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Yields of the Field Experiments 1978

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78/S/RN/2 Rotation II - Wheat, Barley

Rothamsted Research

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78/S/RN/2

ROTATION II

Object: To measure, by crop yields and soil analysis, the residual value of P applied as FYM or superphosphate in the periods 1899-1964 and 1965-1967 and of fresh dressings since - Saxmundham.

Sponsors: G.E.G. Mattingly, A.E. Johnston.

The ninth year of revised scheme, wheat, barley.

For previous years see 'Details' 1967 & 1973, and 74-77/S/RN/2.

Whole plot dimensions: 5.49 x 39.8.

Treatments: From 1899-1964 the experiment tested farmyard manure and nitrogen and phosphate fertilisers applied to a rotation of crops. Since 1965 the treatments have been changed to evaluate old residues of P (from FYM and superphosphate) and new residues from treatments applied 1965-1967. All crops of the rotation - potatoes, barley, sugar beet, barley - were grown until 1974. The whole experiment was sown to barley in 1975 and 1976, wheat and barley since 1977, and tests combinations of:

Whole plots

1. RESIDUE Residues of previous treatments:-

		Approximate total dressing 1899-1964	Total dressing 1965-1967
(O)O	Plot 1	None	None
(D)O	Plot 2	400 tonnes FYM	None
(DP)O	Plot 3	400 tonnes FYM, 2.7 tonnes P205	None
(DP)D2	Plot 4	400 tonnes FYM, 2.7 tonnes P205	100 tonnes FYM
(DP)D2P1	Plot 5	400 tonnes FYM, 2.7 tonnes P205	100 tonnes FYM, 0.56 tonnes P205
(DP)P1	Plot 6	400 tonnes FYM, 2.7 tonnes P205	0.56 tonnes P205
(DP)P2	Plot 7	400 tonnes FYM, 2.7 tonnes P205	1.13 tonnes P205
(DP52)O	Plot 8	326 tonnes FYM, 4.3 tonnes P205 (until 1952 only)	None

Barley in 1978 (after wheat 1977) tests in addition to 1:-

Sub plots

2. P Phosphate (total P205 applied in each period (kg)):

	1969-71	1973-75	1978 (to preceding wheat stubble)
(O)(O)O	0	0	0
(O)(3)O	0	378	0
(1)(3)1	126	378	120
(2)(3)1	252	378	120
(3)(3)O	378	378	0

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and some of the combinations of 2 with:-

3. N Nitrogen fertiliser (kg N as 'Nitro-Chalk 25'):

30
60
90
120

Wheat in 1978 (after barley 1977) tests in addition to 1:

Sub plots

2. P Phosphate (total P₂O₅ applied in each period (kg)):

	1969-71	1973-75
(0)(0)	0	0
(0)(3)	0	378
(1)(3)	126	378
(2)(3)	252	378
(3)(3)	378	378

and some of the combinations of 2 with:-

3. N Nitrogen fertiliser (kg N as 'Nitro-Chalk 25') (in addition to autumn basal N):

40
80
120
160

Standard applications:

Both crops: Manures: K₂O at 150 kg as muriate of potash. Weedkillers: Ioxynil at 0.42 kg and mecoprop at 1.3 kg in 280 l with the fungicide. Fungicide: Tridemorph at 0.53 kg in 280 l.

Winter Wheat: Manures: N at 50 kg at drilling as 'Nitro-Chalk 25'. Weedkillers: Isoproturon at 3.1 kg in 220 l. Growth Regulator: Chlormequat at 1.7 kg in 280 l.

Seed: Winter Wheat: Maris Huntsman, sown at 200 kg.

Barley: Julia, sown at 180 kg.

Cultivations, etc.:-

Both crops: K applied: 21 Sept, 1977. Ploughed: 23 Sept. Weedkillers and fungicide applied: 18 May, 1978.

Winter Wheat: Spring-tine cultivated: 12 Oct, 1977. Seed sown and basal N applied: 19 Oct. Weedkiller applied: 20 Oct. Test N applied: 20 Apr, 1978. Growth Regulator applied: 18 May. Combine harvested: 23 Aug.

Barley: Test P applied: 21 Sept, 1977. Test N applied and spring-tine cultivated: 6 Apr, 1978. Seed sown: 7 Apr. Combine harvested: 24 Aug.

