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Yields of the Field Experiments 1974

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74/R/RN/7 Residual Phosphate - Potatoes, Barley, Wheat, Ley

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RESIDUAL PHOSPHATE

Object: Originally to study the fresh and residual effects of phosphate fertiliser on yields of three arable crops grown in rotation. Since 1974 the effects on ley and on yield and pathogens of continuous wheat are also studied. Great Field IV and Sawyers I.

Sponsors: G.E.G. Mattingly, D.B. Slope.

The fifteenth year, potatoes, barley, ley (Gt. Field IV). Potatoes, barley, wheat (Sawyers I).

For previous years see 'Details' 1967, 68/B/5(t), 69/R/RN/7, 70/R/RN/7(t) and 71-73/R/RN/7.

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

Whole plot dimensions:-

Great Field IV: 4.27 x 18.3. Area harvested: potatoes and barley - 0.00520, ley - 0.00186.
Sawyers I: 4.27 x 20.1. Area harvested: potatoes and barley - 0.00572, wheat - 0.00615.

Treatments: Rates and frequency of applying phosphate: P2O5

None	0
Annual dressings, kg P2O5:-	
29	29 ANN
57	57 ANN
115	115 ANN
172	172 ANN
Triennial dressings, kg P2O5 (last applied 1972):-	
86	86 TRI
172	172 TRI
Six-yearly dressings, kg P2O5 (last applied 1973):-	
344	344 SIX
688	688 SIX
1032	1032 SIX
Single dressing, kg P2O5 applied in 1959:-	
376 as Gafsa rock phosphate	376 G(1)
376 as superphosphate	376 S(1)

- NOTES: (1) Since 1974 the original rotation of potatoes, barley, swedes on both fields has been changed. Blocks after barley are sown to ley on Gt. Field IV, to continuous wheat on Sawyers I.
(2) Since 1960 all phosphate has been applied as superphosphate.
(3) The six-yearly dressings were applied half in autumn before ploughing, half in spring.
(4) For a fuller record of treatments see 'Details' etc.

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Standard applications:

Potatoes: Manures: N at 250 kg as 'Nitro-Chalk'. K₂O at 250 kg as sulphate of potash. Weedkillers: Linuron at 1.2 kg and paraquat at 0.42 kg ion in 450 l. Fungicide: Mancozeb at 1.3 kg in 450 l on two occasions. Insecticide: Demeton-s-methyl at 0.25 kg applied with mancozeb on the first occasion.

Barley: Manures: (25:0:16) at 390 kg combine drilled. Weedkillers: Dicamba with mecoprop and MCPA ('Tetrallex Plus' at 7.0 l in 220 l).

Winter wheat (Sawyers I only): Manures: Ground chalk at 2.9 tonnes. K₂O at 87 kg as muriate of potash. N at 125 kg as 'Nitro-Chalk'. Weedkiller: Dicamba with mecoprop and MCPA ('Banlene Plus' at 5.6 l in 370 l).

Ley (Gt. Field IV only): Manures: Chalk at 2.9 tonnes. N at 60 kg as 'Nitro-Chalk' and K₂O at 120 kg as muriate of potash in seedbed. N at 100 kg for each cut. Weedkiller: Dicamba with mecoprop and MCPA ('Tetrallex Plus' at 7.0 l in 220 l).

Seed: Potatoes: Majestic, Foundation Stock.

Barley: Julia, dressed with ethirimol, sown at 160 kg.

Wheat: Cappelle, sown at 200 kg.

Grass Clover mixture: 11.2 kg S215 Meadow Fescue, 3.4 kg S48 Timothy, 2.2 kg S51 Timothy, 3.4 kg S26 Cocksfoot, 1.7 kg N.Z. White Clover, 0.6 kg Wild White clover. Sown at 22.5 kg.

Cultivations, etc.:— (both fields where applicable).

Potatoes: Ploughed: 19 Nov, 1973. N, P and K applied, rotary cultivated, seed planted: 22 Apr, 1974. Weedkiller applied: 16 May. Grubbed: 20 June. Rotary ridged: 24 June. Fungicide and insecticide applied: 11 July. Fungicide applied: 2 Aug. Haulm destroyed mechanically: 10 Sept. Sprayed with undiluted BOV at 220 l: 17 Sept. Lifted: 15 Oct (Sawyers I), 21 Oct (Great Field IV).

