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87/R/CS/309 and 87/W/CS/309 Long-term Straw Incorporation - W. Wheat

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87/R/CS/309 and 87/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 third year, w. wheat.

For previous years see 85-86/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 20 Aug, 1986 (R), 4 Sept (W) and burnt 2-4 Sept (R), 5 Sept (W).
- (2) A heavy spring-tine cultivator was used to cultivate to 10 cm depth, on 27 Aug, 28 Aug (R), 5 Sept, 18 Sept (W). A chisel plough was used to cultivate to 20 cm depth, on 28 Aug (R) and a deep-tine cultivator to 20 cm on 15 Sept (W).
- (3) Ploughed plots were ploughed to 20 cm depth on: Chopped plots 28 Aug (R), burnt plots 4 Sept (R), 19 Sept (W).
- (4) In error five plots of STRAW BURNT at Rothamsted were heavy spring-tine cultivated to 10 cm on 27 Aug before burning. Two were combinations with CULTIVTN TN10PL20 the others were combinations with CULTIVTN TINE 10, TN10TN20 and PLOUGH20. All were subsequently burnt with a flame gun on 4 Sept. Combinations with CULTIVTN TN10PL20 and with PLOUGH20 were ploughed, with TINE 10 heavy spring-tine cultivated and with TN10TN20 deep-tine cultivated on 8 Sept.

87/R/CS/309 and 87/W/CS/309

Basal applications:

Great Knott III (R): Manures: 'Nitram' at 130 kg followed by 580 kg.
Weedkillers: Paraquat at 0.60 kg ion in 200 l. Isoproturon at 2.5 kg in 200 l. Clopyralid at 0.05 kg, bromoxynil at 0.24 kg with mecoprop at 1.8 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. Propiconazole at 0.12 kg with carbendazim at 0.25 kg and maneb at 1.6 kg in 200 l.
Far Field I (W): Manures: 'Nitram' at 120 kg followed by 600 kg.
Weedkillers: Tri-allate (as 'Avadex BW' at 4.2 l) in 250 l. Isoproturon at 2.0 kg, clopyralid at 0.07 kg, bromoxynil at 0.34 kg and mecoprop at 2.5 kg in 240 l. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg in 200 l. Propiconazole at 0.12 kg with tridemorph at 0.52 kg in 200 l. Propiconazole at 0.12 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 200 l.

Seed: Great Knott III (R) and Far Field I (W): Mission, sown at 190 kg.

Cultivations, etc.:-

Great Knott III (R): Paraquat applied: 27 Sept, 1986. Rolled: 29 Sept. Disced: 1 Oct. Rotary harrowed, seed sown, harrowed: 6 Oct. Rolled: 8 Oct. N applied: 19 Mar, 1987 and 18 Apr. Isoproturon applied: 31 Mar. Clopyralid, bromoxynil, mecoprop, prochloraz and carbendazim applied: 18 Apr. Propiconazole applied: 28 May. Propiconazole, carbendazim and maneb applied: 30 June. Combine harvested: 17 Aug.
Far Field I (W): Disced: 29 Sept, 1986. Rolled: 1 Oct. Rotary cultivated with crumbler attached, seed sown: 8 Oct. Rolled: 9 Oct. Tri-allate applied, harrowed: 10 Oct. N applied: 31 Mar, 1987 and 16 Apr. Isoproturon, clopyralid, bromoxynil and mecoprop applied: 17 Apr. Prochloraz and carbendazim applied: 7 May. Propiconazole and tridemorph applied: 5 June. Propiconazole, carbendazim and maneb applied: 30 June. Combine harvested: 18 Sept.

- 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.

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

GRAIN TONNES/HECTARE

***** Tables of means *****

CULTIVTN STRAW	TINE 10	TN10PL20	TN10TN20	PLOUGH20	Mean
BURNT	6.04	5.92	5.67	6.36	6.00
CHOPPED	6.24	5.80	5.48	5.86	5.84
Mean	6.17	5.84	5.54	6.03	5.89

*** Standard errors of differences of means ***

Table	STRAW	CULTIVTN	STRAW CULTIVTN	
s.e.d.	0.174	0.232	0.401	min.rep
			0.347	max-min
			0.284	max.rep

min.rep STRAW
BURNT only
max-min BURNT v CHOPPED
max.rep CHOPPED only

***** Stratum standard errors and coefficients of variation *****

Stratum	d.f.	s.e.	cv%
BLOCK.WP	37	0.567	9.6

GRAIN MEAN DM% 85.8

PLOT AREA HARVESTED 0.00648

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

GRAIN TONNES/HECTARE

***** Tables of means *****

CULTIVTN STRAW	TINE 10	TN10PL20	TN10TN20	PLOUGH20	Mean
BURNT	4.34	3.78	4.17	3.90	4.05
CHOPPED	4.80	3.75	4.45	3.63	4.16
Mean	4.64	3.76	4.36	3.72	4.12

*** Standard errors of differences of means ***

Table	STRAW	CULTIVTN	STRAW CULTIVTN	
s.e.d.	0.243	0.324	0.561	min.rep
			0.486	max-min
			0.397	max.rep

min.rep STRAW
BURNT only
max-min BURNT v CHOPPED
max.rep CHOPPED only

***** Stratum standard errors and coefficients of variation *****

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	0.561	13.6
GRAIN MEAN DM%	82.8		
PLOT AREA HARVESTED	0.00884		