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77/R/CS/90 Cultivations for Cereals - Wheat

Rothamsted Research

Rothamsted Research (1978) *77/R/CS/90 Cultivations for Cereals - Wheat* ; Yields Of The Field Experiments 1977, pp 159 - 160 - DOI: <https://doi.org/10.23637/ERADOC-1-29>

77/R/CS/90

CULTIVATIONS FOR CEREALS

Object: To study the engineering aspects - power requirements, rate of work, revenue and costs - of different tillage systems for continuous wheat. Effects on weeds, soil pathogens and yields are also studied - Meadow.

Sponsors: D.E. Patterson (N.I.A.E.), R. Moffitt, R.D. Prew, C.A. Edwards.

The sixth year, winter wheat.

For previous years see 72-76/R/CS/90.

Design: 3 randomised blocks of 10 plots.

Whole plot dimensions: 13.7 x 33.8.

Treatments

TILLAGE Tillage systems:-

- 1 Three passages of the tractor (three-pass system): Ploughed* 20 cm deep (8 inches): disc harrowed: drilled.
- 2 Three-pass system: Chisel-ploughed once* 15 cm deep (6 inches): disc harrowed: drilled.
- 3 Two-pass system: Ploughed* 20 cm deep: spring-tine cultivated and drilled.
- 4 Two-pass system: Ploughed* 10 cm deep: spring-tine cultivated and drilled.
- 5 Two-pass system: Sprayed with paraquat (0.56 kg ion in 220 l on 20 Oct, 1976): spring-tine cultivated and drilled.
- 6 Three-pass system: Heavy spring-tine cultivated* 15 cm deep: disc harrowed: spring-tine cultivated and drilled.
- 7 Two-pass system (stubble of 1976 crop burnt on 16 Aug): Heavy spring-tine cultivated* 15 cm deep: spring-tine cultivated and drilled.
- 8 Two-pass system: Sprayed with paraquat (0.56 kg ion in 220 l on 20 Oct): direct drilled.
- 9 Three-pass system: Rotary digger (N.I.A.E.) cultivated*: disc harrowed: spring-tine cultivated and drilled.
- 10 Two-pass system (stubble of 1976 crop burnt on 16 Aug): Rotary digger (N.I.A.E.) cultivated*: spring-tine cultivated and drilled.

NOTE: Rotary digger (N.I.A.E.) - depth of working: rotor 10 cm, tines 20 cm.

* Cultivations done on 30 Sept, 1976. Three plots of TILLAGE 1, two of TILLAGE 2 and one each of TILLAGE 3, 6 and 10 received remaining cultivations and were sown on 21 Oct. TILLAGE 8 plots sown on 2 Nov. All remaining cultivations and drilling done on 3 Nov, and these plots only disc harrowed. A disc drill was used on all treatments except 8.

Basal applications: Manures: Chalk at 7.5 t. (10:24:24) at 250 kg, combine drilled. 'Nitro-Chalk' at 400 kg. Weedkillers: Paraquat at 0.56 kg ion in 220 l, methabenzthiazuron at 3.1 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 270 l.

Seed: Maris Huntsman, sown at 160 kg.

Cultivations, etc.: - Chalk applied: 1 Sept, 1976. Paraquat applied: 27 Sept. Methabenzthiazuron applied: 19 Nov. N applied: 8 Apr, 1977. Insecticide applied: 13 July. Combine harvested: 7 Sept.

77/R/CS/90

NOTES: Observations and determinations were made as follows:-

- (1) Soil: Structure assessments, photographs for aggregate size, moisture determinations.
- (2) Implements: Depth and width of work, forward speed, wheel slip and power requirements.
- (3) Crop: Plant and tiller counts, number of ears and grains per ear, disease and pest assessments, aerial photographs.

GRAIN TONNES/HECTARE

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

| TILLAGE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | MEAN |
|---------|------|------|------|------|------|------|------|------|------|------|------|
| | 5.24 | 5.04 | 5.18 | 5.35 | 4.74 | 4.79 | 5.16 | 4.49 | 5.02 | 5.27 | 5.03 |

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

| TABLE | TILLAGE |
|-------|---------|
| ----- | ----- |
| SED | 0.197 |

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

| STRATUM | DF | SE | CV% |
|----------|----|-------|-----|
| BLOCK.WP | 18 | 0.242 | 4.8 |

GRAIN MEAN DM% 81.0

PLOT AREA HARVESTED 0.01031