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BARLEY AFTER WHEAT (1977)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

VARIATE: GRAIN (AT 85% DM) TONNES/HECTARE

RESIDUE	N P	30	60	90	120
(O)O	(O)(O)O			2.47	2.64
(O)O	(O)(3)O	3.23	3.21		
(O)O	(1)(3)1	3.09		4.49	
(O)O	(2)(3)1		4.22		5.01
(O)O	(3)(3)O		3.55		4.52
(D)O	(O)(O)O	2.88	4.41		
(D)O	(O)(3)O			4.50	4.97
(D)O	(1)(3)1		4.56		5.21
(D)O	(2)(3)1	3.25		4.66	
(D)O	(3)(3)O	3.44		4.48	
(DP)O	(O)(O)O			4.59	4.88
(DP)O	(O)(3)O	4.21	4.57		
(DP)O	(1)(3)1	3.69		5.13	
(DP)O	(2)(3)1		5.07		5.90
(DP)O	(3)(3)O		4.69		5.06
(DP)D2	(O)(O)O	4.21	5.18		
(DP)D2	(O)(3)O			5.10	5.08
(DP)D2	(1)(3)1	4.27		4.90	
(DP)D2	(2)(3)1		4.67		5.58
(DP)D2	(3)(3)O		5.01		5.07
(DP)D2P1	(O)(O)O			5.35	5.42
(DP)D2P1	(O)(3)O	4.67	5.13		
(DP)D2P1	(1)(3)1	3.96		5.85	
(DP)D2P1	(2)(3)1		5.16		5.88
(DP)D2P1	(3)(3)O		5.09		6.21
(DP)P1	(O)(O)O			5.26	4.59
(DP)P1	(O)(3)O	4.23	5.23		
(DP)P1	(1)(3)1		5.11		5.77
(DP)P1	(2)(3)1	4.62		5.40	
(DP)P1	(3)(3)O	4.34		6.23	
(DP)P2	(O)(O)O	4.36	5.13		
(DP)P2	(O)(3)O			5.60	6.67
(DP)P2	(1)(3)1		5.31		5.64
(DP)P2	(2)(3)1	4.68		5.45	
(DP)P2	(3)(3)O	4.20		6.15	
(DP52)O	(O)(O)O	4.30	4.75		
(DP52)O	(O)(3)O			5.34	5.21
(DP52)O	(1)(3)1		5.55		5.13
(DP52)O	(2)(3)1	4.43		5.27	
(DP52)O	(3)(3)O	4.78		5.31	

GRAIN MEAN DM% 80.7

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BARLEY AFTER WHEAT (1977)

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

VARIATE: STRAW (AT 85% DM) TONNES/HECTARE

RESIDUE	N P	30	60	90	120
(O)O	(O)(O)O			2.04	1.84
(O)O	(O)(3)O	2.01	1.57		
(O)O	(1)(3)1	1.77		3.06	
(O)O	(2)(3)1		1.98		3.92
(O)O	(3)(3)O		1.58		3.09
(D)O	(O)(O)O	1.75	3.84		
(D)O	(O)(3)O			3.51	3.22
(D)O	(1)(3)1		3.04		4.72
(D)O	(2)(3)1	3.86		3.36	
(D)O	(3)(3)O	2.32		3.82	
(DP)O	(O)(O)O			3.22	4.54
(DP)O	(O)(3)O	2.72	2.25		
(DP)O	(1)(3)1	1.45		4.11	
(DP)O	(2)(3)1		4.09		4.47
(DP)O	(3)(3)O		4.27		4.59
(DP)D2	(O)(O)O	2.42	3.73		
(DP)D2	(O)(3)O			5.70	4.13
(DP)D2	(1)(3)1	2.34		3.56	
(DP)D2	(2)(3)1		2.96		3.67
(DP)D2	(3)(3)O		4.37		4.30
(DP)D2P1	(O)(O)O			3.87	4.58
(DP)D2P1	(O)(3)O	3.86	4.17		
(DP)D2P1	(1)(3)1	2.26		4.46	
(DP)D2P1	(2)(3)1		3.61		4.66
(DP)D2P1	(3)(3)O		3.76		5.30
(DP)P1	(O)(O)O			4.42	4.40
(DP)P1	(O)(3)O	2.26	3.89		
(DP)P1	(1)(3)1		4.19		4.17
(DP)P1	(2)(3)1	2.31		4.57	
(DP)P1	(3)(3)O	2.58		4.52	
(DP)P2	(O)(O)O	2.76	4.00		
(DP)P2	(O)(3)O			4.59	5.56
(DP)P2	(1)(3)1		3.90		4.75
(DP)P2	(2)(3)1	3.16		4.10	
(DP)P2	(3)(3)O	3.33		4.41	
(DP52)O	(O)(O)O	2.33	5.17		
(DP52)O	(O)(3)O			4.12	3.33
(DP52)O	(1)(3)1		3.38		4.44
(DP52)O	(2)(3)1	1.92		4.00	
(DP52)O	(3)(3)O	3.42		3.97	

