

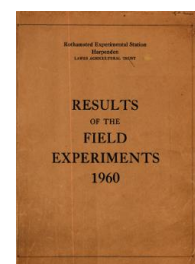
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60/R/B/9 Residual Phosphate Rotations

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60/B/9.1

RESIDUAL PHOSPHATE ROTATIONS

The long term and residual effects of a number of phosphate fertilisers compared with superphosphate - Great Field IV and Sawyers I 1960.

Design: Great Field IV: 1 randomised block of 12 plots per crop.
Sawyers I: 2 randomised blocks of 12 plots each per crop.

Rotation: Potatoes, Barley, Swedes.

Area of each plot (acres):

Great Field IV: 0.0193. Area harvested: Potatoes and Barley - 0.0129, Swedes - 0.0096.
Sawyers I: 0.0212. Area harvested: Potatoes and Barley - 0.0141, Swedes - 0.0106.

Treatments:

Granular superphosphate treatments broadcast in spring before sowing or ridging:-

1. No phosphate.
2. 0.25 cwt P_{205} per acre per year.
3. 0.50 cwt P_{205} per acre per year.
- 4 & 5. No phosphatic fertiliser in 1960 or 1961, but later at rates to be decided.

Phosphate fertilisers ploughed in (to a depth not exceeding 6 inches) at 3.0 cwt P_{205} per acre in September 1959 and rotary hoed in in spring:-

- | | |
|-------------------------------|---|
| 6. Nitrophosphate I | (17.1% P_{205} , none water soluble) |
| 7. Nitrophosphate II | (18.8% P_{205} , one quarter water soluble) |
| 8. Nitrophosphate III | (22.4% P_{205} , half water soluble) |
| 9. Gafsa rock phosphate | (28.9% P_{205}) |
| 10. Bessemer basic slag | (15.2% P_{205}) |
| 11. Potassium metaphosphate * | (57.9% P_{205} , 38.8% K_2O) |
| 12. Granular superphosphate | (20.4% P_{205}) |

*Note. To balance the K_2O content of potassium metaphosphate, all the other treatments included 2.0 cwt K_2O per acre as sulphate of potash in autumn 1959.

Basal dressings per acre: Broadcast in spring before sowing or ridging:

N as 'Nitro-Chalk' 21:-

To potatoes: 1.2 cwt; to barley: 0.6 cwt; to swedes: 0.5 cwt.

K_2O as sulphate of potash:-

To potatoes: 1.0 cwt; to barley: 1.0 cwt; to swedes: 1.0 cwt.

Cultivations, etc. (both fields, except as indicated):

Phosphate fertilisers applied: Sept 23 - 24, 1959. Ploughed: Sept 25 - 26. Balancing potassium sulphate applied: Nov 3. Ploughed second time: Nov 9 - 27. Rotary hoed twice: Mar 7 - 8, 1960.

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Potatoes: Basal fertilisers and spring superphosphate applied: Apr 8, 1960. Planted: Apr 13. Earthed up: June 20 - 21. Sprayed with copper fungicide at 5 lb in 40 gallons per acre: July 16. Sawyers I sprayed with sulphuric acid, 15% BOV, at 100 gallons per acre: Aug 31; and again, 10% BOV, at 100 gallons-per acre: Sept 13. Great Field IV sprayed with sulphuric acid, 15% BOV, at 100 gallons per acre: Sept 13. Haulm on Great Field IV destroyed mechanically: Sept 19. Lifted: Oct 4 - 5. Variety: Majestic.

Barley: Basal fertilisers and spring superphosphate applied, seed drilled at $2\frac{1}{4}$ bushels per acre: Mar 18, 1960. Sawyers I sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 10. Great Field IV sprayed with CMPP at 6 pints in 40 gallons per acre: May 25. Combine harvested: Aug 17. Variety: Proctor.

Swedes: Basal fertilisers and spring superphosphate applied: May 10 - 11, 1960. Hand drilled at 3 lb per acre: May 16. Singled: June 16 - 19. Lifted: Oct 28 - 31. Variety: Wilhelmsburger.

