

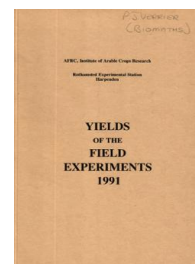
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## Yields of the Field Experiments 1991

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### 91/R/CS/10 and 91/W/CS/10 Long-term Liming - W. Oilseed Rape

#### Rothamsted Research

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## 91/R/CS/10 and 91/W/CS/10

### LONG TERM LIMING

**Object:** To study the effects of different amounts of lime, phosphate and sulphur on the yields and compositions of a sequence of crops - Rothamsted (R) Sawyers I and Woburn (W) Stackyard C.

**Sponsors:** S.P. McGrath, P.B. Barraclough, G.F.J. Milford.

The 30th year, w. oilseed rape.

For previous years see 'Details' 1967, 1973 and 74-90/R&W/CS/10.

**Design:** 2 randomised blocks of 16 plots split into 2.

**Whole plot dimensions:** 6.0 x 18.3.

**Treatments:** All combinations of:-

Whole plots

1. **CHALK** Residual effects of ground chalk (tonnes CaCO<sub>3</sub>) (total applied 1962-87):

R	W	Rothamsted total		Woburn total	
		1962-78	1982-87	1962-78	1982-87
0	0	0	0	0	0
15	9	7	8	6	3
24.5	25.5	15	9.5	14	11.5
52.5	45.5	30	22.5	23	22.5

2. **P** Residual effects of P fertilizer applied:

	Until 1978		1981	1982	1983		1988	
	R & W	R & W	R & W	R & W	R	W	R	W
0	0	0	0	0	0	0	0	0
P1	0	P1	P1	0	P2	P1	P1	
P2	P	P1	0	P2	P2	P1	P1	
P3	P	P3	P1	P2	P4	P3	P3	

Rates 1981-83 P1, P2, P3, P4 = 25, 50, 75, 100 kg P as superphosphate

Sub plots

3. **SULPHUR** Sulphur (kg S, as calcium sulphate):

0  
30

- NOTES:** (1) Until 1978 test P was applied cumulatively, rates varied with crop, none in 1979 and 1980. K was also applied cumulatively, to P1 and P3 plots. Since 1981 K has been applied basally (none in 1986, 1987, 1989 and 1990).  
 (2) Sulphur was applied as gypsum (17.5% S) on 13 Mar, 1991 (R), 21 Mar (W).  
 (3) Test manganese was applied cumulatively, 1987-90.

91/R/CS/10 and 91/W/CS/10

**Basal applications:**

Sawyers I (R): Manures: (25:0:16) at 200 kg. 'Nitram' at 640 kg. Magnesium at 0.13 kg as 'Vytel Liquid Magnesium' in 200 l. Manganese at 0.093 kg as 'Vytel Liquid Manganese' in 200 l. Weedkillers: Metazachlor at 0.75 kg in 200 l. Clopyralid at 0.10 kg in 200 l. Fungicide: Prochloraz at 0.50 kg in 200 l and on a second occasion at 0.40 kg in 200 l. Insecticide: Deltamethrin at 6.2 g in 200 l and at 12 g in 200 l on a second occasion. Desiccant: Diquat at 0.60 kg ion applied with wetting agent, 'Vassgro' at 0.52 l, in 520 l. Irrigation: 25 mm applied on two occasions.

Stackyard C (W): Manures: (25:0:16) at 200 kg. Magnesium at 0.13 kg as 'Vytel Liquid Magnesium' in 200 l. 'Nitram' at 580 kg. Manganese at 0.078 kg as 'Vytel Liquid Manganese' in 300 l. Weedkillers: Quizalofop-ethyl at 38 g with metazachlor at 0.75 kg applied with adjuvant 'Cropspray 11 E' at 2.0 l in 220 l. Fungicide: Prochloraz at 0.28 kg applied with the second insecticide in 200 l. Insecticide: Deltamethrin at 6.2 g in 220 l and on a second occasion at 12 g. Desiccant: Diquat at 0.60 kg ion applied with a wetting agent, 'Agral' at 0.40 l, in 400 l.

**Seed:** Libravo, dressed fenpropimorph, gamma-HCH, and thiram, at 6.0 kg (R & W).

**Cultivations, etc.:-**

Sawyers I (R): N and K applied: 23 Aug, 1990. Ploughed: 28 Aug. Rolled: 29 Aug. Rotary harrowed: 30 Aug. Rotary harrowed, seed sown, harrowed, rolled, metazachlor applied: 31 Aug. Irrigated: 21 and 27 Sept. Deltamethrin applied: 7 Nov. Prochloraz and Mg applied: 3 Dec. Clopyralid applied: 17 Dec. N applied: 4 Mar, 1991. Second deltamethrin applied: 12 Apr. Second prochloraz and Mn applied: 23 Apr. Desiccant with wetting agent applied: 30 July. Combine harvested: 7 Aug.

