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79/R/CS/216 and 79/W/CS/216 Effects of Subsoiling and Deep P K - Beans

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Rothamsted Research (1980) *79/R/CS/216 and 79/W/CS/216 Effects of Subsoiling and Deep P K - Beans* ; Yields Of The Field Experiments 1979, pp 224 - 225 - DOI:

<https://doi.org/10.23637/ERADOC-1-45>

79/R/CS/216 and 79/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.

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 second year, beans.

For previous year see 78/R&W/CS/216.

Design: 3 randomised blocks of 6 plots.

Whole plot dimensions: 4.27 x 13.7.

Treatments (applied autumn 1977 only, before spring barley 1978):

| TREATMNT | Machines and incorporation of P and K into the subsoil: |
|----------|---|
| NONE | Not subsoiled, no P or K |
| FARM O | Farm standard, unwinged, subsoiler, no P or K |
| NCAE O | N.C.A.E. winged subsoiler, no P or K |
| NCAE PK | N.C.A.E. winged subsoiler, P and K applied |
| WYE O | 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 P₂O₅, as triple superphosphate and 460 kg K₂O 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 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): Weedkillers: Glyphosate at 1.5 kg in 220 l. Trietazine with simazine ('Rental SC' at 2.8 kg in 220 l). Insecticide: Pirimicarb at 0.14 kg in 220 l.

Road Piece (W): Weedkillers: Diquat at 0.79 kg ion in 280 l. Trietazine with simazine ('Rental SC' at 2.4 kg in 280 l). Insecticide: Pirimicarb at 0.14 kg in 250 l.

Seed: Minden, sown at 220 kg on both sites.

Cultivations, etc.:-

Delharding (R): Glyphosate applied: 24 Oct, 1978. Ploughed: 16 Nov. Heavy spring-tine cultivated: 20 Apr, 1979. Rotary harrowed: 21 Apr. Seed sown: 23 Apr. Trietazine with simazine applied: 13 May. Insecticide applied: 22 June. Combine harvested: 21 Sept.

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Road Piece (W): Diquat applied: 8 Sept, 1978. Heavy spring-tine cultivated: 13 Sept. Ploughed: 16 Nov. Spring-tine cultivated with crumbler attached: 16 Apr, 1979. Seed sown: 19 Apr. Trietazine with simazine applied: 1 May. Insecticide applied: 22 June. Combine harvested: 10 Sept.

- NOTES: (1) On Road Piece (W) water use was measured during the season using a neutron probe.
 (2) On both sites samples were taken at intervals during the season to measure above-ground dry matter and nutrient uptake. Grain samples were analysed for N, P, K, Ca, Na and Mg.

79/R/CS/216 DELHARDING (R)

GRAIN TONNES/HECTARE

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

| TREATMNT | NONE | FARM 0 | NCAE 0 | NCAE PK | WYE 0 | WYE PK | MEAN |
|----------|------|--------|--------|---------|-------|--------|------|
| | 3.61 | 3.61 | 3.66 | 3.49 | 3.76 | 4.10 | 3.71 |

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

| TABLE | TREATMNT |
|-------|----------|
| ----- | ----- |
| SED | 0.201 |

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

| STRATUM | DF | SE | CV% |
|----------|----|-------|-----|
| BLOCK.WP | 10 | 0.247 | 6.7 |

GRAIN MEAN DM% 80.3 PLOT AREA HARVESTED 0.00300

79/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 |
|----------|------|--------|--------|---------|-------|--------|------|
| | 1.41 | 1.22 | 1.33 | 1.29 | 1.52 | 1.89 | 1.44 |

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

| TABLE | TREATMNT |
|-------|----------|
| ----- | ----- |
| SED | 0.375 |

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

| STRATUM | DF | SE | CV% |
|----------|----|-------|------|
| BLOCK.WP | 10 | 0.460 | 31.9 |

GRAIN MEAN DM% 87.3 PLOT AREA HARVESTED 0.00260