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Yields of the Field Experiments 1977

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77/W/RN/16 Effects of Deep P K - Wheat, Sugar Beet, Barley, Potatoes

Rothamsted Research

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77/W/RN/16

EFFECTS OF DEEP PK

Object: To study the residual effects of subsoiling, and of incorporating a large dressing of PK in either the subsoil or topsoil, on yields of a rotation of crops - Woburn Butt Furlong.

Sponsor: J. McEwen.

The fourth year, winter wheat, sugar beet, spring barley, potatoes.

For previous years see 74-76/W/RN/16.

Design: 4 series of 3 randomised blocks of 4 plots.

Whole plot dimensions: 4.27 x 2.59.

Treatments: Extra PK and subsoil treatment (applied autumn 1973):

PK SUB	Extra PK	Subsoil (25-50 cm) treatment
- -	None	None
- SUB	None	Subsoiled
PKTOP -	To topsoil (0-25 cm)	None
- PKSUB	To subsoil	Subsoiled

- NOTES: (1) The rates of P and K were 1930 kg P205, as superphosphate and 460 kg K2O as muriate of potash. These quantities, applied to subsoil, were chosen to equalize available P and K in top and subsoil.
- (2) Subsoiling was done by spade, after removing the topsoil which was then replaced. PK to subsoil was worked in by forking.
- (3) PK to topsoil was applied half before ploughing in autumn half soon after on the plough furrow.

Standard applications:

Series II: Winter wheat: Manures: (0:20:20) at 290 kg combine drilled. N at 100 kg as 'Nitro-Chalk'.

Series III: Sugar beet: Manures: Magnesian limestone at 5 tonnes. (0:14:28) at 750 kg. N at 170 kg as 'Nitro-Chalk'.

Series IV: Barley: Manures: (20:14:14) at 380 kg combine drilled. Weedkillers: Ioxynil at 0.63 kg plus mecoprop at 1.9 kg in 340 l.

Series I: Potatoes: Manures: (13:13:20) at 1860 kg. Weedkillers: Linuron at 1.1 kg plus paraquat at 0.42 kg ion in 340 l.

Seed: Winter wheat: Cappelle, sown at 210 kg.

Sugar beet: Klein E, sown at 5.6 kg.

Barley: Julia, dressed with ethirimol, sown at 160 kg.

Potatoes: Pentland Crown.

Cultivations, etc.:-

Series II: Winter wheat: Ploughed, spring-tine cultivated with crumbler attached, seed sown: 9 Nov, 1976. N applied: 12 Apr, 1977. Hand weeded twice: 31 May, 4 June. Hand harvested: 30 Aug.

Series III: Sugar beet: Magnesian limestone applied: 6 Sept, 1976. Ploughed: 9 Nov. PK and N applied: 13 Apr, 1977. Spring-tine cultivated with crumbler attached, seed sown: 15 Apr. Hand weeded: 31 May. Singled: 4 June. Hand lifted: 11 Nov.

Series IV: Barley: Ploughed: 23 Nov, 1976. Spring-tine cultivated with crumbler attached: 8 Mar, 1977. Seed sown: 9 Mar. Weedkillers applied: 18 May. Hand harvested: 23 Aug.

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Series I: Potatoes: Ploughed: 9 Nov, 1976. NPK applied: 5 Apr, 1977.
Rotary cultivated: 14 Apr. Potatoes planted: 15 Apr. Weedkillers
applied: 11 May. Hand lifted: 10 Oct.

NOTE: Samples of wheat and barley grain, potato tubers and sugar beet roots
and tops were taken for analysis of N, P, K, Na, Ca and Mg.

WINTER WHEAT

GRAIN TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	4.03	4.51	3.52	4.95	4.25

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	PK SUB
-----	-----
SED	0.367

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.450	10.6

GRAIN MEAN DM% 83.1

STRAW TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	6.36	6.51	5.94	6.73	6.38

STRAW MEAN DM% 65.9

PLOT AREA HARVESTED 0.00033

SUGAR BEET

ROOTS (WASHED) TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	35.8	42.0	38.2	41.8	39.4

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	PK SUB
-----	-----
SED	3.30

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	6	4.04	10.3

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SUGAR BEET

SUGAR PERCENTAGE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	16.9	17.0	16.8	16.7	16.8

TOTAL SUGAR TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	6.03	7.13	6.42	7.01	6.65

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	PK SUB
-----	-----
SED	0.691

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.847	12.7

TOPS TONNES/HECTARE

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	25.8	32.1	25.4	30.8	28.5

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	PK SUB
-----	-----
SED	3.41

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	6	4.18	14.6

PLOT AREA HARVESTED 0.00041

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BARLEY

GRAIN TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	2.90	3.53	3.20	4.34	3.49

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	PK SUB
-----	-----
SED	0.338

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.414	11.9

GRAIN MEAN DM% 78.9

STRAW TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	4.08	3.69	4.17	4.10	4.01

STRAW MEAN DM% 67.1

PLOT AREA HARVESTED 0.00033

POTATOES

TOTAL TUBERS TONNES/HECTARE

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	37.8	40.7	45.7	43.1	41.8

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	PK SUB
-----	-----
SED	2.17

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	6	2.65	6.3

PLOT AREA HARVESTED 0.00043