

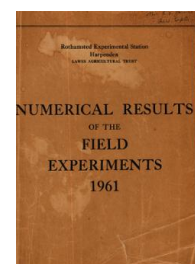
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61/R/B/8 Residual Phosphate Rotation

Rothamsted Research

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RESIDUAL PHOSPHATE ROTATIONS

The long term and residual effects of a number of phosphate fertilisers compared with superphosphate - Great Field IV and Sawyers I 1961, the second year.

Design: Great Field IV: 1 randomised block of 12 plots per crop.
Sawyers I: 2 randomised blocks of 12 plots 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_2O_5 per acre per year.
3. 0.50 cwt P_2O_5 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_2O_5 per acre in September 1959 and rotary hoed in in spring.

- | | |
|------------------------------|--|
| 6. Nitrophosphate I | (17.1% P_2O_5 , none water soluble) |
| 7. Nitrophosphate II | (18.8% P_2O_5 , one quarter water soluble) |
| 8. Nitrophosphate III | (22.4% P_2O_5 , half water soluble) |
| 9. Gafsa rock phosphate | (28.9% P_2O_5) |
| 10. Bessemer basic slag | (15.2% P_2O_5) |
| 11. Potassium metaphosphate* | (57.9% P_2O_5 , 38.8% K_2O) |
| 12. Granular superphosphate | (20.4% P_2O_5) |

*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):

Ploughed: Dec 28, 1960 - Jan 7, 1961. Ground chalk applied to Sawyers I at 9 cwt per acre: Feb 15.

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Potatoes: Rotary cultivated twice, fertilisers applied, planted: Apr 20, 1961. Earthed up: July 5. Lifted: Sept 26.

Variety: Majestic. Previous crop: Swedes.

Barley: Fertilisers applied, seed drilled at 2 bushels per acre on Great Field IV: Mar 14, 1961. Sawyers I rotary cultivated twice, fertilisers applied, seed drilled at 2 bushels per acre: Mar 16. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 12. Combine harvested: Aug 17. Variety: Proctor. Previous crop: Potatoes.

Swedes: Rotary cultivated twice: May 15, 1961. Fertilisers applied: May 16. Seed hand drilled at $2\frac{3}{4}$ lb per acre: May 17.

Singled: Great Field IV - June 30; Sawyers I - July 10.

Lifted: Nov 2. Variety: Wilhelmsburger. Previous crop: Barley.

Standard errors per plot:

Sawyers I

Potatoes, Total tubers: 0.705 tons per acre or 9.9% (13 d.f.)

Barley, Grain (at 85% dry matter): 3.41 cwt per acre or 10.5% (13 d.f.)

Swedes, Roots: 1.438 tons per acre or 11.4% (13 d.f.)

Note. For details for the previous year's results see 'Results of the Field Experiments' 1960 pages 60/B/9.1 to 60/B/9.3.

Summary of Results

Potatoes

Phosphate	Total tubers: tons per acre				Percentage ware (1½" riddle)			
	Great Field IV		Sawyers I		Great field IV		Sawyers I	
	Mean	Increase	Mean	Increase	Mean	Increase	Mean	Increase
			(±0.499)(±0.576)					
None(1,4,5)	10.23		6.60 ⁽¹⁾		96.0		93.1	
2	9.24	-0.99	6.53	-0.07	95.2	-0.8	94.1	+1.0
3	11.53	+1.30	8.09	+1.49	94.7	-1.3	95.0	+1.9
6	11.78	+1.55	7.34	+0.74	96.8	+0.8	95.3	+2.2
7	11.53	+1.30	7.93	+1.33	96.8	+0.8	94.4	+1.3
8	11.89	+1.66	6.35	-0.25	95.7	-0.3	93.9	+0.8
9	11.49	+1.26	6.26	-0.34	96.3	+0.3	94.5	+1.4
10	10.83	+0.60	7.62	+1.02	96.4	+0.4	95.6	+2.5
11	10.98	+0.75	7.55	+0.95	95.2	-0.8	94.3	+1.2
12	11.52	+1.29	8.17	+1.57	94.8	-1.2	95.3	+2.2
Mean	10.96		7.13		95.8		94.3	

(1) (±0.288)

61/B/8.3

Phosphate	Great Field IV		Sawyers I		Great Field IV		Sawyers I	
	Mean	Increase	Mean	Increase	Mean	Increase	Mean	Increase
<u>Barley</u>								
<u>Grain (at 85% dry matter)</u>				<u>Straw (at 85% dry matter)</u>				
cwt per acre				cwt per acre				
			(±2.41)(±2.78)					
None(1,4,5)	41.0		31.0 ⁽¹⁾		31.1		17.1	
2	44.6	+3.6	32.4	+1.4	31.9	+0.8	15.2	-1.9
3	45.1	+4.1	30.0	-1.0	35.2	+4.1	15.1	-2.0
6	45.1	+4.1	29.2	-1.8	35.3	+4.2	20.7	+3.6
7	46.0	+5.0	30.0	-1.0	34.8	+3.7	19.4	+2.3
8	43.0	+2.0	37.0	+6.0	33.6	+2.5	20.1	+3.0
9	47.1	+6.1	35.5	+4.5	37.4	+6.3	20.5	+3.4
10	45.7	+4.7	34.1	+3.1	41.8	+10.7	20.1	+3.0
11	45.0	+4.0	33.2	+2.2	38.2	+7.1	19.9	+2.8
12	41.5	+0.5	34.4	+3.4	37.9	+6.8	19.9	+2.8
Mean	43.8		32.4		35.0		18.5	
Mean dry matter								
% as harvested:	81.9		80.5		72.0		71.5	
(1) (±1.39)								

Swedes, Roots: tons per acre

			(±1.017)(±1.174)	
None(1,4,5)	10.28		6.20 ⁽¹⁾	
2	12.83	+2.55	11.87	+5.67
3	17.04	+6.76	12.00	+5.80
6	18.57	+8.29	17.58	+11.38
7	22.09	+11.81	16.31	+10.11
8	22.18	+11.90	16.82	+10.62
9	19.59	+9.31	14.12	+7.92
10	18.89	+8.61	13.64	+7.44
11	19.03	+8.75	14.84	+8.64
12	22.73	+12.45	15.28	+9.08
Mean	16.98		12.59	
(1) (±0.587)				