ROTHAMSTED RESEARCH

Yields of the Field Experiments 1996

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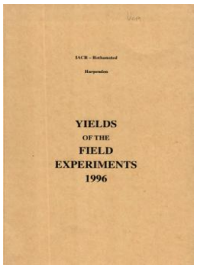

96/R/CS/10 and 96/W/CS/10 Long Term Liming - W. Wheat

Rothamsted Research

Rothamsted Research (1997) *96/R/CS/10 and 96/W/CS/10 Long Term Liming - W. Wheat ;* Yields Of The Field Experiments 1996, pp 52 - 56 **- DOI: https://doi.org/10.23637/ERADOC-1-51**

96/R/CS/10 and 96/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 35th year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-95/R&W/CS/10.

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

Whole plot dimensions: 6.0 x 16.1.

Treatments: All combinations of:-

Whole plots

1. **CHALK** — Residual effects of ground chalk (tonnes CaCO3) (total applied 1962-87):

R	W	Rothamsted total 1962-78	Rothamsted total 1982-87	Woburn total 1962-78	Woburn total 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 R & W	1981 R & W	1982 R & W	1983 R	1983 W	1988 R	1988 W
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 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

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96/R/CS/10 and 96/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 and 1993 to 1996).
(2) Test manganese was applied cumulatively, 1987-90.

Experimental diary:

Sawyers I (R):
10-Aug-95 : B : Straw baled.
22-Aug-95 : B : Sub-soiled.
25-Sep-95 : B : Ploughed.
28-Sep-95 : B : Rotary harrowed, Hereward, dressed Panoctine, drilled at 380 seeds per m^2.
11-Mar-96 : B : 34.5% N at 116 kg.
09-Apr-96 : T : **SULPHUR** 30: Gypsum (17.5% S) at 171 kg.
15-Apr-96 : B : 34.5% N at 463 kg.
26-Apr-96 : B : Ally at 30 g with Cheetah Super at 1.25 l and Barclay Holdup at 2.3 l in 200 l.
13-Jun-96 : B : Alto 100 SL at 0.6 l with Mallard 750 EC at 0.4 l in 300 l.
09-Aug-96 : B : Combine harvested.

Stackyard C (W):
25-Aug-95 : B : Sub-soiled.
19-Sep-95 : B : Ploughed.
23-Sep-95 : B : Rolled.
03-Oct-95 : B : Rotary harrowed, Hereward, dressed Sibutol, drilled at 375 seeds per m^2.
13-Nov-95 : B : Panther at 2.0 l in 200 l.
13-Mar-96 : B : 34.5% N at 116 kg.
19-Mar-96 : T : **SULPHUR** 30: Gypsum (17.5% S) at 171 kg.
16-Apr-96 : B : 34.5% N at 348 kg.
30-Apr-96 : B : Halo at 1.5 l in 200 l.
06-Jun-96 : B : Silvacur at 1.0 l in 300 l.
19-Aug-96 : B : Combine harvested.

NOTE: At Rothamsted, most **CHALK** 0 plots failed. They have been omitted from the analysis.

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

GRAIN TONNES/HECTARE

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

P	0	P1	P2	P3	Mean
CHALK					
15	7.47	8.38	8.91	8.44	8.30
24.5	8.38	8.83	8.74	9.20	8.79
52.5	8.03	8.94	8.69	8.86	8.63
Mean	7.96	8.72	8.78	8.83	8.57

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

GRAIN TONNES/HECTARE

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

SULPHUR	0	30	Mean
CHALK			
15	8.44	8.16	8.30
24.5	8.73	8.85	8.79
52.5	8.74	8.52	8.63
Mean	8.63	8.51	8.57

SULPHUR	0	30	Mean
P			
0	8.21	7.71	7.96
P1	8.64	8.79	8.72
P2	8.84	8.71	8.78
P3	8.83	8.83	8.83
Mean	8.63	8.51	8.57

	SULPHUR	0	30
CHALK	P		
15	0	7.99	6.94
	P1	8.30	8.46
	P2	9.05	8.76
	P3	8.40	8.48
24.5	0	8.50	8.26
	P1	8.75	8.92
	P2	8.51	8.97
	P3	9.16	9.25
52.5	0	8.15	7.91
	P1	8.88	9.00
	P2	8.97	8.40
	P3	8.95	8.77

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

P	CHALK	SULPHUR	P CHALK
0.263	0.227	0.108	0.455

P SULPHUR	CHALK SULPHUR	P CHALK SULPHUR
0.304	0.263	0.526

Except when comparing means with the same level(s) of

P	0.217		
CHALK		0.188	
P.CHALK			0.375

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96/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	0.455	5.3
BLOCK.WP.SP	12	0.375	4.4

GRAIN MEAN DM% 87.8

SUB-PLOT AREA HARVESTED 0.00150

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

GRAIN TONNES/HECTARE

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

P	0	P1	P2	P3	Mean
CHALK					
0	3.58	3.63	4.12	4.45	3.95
9	7.81	8.19	8.12	8.30	8.10
25.5	7.58	7.04	7.76	7.54	7.48
45.5	6.74	8.14	7.46	7.92	7.56
Mean	6.43	6.75	6.86	7.05	6.77

SULPHUR	0	30	Mean
CHALK			
0	4.03	3.86	3.95
9	8.09	8.12	8.10
25.5	7.43	7.53	7.48
45.5	7.51	7.61	7.56
Mean	6.77	6.78	6.77

SULPHUR	0	30	Mean
P			
0	6.25	6.60	6.43
P1	6.65	6.85	6.75
P2	6.90	6.82	6.86
P3	7.26	6.84	7.05
Mean	6.77	6.78	6.77

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

GRAIN TONNES/HECTARE

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

SULPHUR		0	30
CHALK	P		
0	0	3.28	3.88
	P1	3.32	3.95
	P2	3.87	4.38
	P3	5.68	3.22
9	0	7.40	8.21
	P1	8.42	7.97
	P2	8.31	7.93
	P3	8.25	8.35
25.5	0	7.73	7.43
	P1	6.77	7.30
	P2	7.78	7.73
	P3	7.44	7.64
45.5	0	6.59	6.89
	P1	8.10	8.17
	P2	7.66	7.26
	P3	7.69	8.14

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

CHALK	P	SULPHUR	CHALK P
0.548	0.548	0.133	1.097

CHALK SULPHUR	P SULPHUR	CHALK P SULPHUR
0.580	0.580	1.159

Except when comparing means with the same level(s) of

CHALK	0.266
P	0.266
CHALK.P	0.531

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	1.097	16.2
BLOCK.WP.SP	15	0.531	7.8

GRAIN MEAN DM% 90.8

SUB-PLOT AREA HARVESTED 0.00143

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