

EFFECTS OF RESIDUAL PHOSPHORUS ON YIELD OF WHEAT

D. W. L. Read,
Research Station,
Research Branch, Agriculture Canada,
Swift Current, Saskatchewan. S9H 3X2

In the past nine years studies have been conducted to study the effect of a single large application of phosphatic fertilizer on the yield of wheat and to compare this effect with that from normal with seed applications of fertilizer.

In 1966 tests were set up on Wood Mountain clay loam at Swift Current and on Sceptre clay at Cabri. These consisted of four rates of phosphatic fertilizer broadcast on the soil surface in the early fall and worked into the soil. The treatments were arranged in a randomized block design with four replicates. Rates of application were 0, 100, 200 and 400 kg/ha of P applied as super phosphate. These tests were in duplicate, one on fallow and one on stubble. A crop-fallow rotation was followed.

Each treatment block was divided into four, and one quarter was used each year for a fertilizer test where rates from 0 to 50 kg/ha of P_2O_5 plus 15 kg/ha of nitrogen was applied with the wheat seed. This fertilizer test was rotated around from one-quarter of the block to another so that it was never repeated on the same area. Flax was grown as the crop prior to using the block for fertilizer test. The remainder of the area was seeded to wheat.

Yields were taken from the fertilizer tests each year and soil samples were taken each fall to determine the amount of phosphorus remaining in the soil. In 1974 the last quarters were used for fertilizer tests.

The average yield for the eight years is shown in figures 1 and 2. These are from the original application with no extra phosphorus and with a single application of phosphorus with the seed.

At both Cabri and Swift Current there was a significant yield increase from the with seed applications only on the plots that had received no phosphorus in the initial application. At Cabri, the yield from the 100, 200 and 400 rates with no with seed application was higher than from 50 lb. with the seed where there had been no previous fertilizer. At Swift Current, where the response to phosphatic fertilizer is always low, the advantages of residual fertilizers are not as marked. These results are based on the average of eight years. The 1974 pattern was more in favor of the residual phosphorus, indicating that the effect has not yet worn off.

With similar tests at Brandon, similar results were obtained. To check the effects of residual phosphorus further, three other tests were set up. One at Carduners, Swift Current, on Haverhill clay loam, one near the site at Cabri and one on Sceptre clay at Stewart Valley. In

