

Soil Fertility Research - 1972

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Rates and Placement of Phosphate for Wheat, Barley and Rapeseed on Fallow

Phosphate fertilizer was applied with the seed or side banded approximately 0.75 inch to the side and above the seed at rates from 10 to 80 lb P_2O_5 /acre for wheat, barley and rapeseed on several soil types.

On a black Waseca loam at Lashburn containing 18 lb P/acre (0 to 6" depth) on the basis of soil samples taken just prior to seeding in the spring, 40 lb P_2O_5 /acre, applied with the seed, produced yield increases of 107% and 83% for wheat and barley, respectively, above check yields of 23 and 49 bu/acre. Barley grain yields were approximately 60% higher than wheat, and barley continued to respond to rates up to 60 lb P_2O_5 /acre.

On Sceptre heavy clay at Kindersley, with 5 lb/acre available P at seeding, under relatively dry conditions, 40 lb P_2O_5 raised wheat yields 38% above a check of 16.8 bu/acre, with very little additional response above this rate. Seed-placed P was somewhat more effective than side banding.

On Scott loam, maximum yields of wheat were obtained at the 60 lb P_2O_5 rate of applied phosphate under non-irrigated and irrigated conditions, and irrigated barley also yielded highest with this rate. Yield increases for wheat were 97% and 55% for dryland and irrigated conditions, respectively, where soil test levels of available P were 15 and 25 lb/acre. Barley yields were increased by 40% and 47% under dryland and irrigation, respectively. Irrigation almost doubled the yield of both crops.

On Scott loam on a dryland site with 15 lb available P/acre (0 to 6" depth) at seeding, yields of Span rapeseed were increased 50% above a check yield of 900 lb/acre by phosphate applied at 40 lb P_2O_5 /acre. However, on an irrigated site with 26 lb available P/acre at seeding,

although irrigation almost doubled the unfertilized yield, there was no significant response to phosphate. Seed-placed and side-banded phosphate were similar in effectiveness. Yields of Span rapeseed were not increased at Saskatoon on a loam soil containing 41 lb available P/acre at seeding time.

Effects of Rates and Dates of Seeding of Rapeseed on Yields and Response to Phosphate Fertilizer

Yields of Span and Zephyr rapeseed at Saskatoon were not significantly influenced by varying seeding rates from 2 to 10 lb/acre. With 41 lb available P/acre (0 to 6") at seeding, there was no response to applied phosphate. Oil content in the seed was not affected by seed rates or phosphate fertilizer. Dates of seeding at Scott and Saskatoon appeared to have some effect on response to P and on oil content as well as on yields of Span and Zephyr and these experiments will be continued in 1972.

Response of several Wheat Varieties and Barley to N and P Fertilizers on Fallow

The response of Neepawa, Pitic 62, QK-13 and Opal wheats, and Galt barley to several rates of N and P were investigated on Scott loam and Elstow silty clay loam at Scott and Rosetown, respectively. The levels of $\text{NO}_3\text{-N}$ to 24-inch depth and $\text{NaHCO}_3\text{-extr. P}$ to 6-inch depth at seeding time in the Scott loam and Elstow silty clay loam were 17 and 95, and 20 and 171 lb/acre, respectively. With more favourable moisture conditions at the Elstow silty clay loam site, yields of all varieties were substantially higher than on the Scott loam, but response to P and N were higher on the Scott loam. Pitic 62 outyielded all other wheats and the barley at both locations, but had approximately 2% less protein than Neepawa. There were differences in yields and responses to N and P for the other varieties on the two soils. High rates of N increased protein contents of grain more on the Scott loam than on the Elstow silty clay loam.

Relative Efficiencies of Urea and Ammonium Nitrate for Wheat and Barley on Stubble

Urea and ammonium nitrate were applied at rates up to 80 lb N/acre with the seed or broadcast prior to seeding for wheat and barley on stubble on four different soil types. Factors which influenced the relative efficiencies of the two sources of N were rate applied, placement method, soil moisture at seeding time and cation-exchange capacity of the soil. A summary of the results of this investigation are presented elsewhere in these proceedings.

Large increases in yields of rapeseed were obtained from nitrogen applications on stubble on Scott loam. However, high rates of N tended to reduce oil content in the seed.

Liming for Wheat and Barley on Scott Loam

Yields of wheat and barley continue to show substantial increases from liming of the acid Scott loam 10 years after lime application.

Fertilizers for Brome-Alfalfa and Alfalfa on Loon River Loam

Applications of N, P and S were made to established stands of brome-alfalfa and alfalfa on Loon River loam soil. Soil analyses in the spring of 1972 showed $\text{SO}_4\text{-S}$ levels of 9 lb/acre to 24" depth.

Yields of alfalfa hay and seed were increased by S fertilizer. Brome-alfalfa containing a relatively small amount of alfalfa in the mixture responded strongly to N and P, but S had very little effect on yields.