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Yields of the Field Experiments 1975

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75/ W/RN/16 - Effects of Deep Pk - Wheat, Sugar Beet, Barley, Potatoes

Rothamsted Research

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75/W/RN/16

EFFECTS OF DRESSING WITH P & K

Object: To study the 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 second year, winter wheat, sugar beet, spring barley, potatoes.

For previous year see 74/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	- -
None	Subsoiled	- SUB
To topsoil (0-25 cm)	None	PKTOP -
To subsoil	Subsoiled	- PKSUB

- 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 I: Sugar beet: Manures: Magnesian limestone at 5 tonnes. (0:14:28) at 750 kg. N at 160 kg as 'Nitro-Chalk'. Insecticide: Pirimicarb ('Aphox' at 0.28 kg in 340 l).
- Series II: Barley: Manures: (20:14:14) at 380 kg combine drilled. Weedkiller: Ioxynil at 0.63 kg plus mecoprop at 1.9 kg in 340 l.
- Series III: Potatoes: Manures: (13:13:20) at 1860 kg. Weedkiller: Linuron at 1.0 kg plus paraquat at 0.42 kg ion in 340 l. Insecticide: Pirimicarb ('Aphox' at 0.28 kg in 340 l).
- Series IV: Winter wheat: Manures: (0:20:20) at 290 kg combine drilled. N at 100 kg as 'Nitro-Chalk'. Weedkiller: Ioxynil at 0.63 kg plus mecoprop at 1.9 kg in 340 l. Fungicide: Carbendazim at 0.22 kg plus tridemorph at 0.26 kg in 170 l.

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Seed: Sugar beet: Klein E, sown at 5.6 kg.
 Barley: Julia, dressed with ethirimol, sown at 160 kg.
 Potatoes: Pentland Crown.
 Winter wheat: Cappelle, sown at 200 kg.

Cultivations, etc.:-

Series I: Sugar beet: Magnesian limestone applied: 7 Nov, 1974.
 Ploughed: 29 Nov. PK applied: 22 Apr, 1975. Spring-tine cultivated, N applied: 25 Apr. Spring-tine cultivated with crumbler, seed sown: 29 Apr. Hand weeded three times: 22 May, 13 June, 21 June. Singled by hand: 29 May. Insecticide applied twice: 5 June, 20 June. Hand lifted: 12 Nov.
 Series II: Barley: Ploughed: 29 Nov, 1974. Spring-tine cultivated: 25 Feb, 1975. Seed sown: 28 Feb. Rolled: 26 Apr. Weedkiller applied: 22 May. Hand harvested: 12 Aug.
 Series III: Potatoes: Ploughed: 29 Nov, 1974. NPK applied: 21 Apr, 1975. Spring-tine cultivated: 25 Apr. Rotary harrowed, potatoes planted: 1 May. Weedkiller applied: 22 May. Insecticide applied: 20 June. Hand lifted: 22 Oct.
 Series IV: Winter wheat: Deep-tine cultivated: 6 Nov, 1974. Spring-tine cultivated: 7 Nov. Seed sown: 8 Nov. N applied: 18 Apr, 1975. Weedkiller applied: 22 May. Fungicide applied: 20 June. Hand harvested: 7 Aug.

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.

POTATOES

TOTAL TUBERS TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	33.8	36.4	32.7	41.4	36.1

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

TABLE	PK SUB
SED	3.39

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	4.76	13.2

PLOT AREA HARVESTED 0.00043

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SUGAR BEET

ROOTS WASHED TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	14.5	17.1	15.2	17.3	16.0

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

TABLE	PK SUB
SED	1.00

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	1.22	7.6

SUGAR PERCENTAGE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	15.6	15.5	15.5	15.7	15.6

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SUGAR BEET

TOTAL SUGAR TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	2.26	2.66	2.36	2.72	2.50

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

TABLE	PK SUB
-----	-----
SED	0.180

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.220	8.8

TOPS TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	10.0	12.4	9.6	11.4	10.9

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

TABLE	PK SUB
-----	-----
SED	0.75

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.92	8.5

PLOT AREA HARVESTED 0.00049

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BARLEY

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUP	PKTOP -	- PKSUB	MEAN
	2.30	3.79	1.90	4.69	3.17

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

TABLE	PK SUB
-----	-----
SED	0.240

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.293	9.3

GRAIN MEAN DM% 88.0

STRAW TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	3.54	4.40	3.30	5.29	4.13

STRAW MEAN DM% 82.3

PLOT AREA HARVESTED 0.00030

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WINTER WHEAT

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	4.23	5.65	4.31	5.49	4.92

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

TABLE	PK SUB
-----	-----
SED	0.333

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.408	8.3

GRAIN MEAN DM% 87.3

STRAW TONNES/HECTARE

*** TABLES OF MEANS ***

PK SUB	- -	- SUB	PKTOP -	- PKSUB	MEAN
	7.28	8.39	6.61	8.72	7.75

STRAW MEAN DM% 64.8

PLOT AREA HARVESTED 0.00030