STRAW MEAN DM% 85.8

SUB PLOT AREA HARVESTED 0.00075

78/S/RN/2

WHEAT AFTER BARLEY (1977)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

VARIATE: GRAIN (AT 85% DM) TONNES/HECTARE

RESIDUE	N P	40	80	120	160
(O)O	(0)(0)	3.45	3.74		
(O)O	(0)(3)			4.06	5.94
(O)O	(1)(3)		4.94		7.50
(O)O	(2)(3)	5.44		6.80	
(O)O	(3)(3)	5.47		7.86	
(D)O	(0)(0)			6.34	6.53
(D)O	(0)(3)	6.61	6.62		
(D)O	(1)(3)	5.10		7.14	
(D)O	(2)(3)		7.51		8.05
(D)O	(3)(3)		7.00		8.44
(DP)O	(0)(0)	5.80	8.07		
(DP)O	(0)(3)			8.29	8.14
(DP)O	(1)(3)		6.83		8.49
(DP)O	(2)(3)	5.97		8.57	
(DP)O	(3)(3)	6.41		8.19	
(DP)D2	(0)(0)			8.32	8.01
(DP)D2	(0)(3)	7.43	7.71		
(DP)D2	(1)(3)		8.09		6.84
(DP)D2	(2)(3)	6.62		6.94	
(DP)D2	(3)(3)	6.80		8.15	
(DP)D2P1	(0)(0)	6.27	8.09		
(DP)D2P1	(0)(3)			8.12	8.22
(DP)D2P1	(1)(3)		8.70		8.60
(DP)D2P1	(2)(3)	7.11		8.69	
(DP)D2P1	(3)(3)	6.86		8.67	
(DP)P1	(0)(0)	5.88	8.53		
(DP)P1	(0)(3)			7.86	7.48
(DP)P1	(1)(3)	6.52		8.20	
(DP)P1	(2)(3)		7.87		9.44
(DP)P1	(3)(3)		8.01		8.92
(DP)P2	(0)(0)			8.43	9.07
(DP)P2	(0)(3)	7.16	7.87		
(DP)P2	(1)(3)	6.21		8.11	
(DP)P2	(2)(3)		8.26		8.84
(DP)P2	(3)(3)		7.60		8.37
(DP52)O	(0)(0)			7.92	8.18
(DP52)O	(0)(3)	6.32	7.88		
(DP52)O	(1)(3)	6.35		7.12	
(DP52)O	(2)(3)		7.85		7.70
(DP52)O	(3)(3)		8.61		7.45

GRAIN MEAN DM% 78.9

78/S/RN/2

WHEAT AFTER BARLEY (1977)

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

VARIATE: STRAW (AT 85% DM) TONNES/HECTARE

RESIDUE	N P	40	80	120	160
(O)O	(0)(0)	1.93	1.14		
(O)O	(0)(3)			1.71	4.28
(O)O	(1)(3)		2.00		4.09
(O)O	(2)(3)	1.93		4.40	
(O)O	(3)(3)	3.07		5.03	
(D)O	(0)(0)			4.16	4.68
(D)O	(0)(3)	5.30	6.54		
(D)O	(1)(3)	3.68		5.83	
(D)O	(2)(3)		4.91		6.89
(D)O	(3)(3)		6.24		6.87
(DP)O	(0)(0)	4.78	6.22		
(DP)O	(0)(3)			5.77	5.99
(DP)O	(1)(3)		5.60		5.72
(DP)O	(2)(3)	3.39		6.89	
(DP)O	(3)(3)	4.98		6.63	
(DP)D2	(0)(0)			7.38	6.30
(DP)D2	(0)(3)	5.10	5.71		
(DP)D2	(1)(3)		6.88		7.06
(DP)D2	(2)(3)	5.80		6.23	
(DP)D2	(3)(3)	6.15		6.38	
(DP)D2P1	(0)(0)	5.25	6.47		
(DP)D2P1	(0)(3)			6.85	7.51
(DP)D2P1	(1)(3)		6.35		6.44
(DP)D2P1	(2)(3)	5.63		7.20	
(DP)D2P1	(3)(3)	5.37		6.78	
(DP)P1	(0)(0)	4.78	6.52		
(DP)P1	(0)(3)			6.24	7.31
(DP)P1	(1)(3)	5.35		7.71	
(DP)P1	(2)(3)		5.69		8.24
(DP)P1	(3)(3)		8.06		7.16
(DP)P2	(0)(0)			8.37	7.89
(DP)P2	(0)(3)	5.68	7.00		
(DP)P2	(1)(3)	5.02		6.53	
(DP)P2	(2)(3)		6.35		7.60
(DP)P2	(3)(3)		6.26		7.58
(DP52)O	(0)(0)			5.35	5.63
(DP52)O	(0)(3)	3.21	5.76		
(DP52)O	(1)(3)	4.17		5.12	
(DP52)O	(2)(3)		5.47		6.10
(DP52)O	(3)(3)		4.77		6.16

STRAW MEAN DM% 64.2

SUB PLOT AREA HARVESTED 0.00075