ROTHAMSTED RESEARCH

Yields of the Field Experiments 1980

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80/W/CS/245 Minimum Cultivation and Deep Pk

Rothamsted Research

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80/W/CS/245

MINIMUM CULTIVATION AND DEEP PK

Object: In the first year: to study the effects of thorough subsoil disturbance and the incorporation of P & K into the subsoil on s. wheat and s. barley, provision is made for additional treatments in subsequent years - Woburn Warren Field I and II.

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The first year, s. wheat and s. barley.

Whole plot dimensions: 4.27 x 57.6.

Design: 3 series each of 20 x 4 criss cross

Treatments: All combinations of:-

Series

1. SER CROP	Series, crops and previous cropping:
SER1 WS1	Series I, s. wheat, first cereal after a break crop
SER2 WS3	Series II, s. wheat, third cereal after a break crop
SER3 BS3	Series III, s. barley, third cereal after a break crop

Column plots

2. PK SUB	Extra PK and subsoil treatments (applied autumn 1979):
---	None, mouldboard ploughed (six plots per series)
--S	None, subsoiled (six plots per series)
PKS	PK to subsoil (six plots per series)
PKT	PK to topsoil, mouldboard ploughed (two plots per series)

Row plots

3. N PATH	Nitrogen fertiliser to seedbed, and pathogen control:
50 ENHD	50 kg N, enhanced pathogen control
100 ENHD	100 kg N, enhanced pathogen control
150 ENHD	150 kg N, enhanced pathogen control
100 STND	100 kg N, standard pathogen control

NOTES: (1) Rates of P and K were 500 kg P_2O_5, as superphosphate, 250 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 & K this was distributed ahead of the rotary cultivator.
(3) The topsoil PK dressing was equally divided before and after ploughing.
(4) Standard pathogen control was none, other than conventional seed dressings, including ethirimol to barley. Enhanced pathogen control was the use of the same seed dressings plus prochloraz (as 'Sportak' at 1.0 l) in 280 l applied 12 June, 1980.

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Basal applications: Manures: Magnesian limestone at 5 t (Series II and III only), (0:20:20) at 300 kg, combine drilled. Weedkillers: Paraquat at 0.56 kg ion in 250 l. Dicamba with mecoprop and MCPA as ('Banlene Plus' at 4.9 l) in 280 l (s. barley only). Mecoprop with bromoxynil and ioxynil as ('Brittox' at 3.5 l) in 280 l (s. wheat only).

Seed: S. wheat : Timmo, sown at 180 kg.
S. barley : Georgie, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:-
Series I: S. wheat: Heavy spring-tine cultivated: 24 Sept, 1979. Paraquat applied: 24 Oct. First half topsoil P and K applied, ploughing and subsoil treatments applied: 28 Nov-4 Dec. Second half topsoil P and K applied: 7 Dec. Heavy spring-tine cultivated: 21 Feb, 1980. N applied: 5 Mar. Rotary cultivated, spring-tine cultivated with crumbler attached: 7 Apr. Seed sown: 8 Apr. 'Brittox' applied: 11 June. Combine harvested: 18 Sept. Previous crops: S. barley 1978, s. oats 1979.
Series II: S. wheat: Heavy spring-tine cultivated: 24 Sept, 1979. Magnesian limestone applied: 29 Sept. Paraquat applied: 24 Oct. First half topsoil P and K applied, ploughing and subsoil treatments applied: 4-7 Dec. Second half topsoil P and K applied: 6 Dec. Heavy spring-tine cultivated: 21 Feb, 1980. N applied: 5 Mar. Rotary cultivated: 5 Apr. Spring-tine cultivated with crumbler attached: 7 Apr. Seed sown: 8 Apr. 'Brittox' applied: 11 June. Combine harvested: 19 Sept. Previous crops: W. wheat 1978 and 1979.
Series III: S. barley: Heavy spring-tine cultivated: 24 Sept, 1979. Magnesian limestone applied: 29 Sept. Paraquat applied: 24 Oct. First half topsoil P and K applied: 21 Nov. Ploughing and subsoil treatments applied 21-27 Nov. Second half topsoil P and K applied: 7 Dec. Heavy spring-tine cultivated: 21 Feb. N applied, rotary cultivated, seed sown: 5 Mar. 'Banlene Plus' applied: 7 May. Combine harvested: 22 Aug. Previous crops: W. wheat 1978, s. barley 1979.

NOTE: Plant establishment counts were made. Observations on diseases were made during the season. Components of yield of s. barley were measured at harvest.

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SERIES I SPRING WHEAT

GRAIN TONNES/HECTARE

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

N PATH / PK SUB	50 ENHD	100 ENHD	150 ENHD	100 STND	MEAN
---	3.61	3.55	3.71	3.17	3.51
--S	3.28	3.40	3.58	3.18	3.36
PKS	3.74	3.85	3.90	3.44	3.73
PKT	4.24	4.02	4.29	3.85	4.10
MEAN	3.61	3.64	3.79	3.32	3.59

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

TABLE	PK SUB	PK SUB* N PATH	
SED		0.319	MIN REP
	0.227	0.261	MAX-MIN
	0.161	0.184	MAX REP

* WITHIN THE SAME LEVEL OF N PATH ONLY

	PK SUB
MAX-MIN	PKT V ANY OF THE REMAINDER
MIN REP	PKT ONLY
MAX REP	ANY OF THE REMAINDER

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

STRATUM	DF	SE	CV%
WP1	16	0.278	7.8
WP1.WP2	48	0.181	5.0

GRAIN MEAN DM% 77.6

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SERIES II SPRING WHEAT

GRAIN TONNES/HECTARE

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

N PATH PK SUB	50 ENHD	100 ENHD	150 ENHD	100 STND	MEAN
---	3.72	3.98	4.28	3.30	3.82
--S	3.36	3.83	3.95	3.19	3.58
PKS	3.81	4.11	4.11	3.47	3.87
PKT	4.03	4.39	4.58	3.83	4.21
MEAN	3.67	4.01	4.16	3.37	3.80

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

TABLE	PK SUB	PK SUB* N PATH	
SED		0.290	MIN REP
	0.191	0.236	MAX-MIN
	0.135	0.767	MAX REP

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

STRATUM	DF	SE	CV%
WP1	16	0.234	6.2
WP1.WP2	48	0.197	5.2

GRAIN MEAN DM% 81.4

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SERIES III SPRING BARLEY

GRAIN TONNES/HECTARE

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

N PATH / PK SUB	50 ENHD	100 ENHD	150 ENHD	100 STND	MEAN
---	5.07	5.96	6.72	5.95	5.93
--S	5.10	6.01	6.73	5.54	5.85
PKS	5.57	6.38	7.00	6.07	6.25
PKT	5.70	6.12	6.94	6.01	6.19
MEAN	5.29	6.12	6.83	5.87	6.03

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

TABLE	PK SUB	PK SUB* N PATH
SED		0.377
	0.204	0.308
	0.144	0.218

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

STRATUM	DF	SE	CV%
WP1	16	0.250	4.2
WP1.WP2	48	0.326	5.4

GRAIN MEAN DM% 84.1

PLOT AREA HARVESTED 0.00386

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