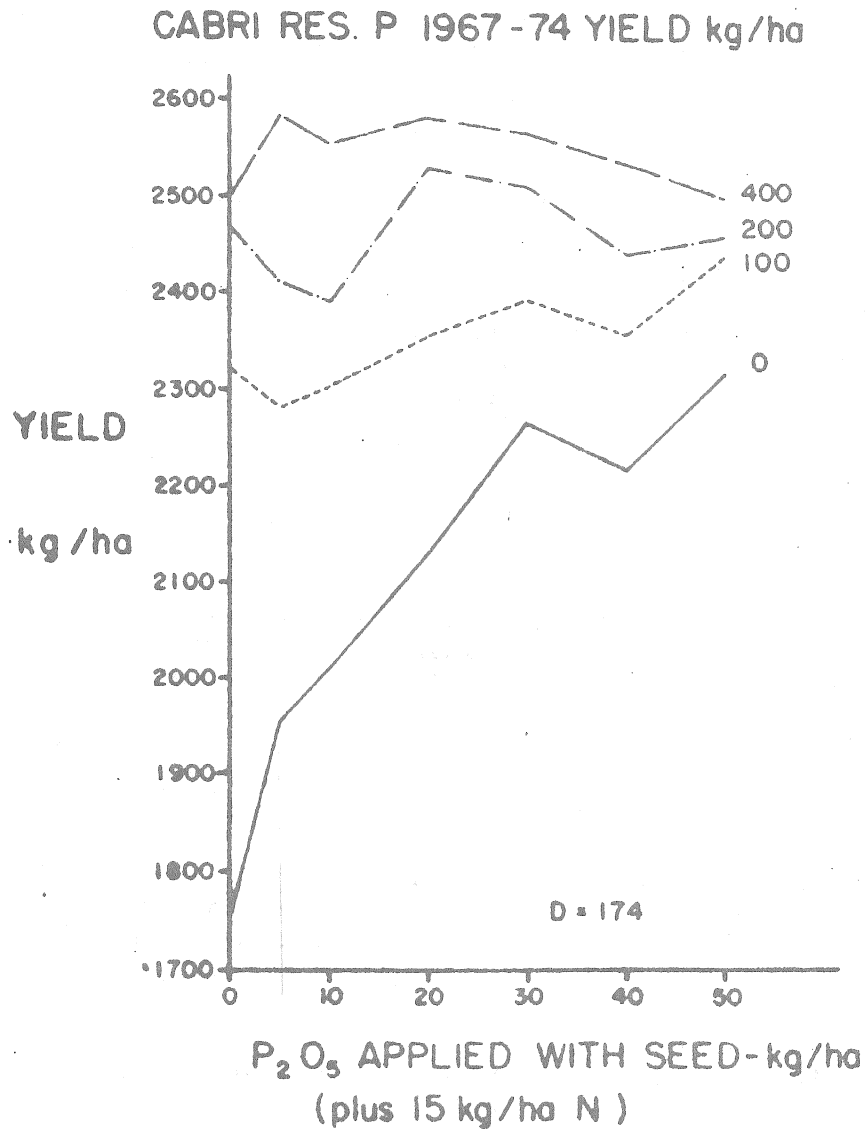


Figure 1

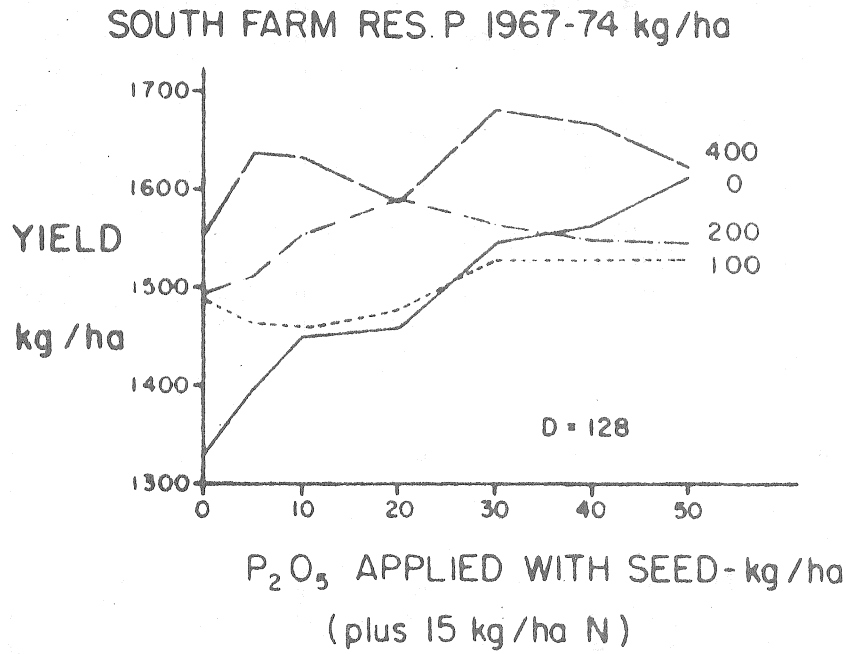


Figure 2

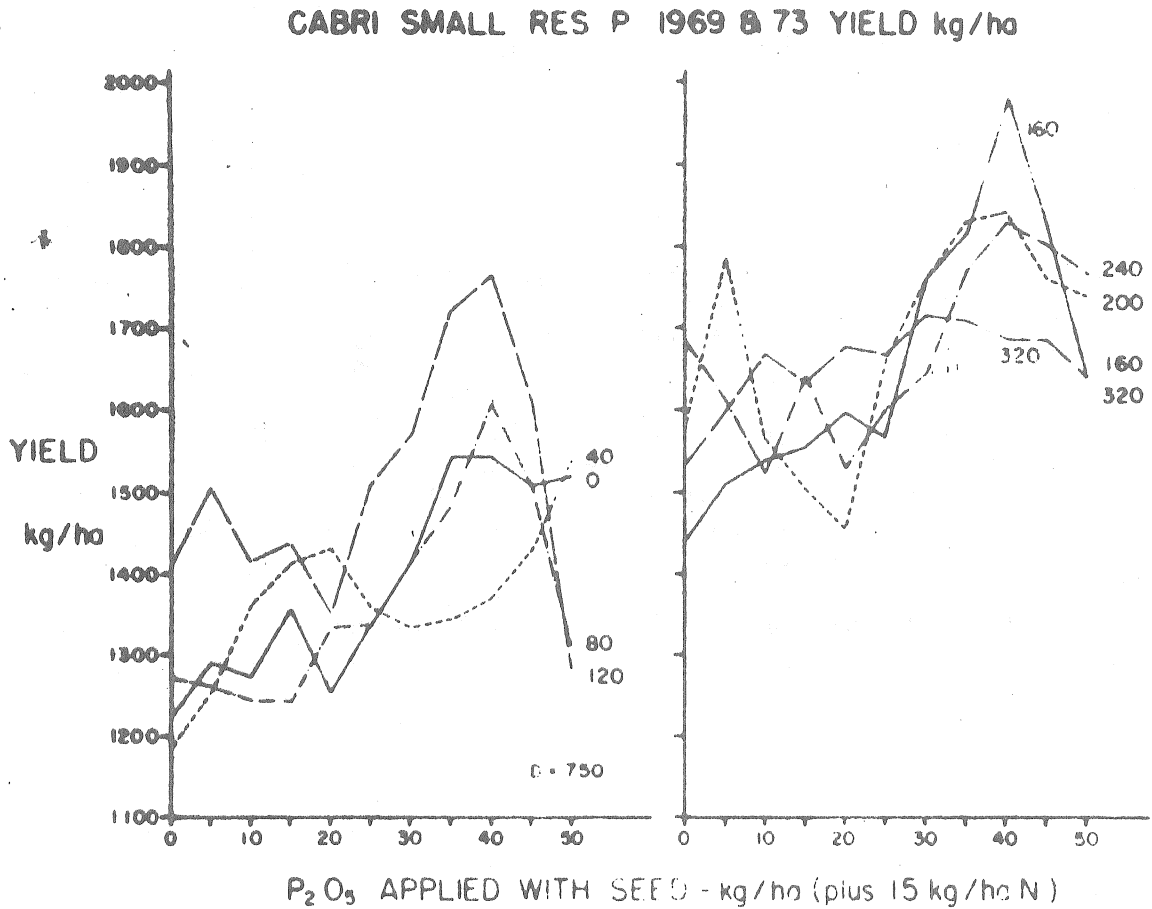


Figure 3