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80/R/CS/216 and 80/W/CS/216 Effects of Subsoiling & Deep Pk

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80/R/CS/216 and 80/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 a sequence of crops - Rothamsted (R) Delharding and Woburn (W) Road Piece.

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The third year, s. barley.

For previous years see 78-79/R&W/CS/216.

Design: 3 randomised blocks of 6 plots.

Whole plot dimensions: 4.27 x 13.7.

Treatments:

TREATMNT	Machines and incorporation of extra P and K into the subsoil:
000 00	Not subsoiled, no P or K
FOO FO	Farm standard, unwinged, subsoiler, no P or K, autumn 1977 & autumn 1979
NOO NO	N.C.A.E. winged subsoiler, no P or K, autumn 1977 & autumn 1979
NPK NO	N.C.A.E. winged subsoiler, P and K applied autumn 1977, subsoiled only autumn 1979
WOO 00	Wye double digger, no P or K, autumn 1977 only
WPK 00	Wye double digger, P and K applied, autumn 1977 only

- NOTES: (1) The rates of P and K were 1930 kg P₂O₅, as triple superphosphate and 460 kg K₂O as muriate of potash.
- (2) In autumn 1977 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). In autumn 1979 it was set to work at a depth of 56 cm at intervals of 76 cm Delharding (R) and 142 cm Road Piece (W).
- (3) In autumn 1977 the N.C.A.E. winged subsoiler had a single tine 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. In autumn 1979 the winged subsoiler had three tines, the centre tine preceding the others, all set to work at a depth of 40 cm spaced 40 cm apart.
- (4) The Wye double digger turned a furrow with a conventional plough to a depth of 23 cm and at the same time rotary cultivated the bottom of the furrow to a further depth of 15 cm. When applying P & K this was distributed ahead of the rotary cultivator.

80/R/CS/216 and 80/W/CS/216

Basal applications:

Delharding (R): Manures: (20:10:10) at 450 kg, combine drilled.
Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 3.5 l) in 250 l with the tridemorph. Fungicides: Tridemorph at 0.53 kg. Triadimefon at 0.12 kg in 250 l.
Road Piece (W): Manures: Magnesian limestone at 7.5 t. (20:10:10) at 450 kg, combine drilled. Weedkillers: Glyphosate at 1.7 kg in 250 l. Dicamba with mecoprop and MCPA ('Banlene plus' at 4.9 l) in 280 l. Fungicides: Tridemorph at 0.53 kg in 280 l. Ethirimol (as 'Milgo E' at 1.3 l) in 280 l.

Cultivations, etc.:-

Delharding (R): Winged subsoiler treatment applied: 12 Oct, 1979. Farm subsoiler treatment applied: 17 Oct. Chisel ploughed (except winged subsoiler plots): 29 Oct. Spring-tine cultivated: 3 Mar, 1980. Seed sown: 5 Mar. Weedkillers with tridemorph applied: 7 May. Triadimefon applied: 3 June. Combine harvested: 18 Aug.
Road Piece (W): Glyphosate applied: 28 Sept, 1979. Winged subsoiler treatment applied: 12 Oct. Farm subsoiler treatment applied: 20 Oct. Deep-tine cultivated 23 cm deep (except winged subsoiler plots): 24 Oct. Heavy spring-tine cultivated: 29 Feb, 1980. Rotary cultivated, seed sown: 4 Mar. 'Banlene plus' applied: 7 May. Tridemorph applied: 13 May. Ethirimol applied: 5 June. Combine harvested: 19 Aug.

- NOTES: (1) Bulk densities of soil were measured on Road Piece (W).
(2) Water and nutrient contents of green crop were measured during the season.
(3) Nutrient contents of grain were measured.
(4) On Delharding (R) some plots were damaged by sparrows near maturity. A hand harvest yield was obtained from all plots from undamaged areas. Combine harvester yields were also obtained except for two of the replicates of WPK 00 on which there was insufficient undamaged area remaining. Combine harvester yields are presented with the two missing plots estimated from the hand harvested yields.

80/R/CS/216 DELHARDING (R)

GRAIN TONNES/HECTARE

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

TREATMNT	000 00	FOO FO	N00 NO	NPK NO	W00 00	WPK 00	MEAN
	7.23	7.56	6.33	7.25	7.68	7.57	7.27

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

TABLE	TREATMNT
-----	-----
SED	0.543

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.665	9.1

GRAIN MEAN DM% 80.6

PLOT AREA HARVESTED 0.00217

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

GRAIN TONNES/HECTARE

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

TREATMNT	000 00	FOO FO	N00 NO	NPK NO	W00 00	WPK 00	MEAN
	4.88	5.44	5.32	5.46	5.34	5.26	5.28

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

TABLE	TREATMNT
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SED	0.287

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.352	6.7

GRAIN MEAN DM% 83.4

PLOT AREA HARVESTED 0.00260