the average check yield and the increase obtained from different rates of fertilizer on fallow and stubble.

Table 1. Average check yield and yield increase from fertilizer on fallow - 1967-77 (kg/ha) (Rainfall 0-15+ cm)

Fertilizer rate		Available soil moisture at seeding (cm)			
kg/ha N - P_2O_5		0-15+	0-10	10-15	15+
Check	0-0	1397	1275	1492	1385
Increase from	15-10	262	137	337	268
	45-20	262	190	352	229
	10-0	36	19	22	56
	10-10	171	106	201	181
	10-15	205	118	254	211
	10-20	227	127	287	232
	10-40	295	180	376	292
Number of tests included		94	21	32	41

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Table 2. Change check yield and yield increase from fertilizer on stubble - 1967-1971 (kg/ha)
(Rainfall 0-15+ cm)

Fertilizer rate		Available soil moisture at seeding (cm.)			
kg/ha	N - P_2O_5	0-15+	0-10	10-15	15+
check	0-0	719	632	826	775
Increase from	4-20	106	111	138	53
	15-20	208	151	322	187
	45-20	403	261	541	538
	60-20	446	296	597	581
	30-20	332	230	469	381
	30-0	233	146	333	295
Number of tests included		59	29	17	13

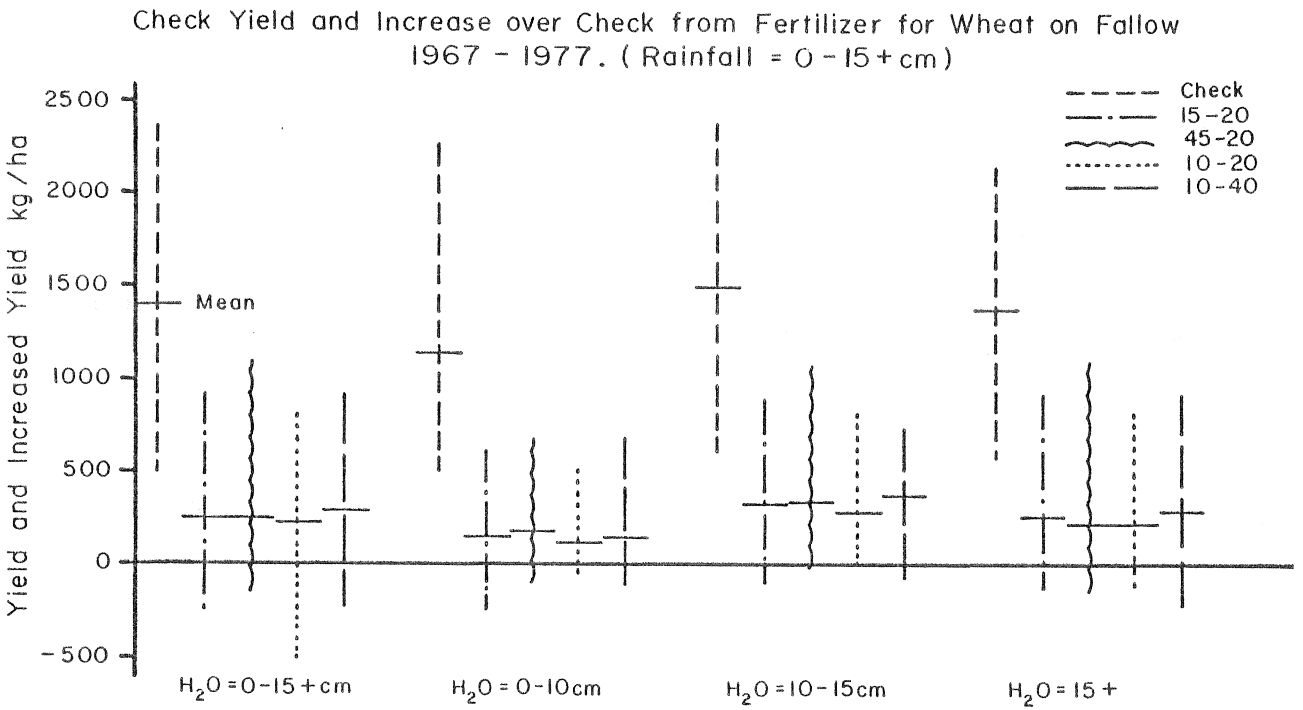
Figures 1 and 2 show the same information but include the maximum and minimum yields on yield increases obtained for each of the moisture levels.

