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86/R/CS/309 and 86/W/CS/309 Long-term Straw Incorporation - W. Wheat

Rothamsted Research

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86/R/CS/309 and 86/W/CS/309

LONG-TERM STRAW INCORPORATION

Object: To study the effects of mixing and depths of incorporation of straw on straw decomposition, soil nitrogen content, soil physical condition, pests, diseases and on the establishment, growth and yield of w. wheat - Rothamsted (R) Great Knott III and Woburn (W) Far Field I.

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The second year, w. wheat.

For first year see 85/R&W/CS/309.

Design: 4 randomised blocks of 12 plots (R).
2 randomised blocks of 12 plots (W).

Whole plot dimensions: 9.0 x 28.0 (R).
9.0 x 30.0 (W).

Treatments, applied cumulatively in successive years: All combinations of:-

- | | |
|-------------|---|
| 1. STRAW | Treatments to straw from previous wheat: |
| BURNT | Burnt |
| CHOPPED | Chopped and spread (duplicated) |
| 2. CULTIVTN | Cultivations: |
| TINE 10 | Tine cultivated to 10 cm depth |
| TN10PL20 | Tine cultivated to 10 cm depth, ploughed to 20 cm |
| TN10TN20 | Tine cultivated to 10 cm depth and again to 20 cm |
| PLOUGH20 | Ploughed to 20 cm depth |

- NOTES: (1) Straw was chopped by trailed straw chopper and spread on 6 Sept, 1985 (R), 12 Sept (W). Straw was spread 6 Sept (R) and burnt 10 Sept (R) and spread and burnt 13 Sept (W).
- (2) A heavy spring-tine cultivator was used to cultivate to 10 cm depth, twice on 17 Sept (R), 19 Sept, 28 Sept (W). A chisel plough was used to cultivate to 20 cm depth, on 18 Sept (R) and a deep-tine cultivator to 20 cm on 19 Sept (W). All tine-cultivated plots were disced on 19 Sept (R) only.
- (3) Ploughed plots were ploughed to 20 cm depth on 18 Sept (R), 19 Sept (W).

86/R/CS/309 and 86/W/CS/309

Basal applications:

Great Knott III (R): (0:24:24) at 1000 kg. N at 45 kg followed by 180 kg as 'Nitram'. Weedkillers: Paraquat at 0.60 kg ion in 200 l. Isoproturon at 2.1 kg and clopyralid at 0.07 kg with bromoxynil octanoate at 0.34 kg and mecoprop at 2.5 kg applied with the prochloraz and carbendazim in 200 l. Fungicides: Prochloraz at 0.40 kg with carbendazim at 0.15 kg. Propiconazole at 0.12 kg in 200 l. Fenpropimorph at 0.75 kg and carbendazim with maneb (as 'Septal' at 2.5 kg) in 200 l.

Far Field I (W): (0:20:20) at 1030 kg. N at 40 kg followed by 190 kg as 'Nitram'. Weedkillers: Paraquat at 0.50 kg ion in 250 l. Clopyralid at 0.07 kg with bromoxynil octanoate at 0.34 kg and isoproturon at 1.5 kg applied with the prochloraz and carbendazim in 250 l. Fungicides: Prochloraz at 0.40 kg with carbendazim at 0.15 kg. Propiconazole at 0.12 kg in 240 l. Fenpropimorph at 0.75 kg and carbendazim with maneb (as 'Septal' at 2.5 kg) in 240 l.

Seed: Great Knott III (R) and Far Field I (W): Mission, sown at 180 kg.

Cultivations, etc.:-

Great Knott III (R): PK applied: 16 Sept, 1985. Paraquat applied: 8 Oct. Rotary harrowed, seed sown: 9 Oct. Rolled: 15 Oct. N applied: 14 Mar, 1986, 27 Apr. Isoproturon, clopyralid, bromoxynil octanoate, mecoprop, prochloraz and carbendazim applied: 29 Apr. Propiconazole applied: 13 June. Fenpropimorph and 'Septal' applied: 15 July. Combine harvested: 20 Aug.

Far Field I (W): PK applied: 1 Oct, 1985. Paraquat applied: 9 Oct. Rolled: 12 Oct. Rotary harrowed, seed sown: 16 Oct. N applied: 14 Mar, 1986, 28 Apr. Clopyralid, bromoxynil octanoate, isoproturon, prochloraz and carbendazim applied: 2 May. Propiconazole applied: 25 June. Fenpropimorph and 'Septal' applied: 16 July. Combine harvested: 20 Aug.

- NOTES: (1) Establishment counts were made in the autumn and measurements were made of total dry matter in spring.
(2) Fungal diseases and pests were assessed at intervals during the season.
(3) Components of yield were measured, and numbers of volunteer ears assessed.

86/R/CS/309 GREAT KNOTT III (R)

GRAIN TONNES/HECTARE

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

CULTIVTN	TINE 10	TN10PL20	TN10TN20	PLOUGH20	MEAN
STRAW					
BURNT	7.84	8.63	8.06	8.18	8.18
CHOPPED	8.53	8.25	8.54	7.98	8.33
MEAN	8.30	8.38	8.38	8.05	8.28

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

TABLE	STRAW	CULTIVTN	STRAW CULTIVTN	
SED			0.416	MIN REP
	0.180	0.240	0.360	MAX-MIN
			0.294	MAX REP

MIN REP STRAW
 MAX-MIN BURNT ONLY
 MAX REP BURNT V CHOPPED
 CHOPPED ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	37	0.588	7.1

GRAIN MEAN DM% 79.7

PLOT AREA HARVESTED 0.00631

86/W/CS/309 FAR FIELD I (W)

GRAIN TONNES/HECTARE

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

CULTIVTN	TINE 10	TN10PL20	TN10TN20	PLOUGH20	MEAN
STRAW					
BURNT	7.22	7.60	6.78	8.10	7.43
CHOPPED	7.72	7.29	7.59	7.58	7.55
MEAN	7.55	7.39	7.32	7.76	7.51

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

TABLE	STRAW	CULTIVTN	STRAW CULTIVTN	
SED			0.479	MIN REP
	0.207	0.276	0.414	MAX-MIN
			0.338	MAX REP

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

STRATUM	DF	SE	CV%
BLOCK.WP	15	0.479	6.4

GRAIN MEAN DM% 81.2

PLOT AREA HARVESTED 0.00884