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91/R/CS/309 and 91/W/CS/309 Long-term Straw Incorporation - W. Wheat

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91/R/CS/309 and 91/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 seventh year, w. wheat.

For previous years see 85-90/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	Cultivated to 10 cm depth
TN10PL20	Cultivated to 10 cm depth, ploughed to 20 cm
TN10TN20	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 22 Aug, 1990 (R), 6 Aug (W) and burnt, 22 Aug (R), 14 Aug (W).
(2) Discs were used to cultivate TN10PL20 plots to 10 cm depth on 24 Aug (R), and all plots except PLOUGH20 on 13 Aug and 24 Sept (W). TINE 10 plots were cultivated to 10 cm with a rotary grubber on 11 Oct (R only). A chisel plough was used to cultivate to 20 cm depth, on 10 Oct (R) and a deep-tine cultivator to 20 cm on 14 Aug (W).
(3) Ploughed plots were ploughed to 20 cm depth, on 28 Aug (R), 18 Sept (W), and rolled: 29 Aug (R), 21 Sept (W).

Basal applications:

Great Knott III (R): Manures: 'Nitram' at 120 kg, followed by 580 kg. (0:16:36) at 1040 kg. Weedkillers: Glyphosate at 0.27 kg in 200 l. Tri-allate at 2.2 kg. Isoproturon at 1.3 kg and pendimethalin at 1.3 kg in 200 l. Fungicides: Fenpropimorph at 0.38 kg in 200 l. Propiconazole at 0.25 kg in 200 l.

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Basal applications:

Far Field I (W): Manures: Magnesian limestone at 7.5 t. 'Nitram' at 120 kg followed by 580 kg. Weedkillers: Glyphosate at 0.27 kg in 220 l. Tri-allate at 1.7 kg in 220 l. Pendimethalin at 1.3 kg with isoproturon at 1.2 kg applied with the insecticide in 220 l. Fungicides: Fenpropimorph at 0.38 kg in 210 l, and on a second occasion with chlorothalonil at 0.49 kg and flutriafol at 78 g in 300 l. Insecticide: Deltamethrin at 5.0 g.

Seed: Haven, sown at 190 kg (R), 170 kg (W).

Cultivations, etc.:-

Great Knott III (R): Glyphosate applied: 8 Oct, 1990. Discd and rotary harrowed: 11 Oct. Seed sown, harrowed: 12 Oct. Rolled: 15 Oct. Tri-allate applied: 2 Nov. Isoproturon and pendimethalin applied: 15 Nov. N applied: 4 Mar, 1991 and 3 Apr. P and K applied: 12 Apr. Fenpropimorph applied: 24 Apr. Propiconazole applied: 11 June. Combine harvested: 21 Aug.

Far Field I (W): Magnesian limestone applied: 23 Aug, 1990. Glyphosate applied: 11 Sept. Tri-allate applied, rotary harrowed, seed sown: 2 Oct. Remaining weedkillers and insecticide applied: 27 Nov. N applied: 15 Mar, 1991 and 17 Apr. Fenpropimorph applied: 24 Apr. Fenpropimorph, chlorothalonil and flutriafol applied: 20 June. Combine harvested: 25 Aug.

- NOTES:**
- (1) Establishment counts were made in autumn and shoot numbers and total dry matter were measured in spring.
 - (2) Pests and fungal diseases were measured at intervals during the season.
 - (3) Components of yield were measured and numbers of volunteer ears counted.

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

GRAIN TONNES/HECTARE

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

CULTIVTN	TINE 10	TN10PL20	TN10TN20	PLOUGH20	Mean
STRAW					
BURNT	8.80	8.32	8.56	8.38	8.52
CHOPPED	7.15	8.52	8.73	8.65	8.26
Mean	7.70	8.46	8.67	8.56	8.35

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

STRAW	CULTIVTN	STRAW CULTIVTN	
		0.578	min.rep
0.250	0.334	0.501	max-min
		0.409	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	0.818	9.8
GRAIN MEAN DM%	88.7		
PLOT AREA HARVESTED	0.00621		

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

GRAIN TONNES/HECTARE

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

CULTIVTN STRAW	TINE 10	TN10PL20	TN10TN20	PLOUGH20	Mean
BURNT	8.67	8.59	9.16	9.30	8.93
CHOPPED	7.76	8.29	7.82	8.72	8.15
Mean	8.07	8.39	8.27	8.91	8.41

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

STRAW	CULTIVTN	STRAW CULTIVTN	
0.229	0.305	0.529	min.rep
		0.458	max-min
		0.374	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	0.529	6.3
GRAIN MEAN DM%	85.1		
PLOT AREA HARVESTED	0.00609		