Previous crop (both fields): Fallow.

Standard errors per plot.

Sawyers I

Potatoes, Total tubers: 0.927 tons per acre or 5.9% (13 d.f.)

Barley, Grain (at 85% dry matter): 2.06 cwt per acre or 5.6% (13 d.f.)

Swedes, roots: 3.597 tons per acre or 18.4% (13 d.f.)

Summary of Results

Phosphate	<u>Potatoes</u>				Percentage ware ($1\frac{1}{2}$ " riddle)			
	Total tubers: tons per acre				Great Field IV		Sawyers I	
	Mean	Increase	Mean	Increase	Mean	Increase	Mean	Increase
None (1,4,5)	15.52		13.63 ⁽¹⁾		95.8		95.4	
2	15.38	-0.14	13.69	+0.06	94.0	-1.8	93.4	-2.0
3	18.04	+2.52	14.20	+0.57	91.7	-4.1	94.5	-0.9
6	19.66	+4.14	17.80	+4.17	91.9	-3.9	92.7	-2.7
7	19.28	+3.76	17.38	+3.75	92.2	-3.6	92.1	-3.3
8	20.27	+4.75	17.97	+4.34	92.9	-2.9	93.1	-2.3
9	18.64	+3.12	15.90	+2.27	91.7	-4.1	93.8	-1.6
10	21.09	+5.57	16.67	+3.04	91.2	-4.6	93.2	-2.2
11	20.36	+4.84	17.44	+3.81	93.6	-2.2	94.2	-1.2
12	19.59	+4.07	17.85	+4.22	94.7	-1.1	92.9	-2.5
Mean	18.24		15.81		93.4		93.8	
(1) (± 0.378)								

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Phosphate	Great Field IV		Sawyers I		Great Field IV		Sawyers I	
	Mean	Increase	Mean	Increase	Mean	Increase	Mean	Increase
	<u>Barley</u>				<u>Straw (at 85% dry matter)</u>			
	<u>Grain (at 85% dry matter)</u>				<u>cwt per acre</u>			
			(± 1.46)	(± 1.69)				
			(1)					
None (1,4,5)	31.3		30.2		30.6		18.9	
2	33.0	+1.7	35.4	+5.2	28.3	-2.3	21.1	+2.2
3	33.1	+1.8	36.1	+5.9	29.7	-0.9	20.7	+1.8
6	33.9	+2.6	37.7	+7.5	31.9	+1.3	23.5	+4.6
7	37.5	+6.2	35.5	+5.3	35.7	+5.1	26.9	+8.0
8	33.5	+2.2	39.0	+8.8	37.4	+6.8	27.3	+8.4
9	35.4	+4.1	41.4	+11.2	37.1	+6.5	22.8	+3.9
10	35.0	+3.7	42.6	+12.4	36.8	+6.2	25.3	+6.4
11	37.7	+6.4	41.5	+11.3	35.3	+4.7	24.1	+5.2
12	40.2	+8.9	39.8	+9.6	39.6	+9.0	24.0	+5.1
Mean	34.4		36.6		33.6		22.7	
Mean dry matter								
% as harvested:	82.4		79.7		62.8		67.4	
(1) (± 0.84)								

Swedes, Roots: tons per acre

			(± 2.543)	(± 2.937)
			(1)	
None (1,4,5)	10.97		10.53	
2	19.08	+8.11	15.18	+4.65
3	18.97	+8.00	18.40	+7.87
6	20.06	+9.09	23.41	+12.86
7	23.09	+12.12	23.81	+13.28
8	22.09	+11.12	21.54	+11.01
9	24.12	+13.15	24.13	+13.60
10	19.23	+8.26	27.17	+16.64
11	23.71	+12.74	25.25	+14.72
12	24.00	+13.03	24.57	+14.04
Mean	18.94		19.59	
(1) (± 1.468)				