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## Yields of the Field Experiments 1978

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### **78/R/CS/216 and 78/W/CS/216 Effects of Subsoiling and Deep P K - Barley**

#### **Rothamsted Research**

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78/R/CS/216 and 78/W/CS/216

EFFECTS OF SUBSOILING & DEEP PK

Object: To study the effects of subsoiling and of incorporating a large dressing of PK in the subsoil on yields and nutrient uptakes of barley - Rothamsted (R) Delharding and Woburn (W) Road Piece.

Sponsors: J.McEwen, A.E. Johnston (R), M.K.V. Carr, R.J. Godwin (National College of Agricultural Engineering), P.T. Gooderham, I.B. Warboys, J.M. Wilkes (Wye College).

The first year, barley.

Design: 3 randomised blocks of 6 plots.

Whole plot dimensions: 4.27 x 13.7.

Treatments:

TREATMNT	Machines and incorporation of P and K into the subsoil:
NONE	Not subsoiled, no P or K
FARM 0	Farm standard, unwinged, subsoiler, no P or K
NCAE 0	N.C.A.E. winged subsoiler, no P or K
NCAE PK	N.C.A.E. winged subsoiler, P and K applied
WYE 0	Wye double digger, no P or K
WYE PK	Wye double digger, P and K applied

- NOTES: (1) The rates of P and K were 1930 kg  $P_2O_5$ , as triple superphosphate and 460 kg  $K_2O$  as muriate of potash.
- (2) The Farm standard, unwinged, subsoiler was set to work at a depth of 38 cm at intervals of 50 cm Delharding (R) and at a depth of 50 cm at intervals of 70 cm Road Piece (W).
- (3) The N.C.A.E. winged subsoiler was set to work at a depth of 40 cm at intervals of 60 cm on plots not given P and K and at alternate depths of 30 cm and 40 cm spaced 30 cm apart on plots given P and K. Fertiliser was applied behind the subsoiling points.
- (4) The Wye double digger 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 furrow to a further depth of 15 cm. When applying P and K this was distributed ahead of the rotary cultivator.

Basal applications:

Delharding (R): Manures: (20:14:14) at 440 kg combine drilled. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 220 l). Fungicide: Tridemorph at 0.53 kg in 220 l.

Road Piece (W): Manures: (20:14:14) at 440 kg. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 2.5 kg in 340 l). Fungicide: Tridemorph at 0.53 kg in 280 l.

Seed: Delharding (R) and Road Piece (W): Porthos, dressed with ethirimol, sown at 160 kg.

78/R/CS/216 and 78/W/CS/216

Cultivations, etc.:-

Delharding (R): Farm subsoil treatments applied: 28 Sept, 1977. N.C.A.E. subsoil treatments and PK applied: 29 Sept. Wye double digger treatments and PK applied: 13 Oct. All treatments except Wye double digger, ploughed: 28 Nov. All plots rotary harrowed, seed sown: 11 Mar, 1978. Weedkiller and fungicide applied: 17 May. Combine harvested: 21 Aug. Previous crops: Barley 1976 and 1977.

Road Piece (W): N.C.A.E. subsoil treatments and PK applied: 28 Sept, 1977. Farm subsoil treatments applied: 30 Sept. Wye double digger treatments and PK applied: 13 Oct. All treatments except Wye double digger, ploughed: 31 Oct. All plots spring-tine cultivated: 8 Mar, 1978. Spring-tine cultivated with crumbler attached, seed sown: 9 Mar. Weedkiller and fungicide applied: 12 May. Combine harvested: 18 Aug. Previous crops: Barley 1976 and 1977.

- NOTES: (1) On Road Piece (W) water use was measured during the season using neutron probes.  
 (2) Penetrometer measurements were made on both sites and samples of grain and straw were analysed for contents of N, P, K, Na, Ca and Mg.  
 (3) On Delharding (R) yields have been adjusted for a diagonal trend across the site. For this purpose, the block has been ignored in the analysis.

78/R/CS/216 DELHARDING (R)

GRAIN TONNES/HECTARE

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

TREATMNT	NONE	FARM O	NCAE O	NCAE PK	WYE O	WYE PK	MEAN
	4.39	4.61	4.62	5.08	5.25	5.97	4.99

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

TABLE	TREATMNT
SED	0.426

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.483	9.7

GRAIN MEAN DM% 84.2

STRAW TONNES/HECTARE

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

TREATMNT	NONE	FARM O	NCAE O	NCAE PK	WYE O	WYE PK	MEAN
	2.52	2.69	2.92	2.64	3.27	3.70	2.96

STRAW MEAN DM% 67.2

PLOT AREA HARVESTED 0.00260

78/W/CS/216 ROAD PIECE (W)

GRAIN TONNES/HECTARE

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

TREATMNT	NONE	FARM 0	NCAE 0	NCAE PK	WYE 0	WYE PK	MEAN
	4.35	4.95	3.58	2.89	5.27	5.46	4.42

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

TABLE	TREATMNT
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SED	0.441

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.541	12.2

GRAIN MEAN DM% 83.9

STRAW TONNES/HECTARE

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

TREATMNT	NONE	FARM 0	NCAE 0	NCAE PK	WYE 0	WYE PK	MEAN
	2.03	2.33	1.36	1.59	2.47	2.61	2.07

STRAW MEAN DM% 69.6

PLOT AREA HARVESTED 0.00260