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88/R/CS/309 and 88/W/CS/309 Long-term Straw Incorporation - W. Wheat

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88/R/CS/309 and 88/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.

Sponsors: R.D. Prew, E.T.G. Bacon, D.G. Christian, M.J. Goss, R.J. Gutteridge, S.H.T. Harper, J.F. Jenkyn, A.E. Johnston, B.R. Kerry, R. Moffitt, W. Powell, A.D. Todd.

Associate sponsor: D.S. Powlson.

The fourth year, w. wheat.

For previous years see 85-87/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, 1987 (R), 21 Sept (W) and burnt 21 Aug (R), 9 Sept (W).
(2) A heavy spring-tine cultivator was used to cultivate to 10 cm depth, on 24 Aug, (R), 2 Oct (W). A chisel plough was used to cultivate to 20 cm depth, on 24 Aug (R) and a deep-tine cultivator to 20 cm on 2 Oct (W).
(3) Ploughed plots were ploughed to 20 cm depth on: 24 Aug (R), 2 Oct (W).

Basal applications:

Great Knott III (R): Manures: 'Nitram' at 120 kg followed by 580 kg. Weedkillers: Tri-allate at 2.2 kg. Paraquat at 0.60 kg ion in 200 l. Isoproturon at 2.1 kg in 200 l. Fluroxypyr at 0.20 kg applied with the prochloraz and carbendazim in 200 l. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg. Tridemorph at 0.25 kg and propiconazole at 0.12 kg in 200 l. Carbendazim at 0.25 kg and maneb at 1.6 kg with propiconazole at 0.12 kg in 200 l.

88/R/CS/309 and 88/W/CS/309

Basal applications:

Far Field I (W): Manures: 'Nitram' at 120 kg followed by 580 kg.
Weedkillers: Glyphosate at 1.1 kg in 200 l, followed by 0.27 kg in 200 l, followed by 1.1 kg in 200 l. Isoproturon at 2.1 kg with mecoprop at 1.6 kg, bromoxynil at 0.20 kg and ioxynil at 0.20 kg in 220 l. Fungicides: Tridemorph at 0.25 kg and propiconazole at 0.12 kg in 220 l.

Seed: Mission, sown at 180 kg (R), 200 kg (W).

Cultivations, etc.:-

Great Knott III (R): Paraquat applied: 29 Sept, 1987. Spring-tine cultivated: 23 Oct. Seed sown, harrowed: 24 Oct. Tri-allate applied: 8 Dec. N applied: 24 Feb, 1988 and 22 Apr. Isoproturon applied: 17 Mar. Fluroxypyr, prochloraz and carbendazim applied: 6 May. Propiconazole and tridemorph applied: 3 June. Carbendazim, maneb and propiconazole applied: 23 June. Combine harvested: 25 Aug.
Far Field I (W): Glyphosate applied: 25 Sept, 1987 and 22 Oct. Heavy spring-tine cultivated: 3 Oct. Spike harrowed with crumbler attached: 29 Oct. Spring-tine cultivated: 7 Dec. Spike harrowed with crumbler attached, seed sown: 9 Dec. N applied: 8 Mar, 1988 and 3 May. Isoproturon, mecoprop, bromoxynil and ioxynil applied: 26 Apr. Fungicide applied: 22 June. Glyphosate applied: 16 Aug. Combine harvested: 25 Aug.

- NOTES:** (1) Establishment counts were made in the autumn and total dry matter was measured 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.

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

GRAIN TONNES/HECTARE

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

CULTIVTN STRAW	TINE 10	TN10PL20	TN10TN20	PLOUGH20	Mean
BURNT	7.37	6.65	7.54	6.73	7.07
CHOPPED	7.70	6.94	7.75	6.90	7.33
Mean	7.59	6.84	7.68	6.85	7.24

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

STRAW	CULTIVTN	STRAW CULTIVTN	
0.111	0.148	0.256	min.rep
		0.221	max-min
		0.181	max.rep

STRAW
min.rep 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	0.362	5.0
GRAIN MEAN DM%	80.6		
PLOT AREA HARVESTED	0.00621		

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

GRAIN TONNES/HECTARE

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

CULTIVTN STRAW	TINE 10	TN10PL20	TN10TN20	PLOUGH20	Mean
BURNT	4.49	3.43	5.33	3.67	4.23
CHOPPED	4.35	3.86	4.33	3.95	4.12
Mean	4.40	3.72	4.66	3.86	4.16

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

STRAW	CULTIVTN	STRAW CULTIVTN	
0.285	0.380	0.657	min.rep
		0.569	max-min
		0.465	max.rep

STRAW
min.rep 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	0.657	15.8
GRAIN MEAN DM%	83.4		
PLOT AREA HARVESTED	0.00884		