Barley: Ploughed: 11 Oct, 1973. Spring-tine cultivated and P applied: 8 Mar, 1974. Power harrowed: 27 Mar. Seed sown and NK applied: 28 Mar. Weedkiller applied: 21 May. Combine harvested: 20 Aug.

Wheat: Chalk applied: 11 Sept, 1973. Ploughed: 11 Oct. P and K applied: 23 Oct. Power harrowed and seed sown: 25 Oct. N applied: 16 Apr, 1974. Weedkiller applied: 7 May. Combine harvested: 29 Aug.

Ley: Chalk applied: 11 Sept, 1973. Ploughed: 13 Sept. Rotary harrowed twice, N and K applied, power harrowed and seed sown: 14 Sept. P applied: 17 Sept. Weedkiller applied: 28 May, 1974. N applied: 5 June, 5 Aug. Cut: 25 July, 23 Dec.

Standard errors per plot. Sawyers I.

Potatoes, total tubers: tonnes/hectare:	2.41 or 7.0% (11 d.f.)
Barley, grain: tonnes/hectare:	0.274 or 5.7% (11 d.f.)
Wheat, grain: tonnes/hectare:	0.484 or 7.2% (11 d.f.)

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TABLES OF MEANS

POTATOES

	TOTAL TUBERS: TONNES/HECTARE		% WARE: 3.81 CM (1.5 INCH) RIDDLE	
	Great Field IV	Sawyers I	Great Field IV	Sawyers I
P205				
0	16.9	19.8	96.8	97.2
29 ANN	21.7	30.8	96.9	97.6
57 ANN	18.8	36.7	95.8	98.2
115 ANN	35.4	47.0	98.3	98.0
172 ANN	39.1	47.6	98.0	98.0
86 TRI	18.6	24.8	95.1	96.2
172 TRI	25.6	31.5	97.1	96.6
344 SIX	33.9	41.2	98.3	98.1
688 SIX	39.1	47.3	98.6	98.1
1032 SIX	40.5	47.8	97.8	98.7
376 G(1)	15.9	19.2	97.9	96.2
376 S(1)	17.6	18.8	97.0	96.1
Mean	26.9	34.4	97.3	97.4

Sawyers I only - TOTAL TUBERS

STANDARD ERROR OF DIFFERENCES

P205

2.41

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BARLEY

	GRAIN: TONNES/HECTARE		STRAW: TONNES/HECTARE	
	Great Field IV	Sawyers I	Great Field IV	Sawyers I
P205				
0	3.18	4.06	2.04	2.58
29 ANN	3.98	4.75	2.61	2.55
57 ANN	4.71	4.86	4.06	2.85
115 ANN	3.47	5.15	3.29	3.00
172 ANN	5.05	5.38	4.67	3.38
86 TRI	3.76	4.25	3.10	2.82
172 TRI	4.09	5.01	3.96	2.81
344 SIX	3.65	5.06	3.55	2.68
688 SIX	4.23	4.97	2.73	3.03
1032 SIX	3.58	5.53	3.10	3.19
376 G(1)	4.55	4.22	3.63	2.49
376 S(1)	3.64	4.47	4.02	2.72
Mean	3.99	4.81	3.40	2.84

Sawyers I only - GRAIN

STANDARD ERROR OF DIFFERENCES

P205

0.274

Mean D.M. %	73.7	74.5	68.2	86.3
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	Great Field IV LEY DRY MATTER: TONNES/HECTARE			Sawyers I WHEAT TONNES/HECTARE	
	1st cut	2nd cut	Total of 2 cuts	Grain	Straw
P205					
0	3.70	3.80	7.50	4.80	3.14
29 ANN	3.63	3.56	7.19	7.48	4.84
57 ANN	4.07	3.90	7.97	7.01	4.46
115 ANN	3.71	4.27	7.98	6.91	3.99
172 ANN	3.99	3.73	7.72	7.12	4.55
86 TRI	4.10	3.76	7.86	6.17	3.73
172 TRI	4.10	3.45	7.55	7.11	4.20
344 SIX	4.23	3.57	7.80	7.41	4.32
688 SIX	3.91	3.93	7.84	6.68	4.41
1032 SIX	3.50	4.18	7.68	7.39	4.69
376 G(1)	4.52	3.55	8.07	6.17	3.73
376 S(1)	3.83	3.65	7.48	6.65	3.80
Mean	3.94	3.78	7.72	6.74	4.15

Sawyers I only - Wheat grain

STANDARD ERROR OF DIFFERENCES

P205

0.484

Mean D.N. %	22.9	23.9	23.4	84.1	91.0
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