ROTHAMSTED RESEARCH

Yields of the Field Experiments 1980

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80/R/CS/246 Effects of Subsoiling & Deep Pk

Rothamsted Research

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80/R/CS/246

EFFECTS OF SUBSOILING & DEEP PK

Object: To study the effects of thorough subsoil disturbance and the incorporation of P & K into the subsoil on soil and crop parameters and on yield of s. barley - Gt. Field I.

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The first year, s. barley.

Whole plot dimensions: 4.27 x 17.7.

Design: 2 replicates of 28 plots, fully randomised.

Treatments: All combinations of:-

1. PK SUB — Extra PK and subsoil treatment (applied autumn/winter 1979/80)

- - -	None, mouldboard ploughed (duplicated)
- - S	Subsoiled
P - S	P to subsoil
- K S	K to subsoil
P K S	PK to subsoil
P K T	PK to topsoil, mouldboard ploughed

2. N — Nitrogen fertiliser (kg N) to seedbed:

0
40
80
120

NOTES: (1) Rates of P and K were 1000 kg P_2O_5, as superphosphate, 500 kg K_2O, as muriate of potash
(2) Subsoiling was done with the Wye double-digger which turns a furrow with a conventional plough share, to a depth of 23 cm, and at the same time rotary cultivates the bottom of the adjacent furrow to a further depth of 15 cm. When applying P and K this was distributed ahead of the rotary cultivator.
(3) Subsoil treatments were applied from 13 to 17 Dec, 1979.
(4) Mouldboard ploughing was done on 18 Dec.
(5) The topsoil PK dressing was equally divided before and after ploughing, applied on 13 Dec and 14 Jan, 1980.

Basal applications: Manures: (0:20:20) at 310 kg, combine drilled. Fungicide: Tridemorph at 0.53 kg applied twice, with weedkillers in 250 l on the first occasion, alone in 220 l on the second. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l).

Seed: Georgie, sown at 160 kg.

Cultivations, etc.:- Spring-tine cultivated: 2 Mar, 1980. N applied: 3 Mar. Rotary harrowed, seed sown: 5 Mar. Weedkillers and fungicide applied: 7 May. Fungicide applied: 30 May. Combine harvested: 19 Aug. Previous crops: W. wheat 1978, s. barley 1979.

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NOTE: Measurements were made of total above-ground dry matter, stomatal resistance, leaf water potential, visible light transmission, leaf areas, roots, soil bulk density, air filled pore and interclod spaces in soil, soil water potentials and crop nutrient contents. Many of the measurements were made on selected treatments only.

GRAIN TONNES/HECTARE

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

PK SUB N	- - -	- - S	P - S	- K S	P K S	P K T	MEAN
0	3.16	3.35	3.91	2.77	4.66	3.66	3.52
40	4.17	5.31	4.20	4.58	6.02	5.49	4.85
80	5.88	6.22	6.31	6.55	6.53	5.82	6.17
120	6.39	6.66	6.00	6.48	6.86	6.89	6.52
MEAN	4.90	5.39	5.10	5.10	6.02	5.46	5.27

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

TABLE	PK SUB	N	PK SUB N	
SED	0.441		0.882	MIN REP
	0.382	0.333	0.764	MAX-MIN
			0.624	MAX REP

PK SUB
MAX REP - - -
MAX-MIN - - - V ANY OF REMAINDER
MIN REP ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
WP	32	0.882	16.7

GRAIN MEAN DM% 81.6

STRAW TONNES/HECTARE

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

PK SUB N	- - -	- - S	P - S	- K S	P K S	P K T	MEAN
0	1.27	1.28	1.20	0.81	1.96	1.28	1.30
40	1.71	2.02	1.81	2.30	3.10	2.22	2.12
80	2.70	2.70	2.49	3.11	3.43	3.08	2.89
120	3.58	2.81	3.05	3.55	4.43	3.48	3.50
MEAN	2.32	2.20	2.14	2.44	3.23	2.51	2.45

STRAW MEAN DM% 74.5

PLOT AREA HARVESTED 0.00217

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