Stackyard C (W): Discd: 15 Aug, 1990. Subsoiled with tines 1.5 m apart, 0.4 m deep: 21 Aug. Ploughed and rolled: 22 Aug. N and K applied: 28 Aug. Rotary harrowed with crumbler attached, seed sown: 30 Aug. Weedkillers and adjuvant applied: 1 Nov. Deltamethrin applied: 15 Nov. Mg applied: 3 Dec. N applied: 15 Mar, 1991. Second deltamethrin applied with fungicide: 12 Apr. Mn applied: 9 May. Desiccant with wetting agent applied: 1 Aug. Combine harvested: 13 Aug.

91/R/CS/10 SAWYERS I (R)

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

\*\*\*\*\* Tables of means \*\*\*\*\*

P	O	P1	P2	P3	Mean
<b>CHALK</b>					
0	0.39	1.20	1.67	2.29	1.39
15	1.96	2.94	3.08	1.54	2.38
24.5	2.46	1.83	2.07	2.11	2.12
52.5	2.91	2.22	2.68	2.44	2.56
Mean	1.93	2.05	2.38	2.10	2.11
<b>SULPHUR</b>					
	0	30	Mean		
<b>CHALK</b>					
0	1.38	1.39	1.39		
15	2.52	2.25	2.38		
24.5	2.06	2.17	2.12		
52.5	2.33	2.80	2.56		
Mean	2.07	2.15	2.11		
<b>SULPHUR</b>					
	0	30	Mean		
<b>P</b>					
0	1.99	1.87	1.93		
P1	1.98	2.11	2.05		
P2	2.15	2.61	2.38		
P3	2.16	2.03	2.10		
Mean	2.07	2.15	2.11		
<b>CHALK</b>					
	<b>SULPHUR</b>	0	30		
<b>P</b>					
0	O	0.52	0.27		
	P1	1.05	1.34		
	P2	1.35	1.99		
	P3	2.61	1.97		
15	O	2.47	1.44		
	P1	3.12	2.77		
	P2	2.94	3.22		
	P3	1.53	1.55		
24.5	O	2.40	2.52		
	P1	1.91	1.74		
	P2	1.96	2.19		
	P3	1.98	2.25		
52.5	O	2.59	3.23		
	P1	1.85	2.59		
	P2	2.33	3.02		
	P3	2.53	2.35		

91/R/CS/10 SAWYERS I (R)

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

\*\*\* Standard errors of differences of means \*\*\*

	CHALK	P	SULPHUR	CHALK P
	0.419	0.419	0.210	0.838
	CHALK SULPHUR	P SULPHUR	CHALK P SULPHUR	
	0.514	0.514	1.027	
Except when comparing means with the same level(s) of	CHALK			
	0.420			
		P		
		0.420		
			CHALK.P	
			0.839	

\*\*\*\*\* Stratum standard errors and coefficients of variation \*\*\*\*\*

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	0.838	39.7
BLOCK.WP.SP	16	0.839	39.8

GRAIN MEAN DM% 76.3

SUB PLOT AREA HARVESTED 0.00079

91/W/CS/10 STACKYARD C (W)

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

\*\*\*\*\* Tables of means \*\*\*\*\*

P	O	P1	P2	P3	Mean
CHALK					
0	0.35	0.56	1.95	1.76	1.16
9	2.15	2.65	2.56	2.31	2.41
25.5	2.25	2.72	2.71	2.77	2.62
45.5	2.84	2.39	2.66	2.85	2.69
Mean	1.90	2.08	2.47	2.42	2.22
SULPHUR	0	30	Mean		
CHALK					
0	1.16	1.15	1.16		
9	2.20	2.63	2.41		
25.5	2.58	2.65	2.62		
45.5	2.52	2.86	2.69		
Mean	2.12	2.32	2.22		

91/W/CS/10 STACKYARD C (W)

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

\*\*\*\*\* Tables of means \*\*\*\*\*

SULPHUR	0	30	Mean
P			
O	1.80	2.00	1.90
P1	1.95	2.21	2.08
P2	2.35	2.60	2.47
P3	2.36	2.48	2.42
Mean	2.12	2.32	2.22

	SULPHUR	0	30
CHALK	P		
0	O	0.41	0.29
	P1	0.14	0.98
	P2	1.99	1.91
	P3	2.09	1.43
9	O	1.94	2.35
	P1	2.65	2.65
	P2	2.23	2.89
	P3	1.99	2.62
25.5	O	2.10	2.40
	P1	2.86	2.59
	P2	2.62	2.81
	P3	2.76	2.79
45.5	O	2.75	2.94
	P1	2.17	2.62
	P2	2.56	2.77
	P3	2.60	3.10

\*\*\* Standard errors of differences of means \*\*\*

	CHALK	P	SULPHUR	CHALK P
	0.168	0.168	0.115	0.337
	CHALK SULPHUR	P SULPHUR	CHALK P SULPHUR	
	0.234	0.234	0.469	
Except when comparing means with the same level(s) of				
CHALK	0.230			
P		0.230		
CHALK.P			0.461	

\*\*\*\*\* Stratum standard errors and coefficients of variation \*\*\*\*\*

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	0.337	15.2
BLOCK.WP.SP	16	0.461	20.8

GRAIN MEAN DM% 90.5

SUB PLOT AREA HARVESTED 0.00182