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## Yields of the Field Experiments 1995

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### 95/R/CS/10 and 95/W/CS/10 Long Term Liming - W. Wheat

#### Rothamsted Research

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## 95/R/CS/10 and 95/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.

**Sponsor:** S.P. McGrath.

The 34rd year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-94/R&W/CS/10.

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

**Whole plot dimensions:** 6.0 x 16.1 (R), 6.0 x 16.1 (W).

**Treatments:** All combinations of:-

Whole plots

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

		Rothamsted total		Woburn total	
R	W	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	P2	P1	P1
P2	P	P1	0	P2	P2	P2	P1	P1
P3	P	P3	P1	P2	P4	P3	P3	P3

Rates 1981-83 and 1988 P1, P2, P3, P4 = 25, 50, 75, 100 kg P as superphosphate

Sub-plots

3. **SULPHUR** Sulphur (kg S, as calcium sulphate), applied cumulatively since 1991:

0  
30

95/R/CS/10 and 95/W/CS/10

**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, 1990, 1993, 1994 and 1995).

(2) Test manganese was applied cumulatively, 1987-90.

**Experimental diary:**

Sawyers I (R):

06-Sep-94 : B : Barclay Gallup at 4.0 l in 200 l.  
 12-Sep-94 : B : Topped.  
 14-Sep-94 : B : Ploughed.  
 29-Sep-94 : B : Disced, heavy spring-tine cultivated.  
 30-Sep-94 : B : Rotary harrowed, Genesis, dressed Rappor, drilled at 380 seeds per m<sup>2</sup>.  
 24-Nov-94 : B : Alpha Isoproturon 500 at 2.5 l with Stomp 400 at 2.5 l in 200 l.  
 13-Apr-95 : B : 34.5% N at 435 kg.  
 01-May-95 : T : **SULPHUR** 30: Gypsum (17.5% S) at 171 kg.  
 10-May-95 : B : Halo at 2.0 l in 200 l.  
 16-Jun-95 : B : Halo at 2.0 l with Patrol at 0.5 l in 300 l.  
 02-Aug-95 : B : Combine harvested.

Stackyard C (W):

23-Sep-94 : B : Ploughed  
 30-Sep-94 : B : Rotary harrowed, Genesis, dressed Rappor, drilled at 300 seeds per m<sup>2</sup>. Rolled.  
 28-Nov-94 : B : Panther at 2.0 l with Decis at 0.20 l in 200 l.  
 13-Mar-95 : T : **SULPHUR** 30: Gypsum (17.5% S) at 171 kg.  
 15-Mar-95 : B : 34.5% N at 116 kg.  
 21-Apr-95 : B : 34.5% N at 348 kg.  
 28-Apr-95 : B : Halo at 2.0 l in 200 l.  
 01-Jun-95 : B : Cyclone at 1.0 l with Mallard at 0.3 l in 200 l.  
 30-Jun-95 : B : Pirimicarb 50 DG at 280 g in 300 l.  
 04-Aug-95 : B : Combine harvested.

**N.B.** At Rothamsted, **CHALK** 0 plots failed, and have been omitted from the analyses.

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

GRAIN TONNES/HECTARE

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

P	-	P1	P2	P3	Mean
<b>CHALK</b>					
15	5.97	6.84	7.27	7.15	6.81
24.5	7.35	7.27	8.17	8.26	7.76
52.5	6.80	7.88	8.20	8.46	7.83
Mean	6.71	7.33	7.88	7.96	7.47

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

GRAIN TONNES/HECTARE

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

SULPHUR	0	30	Mean
<b>CHALK</b>			
15	6.76	6.85	6.81
24.5	7.66	7.87	7.76
52.5	7.78	7.89	7.83
Mean	7.40	7.54	7.47

SULPHUR	0	30	Mean
<b>P</b>			
-	6.81	6.60	6.71
P1	7.15	7.51	7.33
P2	7.78	7.98	7.88
P3	7.85	8.07	7.96
Mean	7.40	7.54	7.47

	SULPHUR	0	30
<b>CHALK</b>	<b>P</b>		
15	-	6.36	5.58
	P1	6.63	7.05
	P2	7.24	7.30
	P3	6.82	7.49
24.5	-	7.36	7.34
	P1	6.93	7.62
	P2	7.89	8.45
	P3	8.46	8.06
52.5	-	6.71	6.88
	P1	7.89	7.86
	P2	8.22	8.18
	P3	8.28	8.65

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

<b>CHALK</b>	<b>P</b>	<b>SULPHUR</b>	<b>CHALK</b>
			<b>P</b>
0.321	0.370	0.159	0.641
<b>CHALK</b>	<b>P</b>	<b>CHALK</b>	
<b>SULPHUR</b>	<b>SULPHUR</b>	<b>P</b>	
		<b>SULPHUR</b>	
0.375	0.433	0.750	
Except when comparing means with the same level(s) of			
<b>CHALK</b>	0.275		
<b>P</b>		0.318	
<b>CHALK . P</b>			0.551

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

GRAIN TONNES/HECTARE

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	11	0.641	8.6
BLOCK.WP.SP	12	0.551	7.4

GRAIN MEAN DM% 90.2

SUB PLOT AREA HARVESTED 0.00150

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

GRAIN TONNES/HECTARE

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

P	-	P1	P2	P3	Mean
<b>CHALK</b>					
0	1.12	0.82	2.24	1.38	1.39
9	7.37	7.74	8.25	7.78	7.78
25.5	7.10	7.13	7.72	7.52	7.37
45.5	6.48	8.12	7.21	7.52	7.33
Mean	5.52	5.95	6.36	6.05	5.97
<b>SULPHUR</b>					
0		30	Mean		
<b>CHALK</b>					
0	1.45	1.32	1.39		
9	7.76	7.81	7.78		
25.5	7.30	7.44	7.37		
45.5	7.14	7.52	7.33		
Mean	5.91	6.02	5.97		
<b>SULPHUR</b>					
0		30	Mean		
<b>P</b>					
-	5.33	5.71	5.52		
P1	5.86	6.05	5.95		
P2	6.38	6.33	6.36		
P3	6.09	6.01	6.05		
Mean	5.91	6.02	5.97		

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

GRAIN TONNES/HECTARE

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

CHALK	SULPHUR	0	30
0	P	0.89	1.34
	P1	0.63	1.00
	P2	2.28	2.21
	P3	2.01	0.74
9	P	6.94	7.79
	P1	8.01	7.47
	P2	8.27	8.24
	P3	7.84	7.72
25.5	P	7.12	7.09
	P1	6.93	7.33
	P2	7.67	7.77
	P3	7.48	7.57
45.5	P	6.36	6.61
	P1	7.86	8.37
	P2	7.32	7.10
	P3	7.04	8.00

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

CHALK	P	SULPHUR	CHALK P
0.244	0.244	0.128	0.489
CHALK SULPHUR	P SULPHUR	CHALK P SULPHUR	
0.304	0.304	0.608	
Except when comparing means with the same level(s) of			
CHALK			0.255
P	0.255		
CHALK.P		0.510	

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	0.489	8.2
BLOCK.WP.SP	16	0.510	8.5

GRAIN MEAN DM% 91.1

SUB PLOT AREA HARVESTED 0.00143