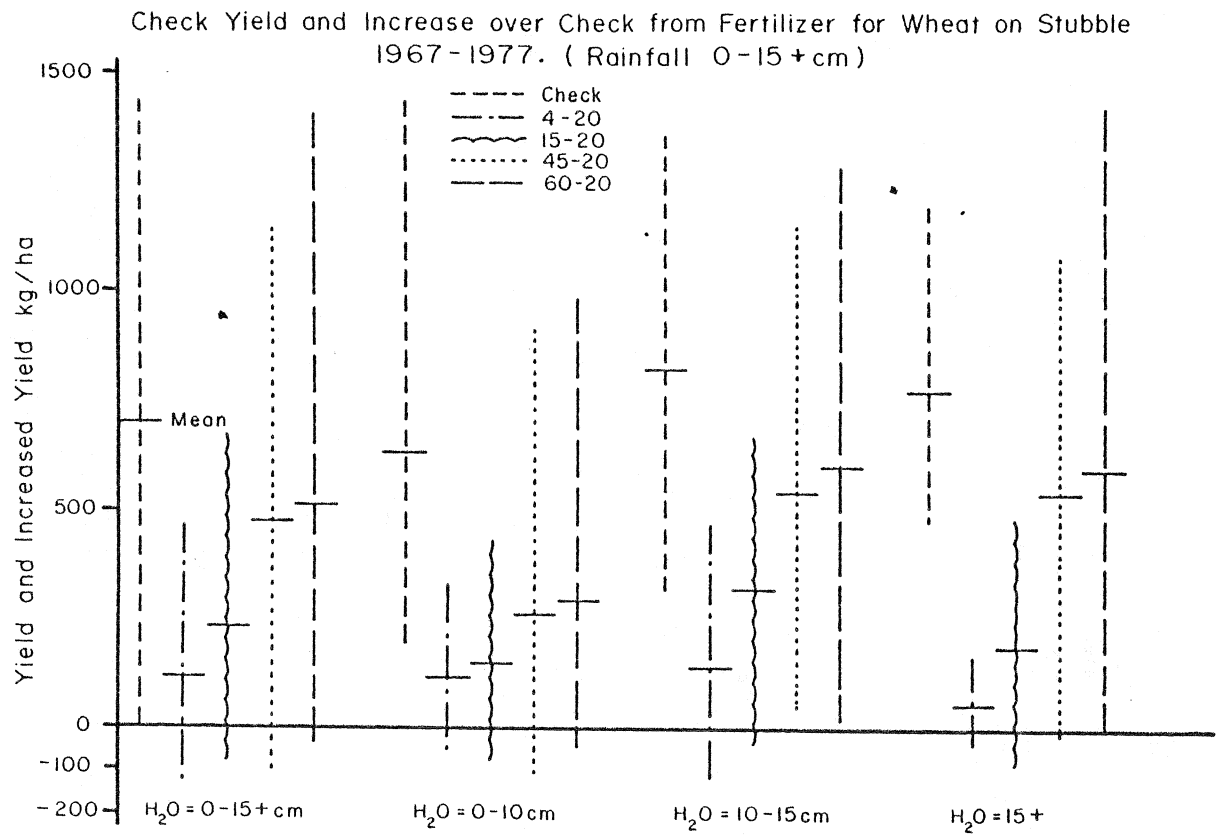
On the average on fallow there was little profit in increasing the nitrogen fertilizer beyond 15 kg/ha under any of the moisture conditions at seeding time. There is a trend toward increased response to N as the moisture increases to 15 cm of available but a decrease with greater amounts of water. There is some increase in yield from increased rates of P_2O_5 but probably not economical. The effect of spring moisture on increased yield is surprisingly small. This is due to the fact that often the growing season rainfall following a dry spring is above average and a wet spring may be followed by a dry summer.

On the average, on stubble, there was an increase in yield by increasing nitrogen up to 45 kg/ha but little further benefit from applying 60 kg/ha. As with fallow the increase with increasing soil moisture at seeding is small, 300 kg increase with 60-20 when the moisture increased from 0-10 to 10-15 cm and generally a decrease with larger amounts of soil moisture.

My conclusions from this data is that on the average, there is little response to nitrogen on fallow and not much advantage in increasing the phosphorus beyond 20 to kg/ha. On stubble there was little increased yield by increasing the nitrogen beyond 45 kg/ha at any spring moisture levels.

These results are based on tests conducted in Southwestern Saskatchewan and apply only to the particular conditions during the year when tests were conducted. In no way is it intended to criticize results from other areas because each area has different conditions. It does, I think form a basis for not completely accepting unquestioningly all recommendations from other areas for application in the South west.


Check Yield and Increase over Check from Fertilizer for Wheat on Fallow
1967 - 1977. (Rainfall = 0 - 15 + cm)
Yield and Increased Yield kg / ha
2500
2000
1500
1000
500
0
- 500
Mean
Check
15 - 20
45 - 20
10 - 20
10 - 40
H2O = 0 - 15 + cm
H2O = 0 - 10cm
H2O = 10 - 15cm
H2O = 15 +


Check Yield and Increase over Check from Fertilizer for Wheat on Stubble
1967-1977. (Rainfall 0-15+cm)
Check
4-20
15-20
45-20
60-20
Yield and Increased Yield kg/ha
1500
1000
500
0
-100
-200
Mean
H2O = 0-15+cm
H2O = 0-10cm
H2O = 10-15cm
H2O = 15+