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93/R/CS/10 and 93/W/CS/10 Long-term Liming - W. Lupins

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93/R/CS/10 and 93/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.

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The 32nd year, w. lupins.

For previous years see 'Details' 1967, 1973 and 74-92/R&W/CS/10.

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

Whole plot dimensions: 5.8 x 16.1 (R), 5.6 x 16.1 (W).

Treatments: All combinations of:-

Whole plots

1. CHALK Residual effects of ground chalk (tonnes CaCO₃) (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	P1
P2	P	P1	0	P2	P2	P1	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):

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, 1990 and 1993).
(2) Test manganese was applied cumulatively, 1987-90.

93/R/CS/10 and 93/W/CS/10

Experimental diary:

Sawyers I (R):

29-Sep-92 : B : Ploughed.
 07-Oct-92 : B : Rotary harrowed, CH 304/70, inoculated with rhizobium,
 drilled at 100 kg.
 13-Oct-92 : B : Opogard 500 FW at 2.8 l in 200 l.
 16-Apr-93 : T : **SULPHUR** 30: 30 kg S as gypsum.
 22-Jun-93 : B : Power Dimethoate 40 at 1.7 l in 200 l.
 02-Jul-93 : B : Mistral at 1.0 l in 200 l.
 : B : Sportak 45 at 1.1 l in 200 l.
 06-Sep-93 : B : Stefes Diquat at 3.0 l with Vassgro Spreader at 0.30 l
 in 260 l.
 10-Oct-93 : B : Combine harvested.

Stackyard C (W):

02-Oct-92 : B : Rotary harrowed, CH 304/70, inoculated with rhizobium,
 drilled at 100 kg.
 12-Oct-92 : B : Opogard 500 FW at 1.8 l and Scythe at 3.0 l in
 200 l.
 22-Mar-93 : B : Ploughed (crop failed).
 08-Jul-93 : B : Rotary cultivated.

- NOTES:** (1) At Rothamsted plant samples were taken in early June from
 transects across plots for a detailed study of the relation
 between soil pH gradient and plant growth. Harvested grain
 samples were taken for sulphur analysis.
 (2) At Woburn the crop failed and no yields were taken.
 (3) At Rothamsted, most **CHALK** 0 plots failed. They have been
 omitted from the analysis.

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

GRAIN TONNES/HECTARE

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

P	O	P1	P2	P3	Mean
CHALK					
15	2.34	2.24	1.95	1.75	2.07
24.5	1.82	1.13	1.67	1.46	1.52
52.5	1.25	1.49	1.26	1.32	1.33
Mean	1.80	1.62	1.63	1.51	1.64
SULPHUR	0	30	Mean		
CHALK					
15	1.90	2.23	2.07		
24.5	1.44	1.60	1.52		
52.5	1.19	1.47	1.33		
Mean	1.51	1.77	1.64		

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

GRAIN TONNES/HECTARE

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

SULPHUR		0	30	Mean
P				
	O	1.63	1.97	1.80
	P1	1.58	1.65	1.62
	P2	1.40	1.86	1.63
	P3	1.44	1.58	1.51
Mean		1.51	1.77	1.64

CHALK	P	SULPHUR	0	30
15	O		2.12	2.55
	P1		2.17	2.30
	P2		1.67	2.23
	P3		1.64	1.85
24.5	O		1.62	2.03
	P1		1.16	1.09
	P2		1.56	1.78
	P3		1.42	1.50
52.5	O		1.15	1.34
	P1		1.40	1.57
	P2		0.96	1.57
	P3		1.25	1.39

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

CHALK	P	SULPHUR	CHALK P
0.161	0.186	0.091	0.323

CHALK SULPHUR	P SULPHUR	CHALK P SULPHUR
0.196	0.226	0.392

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

CHALK	0.157
P	0.181
CHALK.P	0.314

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	11	0.323	19.7
BLOCK.WP.SP	12	0.314	19.2

GRAIN MEAN DM% 70.3

SUB PLOT AREA HARVESTED 0.00149