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## Yields of the Field Experiments 1976

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

#### Rothamsted Research

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76/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 third year, winter wheat, sugar beet, spring barley, potatoes.

For previous year see 74-75/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 P2O5, 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 III: Winter wheat: Manures: (0:20:20) at 290 kg, combine drilled. N at 75 kg as 'Nitro-Chalk'. Weedkiller: Ioxynil at 0.6 kg plus mecoprop at 1.8 kg in 340 l. Insecticide: Pirimicarb at 0.14 kg in 280 l.
- Series IV: Sugar beet: Manures: Magnesian limestone at 5 tonnes. (0:14:28) at 750 kg. N at 140 kg as 'Nitro-Chalk'. Insecticide: Pirimicarb at 0.14 kg in 280 l.
- Series I: Barley: Manures: (20:14:14) at 380 kg, combined drilled. Weedkiller: Ioxynil at 0.6 kg plus mecoprop at 1.8 kg in 340 l. Insecticide: Pirimicarb at 0.14 kg in 280 l.
- Series II: Potatoes: Manures: (13:13:20) at 1860 kg. Weedkiller: Linuron at 0.9 kg in 430 l. Insecticide: Pirimicarb at 0.14 kg in 280 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.

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Cultivations, etc.:-

Series III: Winter wheat: Spring-tine cultivated with crumbler, seed sown: 23 Oct, 1975. N applied: 13 Apr, 1976. Weedkiller applied: 30 Apr. Insecticide applied: 25 June. Hand harvested: 19 July.

Series IV: Sugar beet: Magnesian limestone applied: 5 Sept, 1975. Ploughed: 28 Oct. N and PK applied: 30 Mar, 1976. Spring-tine cultivated with crumbler twice, seed sown: 5 Apr. Singled by hand 22 May. Insecticide applied: 25 June. Hand lifted: 17 Nov.

Series I: Barley: Ploughed: 24 Nov, 1975. Spring-tine cultivated with crumbler: 8 Mar, 1976. Seed sown: 9 Mar. Weedkiller applied: 30 Apr. Insecticide applied: 25 June. Hand harvested: 20 July.

Series II: Potatoes: Ploughed: 28 Oct, 1975. NPK applied: 23 Mar, 1976. Rotary harrowed, potatoes planted: 31 Mar. Weedkiller applied: 30 Apr. Insecticide applied: 25 June. Hand lifted: 19 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.

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WINTER WHEAT

GRAIN TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	3.48	4.06	3.18	4.17	3.72

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

TABLE	PK SUB
-----	-----
SED	0.281

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.344	9.2

GRAIN MEAN DM% 89.2

STRAW TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	4.90	5.64	4.33	6.34	5.30

STRAW MEAN DM% 90.3

PLOT AREA HARVESTED 0.00033

SUGAR BEET

ROOTS WASHED TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	35.3	36.9	33.0	39.3	36.1

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

TABLE	PK SUB
-----	-----
SED	1.62

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	1.98	5.5

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SUGAR BEET

SUGAR PERCENTAGE TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	14.9	15.0	14.8	14.9	14.9

TOTAL SUGAR TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	5.25	5.54	4.88	5.86	5.38

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

TABLE	PK SUB
-----	-----
SED	0.241

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.295	5.5

TOPS TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	23.3	24.9	24.7	25.6	25.9

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

TABLE	PK SUB
-----	-----
SED	1.32

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	1.62	6.3

PLOT AREA HARVESTED 0.00049

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BARLEY

GRAIN TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	-	PKSUB	MEAN
	3.43	4.46	3.77		4.51	4.04

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

TABLE	PK SUB
-----	-----
SED	0.261

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.319	7.9

GRAIN MEAN DM% 89.2

STRAW TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	-	PKSUB	MEAN
	3.16	4.14	3.41		4.44	3.79

STRAW MEAN DM% 92.2

PLOT AREA HARVESTED 0.00033

POTATOES

TOTAL TUBERS TONNES/HECTARE

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

PK SUB	- -	- SUB	PKTOP -	-	PKSUB	MEAN
	41.3	39.7	43.0		47.1	42.8

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

TABLE	PK SUB
-----	-----
SED	2.34

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	2.87	6.7

PLOT AREA HARVESTED 0.00043