ROTHAMSTED RESEARCH

Yields of the Field Experiments 1963

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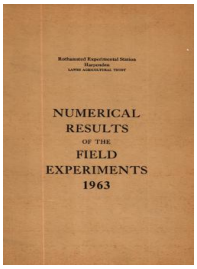

63/R/RP/B/8 Residual Phosphate Rotation

Rothamsted Research

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63/B/8.1

RESIDUAL PHOSPHATE ROTATION

(RP)

The long term and residual effects of a number of phosphate fertilisers compared with superphosphate - Great Field IV and Sawyers I 1963, the fourth year.

Rotation: Potatoes, barley, swedes.

Note: Swede tops are ploughed in.

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

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. 0.75 cwt P_2O_5 per acre in 1962.
5. 1.50 cwt P_2O_5 per acre in 1962.

Phosphate fertilisers ploughed in at 3.0 cwt P_2O_5 per acre in September 1959.

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: None on Great Field IV, 0.6 cwt on Sawyers I, 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.

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Cultivations, etc. (both fields, except as indicated): Ploughed:
Great Field IV - Mar 27, 1963, Sawyers I - Apr 3.
Potatoes: Fertilisers applied, potatoes planted: May 7, 1963.
Earthed up: Great Field IV - June 28, Sawyers I - July 4.
Sprayed with maneb at 1.2 lb in 20 gallons per acre: July 10.
Great Field IV sprayed with copper oxychloride fungicide at 2.3 lb copper plus 0.35 pints menazon in 20 gallons per acre: Aug 14.
Sawyers I sprayed with copper oxychloride fungicide at 2.3 lb copper in 40 gallons per acre: Sept 3. Sprayed with undiluted BOV at 16 gallons per acre: Sept 23. Lifted: Oct 14. Variety: Majestic.
Barley: Fertilisers applied: Apr 11, 1963. Seed drilled at 2 bushels per acre: Apr 13. Sprayed with mecoprop/2,4-D at 6 pints in 40 gallons per acre: June 12. Combine harvested: Sept 13. Variety: Proctor.
Swedes: Ground chalk applied to Sawyers I at 23 cwt per acre: Apr 23, 1963. Fertilisers applied: Sawyers I - May 18, Great Field IV - May 21. Seed drilled at 1.5 lb per acre: May 22. Singled: July 3. Lifted: Nov 6. Variety: Wilhelmsburger.

Note: For details of previous years' results see 'Results of the Field Experiments' 60/B/9, 61/B/8 and 62/B/8.

Standard errors per plot.
Sawyers I
Potatoes, Total tubers: 0.695 tons per acre or 7.7% (11 d.f.)
Barley, Grain (at 85% dry matter): 1.71 cwt per acre or 4.4% (11 d.f.)
Swedes, Roots: 2.125 tons per acre or 11.1% (11 d.f.)

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Summary of Results

Potatoes

Phosphate		Total tubers: tons per acre				Percentage ware (1.5 inch riddle)			
		Great Field IV		Sawyers I		Great Field IV		Sawyers I	
		Mean	Increase	Mean	Increase	Mean	Increase	Mean	Increase
				(±0.491)	(±0.695)				
None	1	11.26		7.75		95.5		93.7	
	2	12.35	+1.09	9.01	+1.26	93.2	-2.3	93.5	-0.2
	3	13.49	+2.23	8.97	+1.22	94.5	-1.0	94.6	+0.9
	4	10.81	-0.45	8.05	+0.30	95.0	-0.5	94.3	+0.6
	5	12.45	+1.19	8.88	+1.13	93.6	-1.9	93.0	-0.7
	6	13.11	+1.85	9.52	+1.77	93.4	-2.1	94.3	+0.6
	7	12.42	+1.16	9.09	+1.34	93.0	-2.5	94.0	+0.3
	8	12.49	+1.23	9.65	+1.90	93.9	-1.6	94.7	+1.0
	9	12.75	+1.49	9.03	+1.28	94.8	-0.7	94.8	+1.1
	10	12.93	+1.67	9.25	+1.50	96.0	+0.5	95.6	+1.9
	11	12.40	+1.14	9.35	+1.60	94.5	-1.0	94.2	+0.5
	12	11.55	+0.29	9.31	+1.56	95.6	+0.1	93.4	-0.3
Mean		12.33		8.99		94.4		94.1	

Barley

		Grain (at 85% dry matter): cwt per acre				Straw (at 85% dry matter): cwt per acre			
				(±1.21)	(±1.71)				
None	1	25.1		35.5		21.9		22.9	
	2	33.9	+8.8	40.1	+4.6	29.6	+7.7	29.3	+6.4
	3	27.9	+2.8	38.5	+3.0	30.6	+8.7	27.8	+4.9
	4	34.2	+9.1	37.7	+2.2	30.6	+8.7	26.7	+3.8
	5	35.5	+10.4	38.3	+2.8	31.1	+9.2	26.0	+3.1
	6	30.3	+5.2	36.9	+1.4	27.0	+5.1	25.2	+2.3
	7	30.6	+5.5	39.6	+4.1	29.6	+7.7	30.1	+7.2
	8	25.8	+0.7	39.9	+4.4	29.9	+8.0	27.7	+4.8
	9	34.5	+9.4	39.7	+4.2	32.4	+10.5	26.6	+3.7
	10	25.8	+0.7	38.9	+3.4	24.4	+2.5	28.9	+6.0
	11	32.0	+6.9	38.2	+2.7	31.3	+9.4	30.6	+7.7
	12	33.4	+8.3	39.4	+3.9	27.2	+5.3	27.4	+4.5
Mean		30.8		38.5		28.8		27.4	

Mean dry matter % as harvested	78.8	80.1	62.2	75.6

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Phosphate		Great Field IV Mean	Great Field IV Increase	Sawyers I Mean	Sawyers I Increase
		Swedes, Roots: tons per acre			
				(±1.503)	(±2.125)
None	1	11.81		11.24	
	2	20.65	+8.84	19.87	+8.63
	3	25.28	+13.47	23.24	+12.00
	4	18.20	+6.39	16.06	+4.82
	5	28.75	+16.94	21.66	+10.42
	6	24.40	+12.59	21.47	+10.23
	7	25.56	+13.75	21.51	+10.27
	8	23.89	+12.08	21.20	+9.96
	9	23.66	+11.85	17.24	+6.00
	10	22.18	+10.37	19.89	+8.65
	11	21.44	+9.63	18.69	+7.45
	12	23.80	+11.99	17.49	+6.25
Mean		22.47		19.13	

For explanation of treatment symbols see page 63/B/8.1

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