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92/W/CS/357 Cover Crops - W. Barley

Rothamsted Research

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92/W/CS/357

COVER CROPS

Object: To compare a range of cover crops for their ability to take up nitrogen during the autumn, to measure rates of mineralization of nitrogen after incorporating them in spring and to measure their effects on the yield of a subsequent spring barley crop in the first year and a winter barley crop in the second year - Woburn, Lansome III.

Sponsors: D.G. Christian, D.S. Powlson.

The second year, w. barley.

For first year see 91/W/CS/357.

Design: 3 randomised blocks of 15 plots split into 2 sub plots.

Whole plot dimensions: 6.0 x 25.0.

Treatments: All combinations of:-

Whole plots

1. **CROP RES** Cover crops, sown 1990, re-sown to s. barley 1991:

FO RA SB	Forage rape
PH TA SB	Phacelia tanacetifolia
RY GR SB	Perennial ryegrass
RYE SB	Rye
WH MU SB	White mustard
WM+RY SB	White mustard + rye

2. **CC SOWDT** Sowing dates of cover crops:

24 AUG	24 August, 1990
24 SEPT	24 September

Sub plots

3. **N RES** Nitrogen fertilizer (kg N) in 1991:

(0)
(50)

plus three extra treatments:

1. **EXTRA**

CULT FAL	Cultivated fallow sown to s. barley in 1991
TUMBDOWN	Tumbledown fallow, no weed control until sown to s. barley in 1991
W BARLEY	W. barley sown in 1990, taken to maturity in 1991

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Sub plots

2. **N EXTRA** Nitrogen fertilizer, (kg N) in 1991:

(0)
(APPLIED) 50 (CULT FAL and TUMBDOWN) or 100 (W BARLEY)

Experimental diary:

11-Sep-91 : B : Ploughed and rolled.
 25-Sep-91 : B : Rotary cultivated, Puffin drilled at 120 kg. Rolled.
 31-Jan-92 : B : Stomp 400 at 2.5 l and Stefes IPU at 1.0 l in 200 l.
 10-Mar-92 : B : 34.5% N at 116 kg.
 01-Apr-92 : B : Bayleton at 0.50 kg and Ringer at 0.35 l in 200 l.
 02-Apr-92 : B : 34.5% N at 348 kg.
 03-May-92 : B : Bayleton at 0.50 kg and Ringer at 0.50 kg in 300 l.
 24-Jul-92 : B : Combine harvested.

GRAIN TONNES/HECTARE

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

CC SOWDT	24 AUG	24 SEPT	Mean
CROP RES			
FO RA SB	5.32	5.47	5.39
PH TA SB	6.00	5.12	5.56
RY GR SB	5.74	5.65	5.70
RYE SB	5.40	6.20	5.80
WH MU SB	5.36	5.92	5.64
WM+RY SB	6.05	6.11	6.08

Mean 5.65 5.75 5.70

N RES	(0)	(50)	Mean
CROP RES			
FO RA SB	5.51	5.28	5.39
PH TA SB	5.50	5.61	5.56
RY GR SB	5.92	5.48	5.70
RYE SB	6.02	5.59	5.80
WH MU SB	5.53	5.75	5.64
WM+RY SB	6.30	5.86	6.08

Mean 5.80 5.60 5.70

N RES	(0)	(50)	Mean
CC SOWDT			
24 AUG	5.69	5.60	5.65
24 SEPT	5.90	5.59	5.75
Mean	5.80	5.60	5.70

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GRAIN TONNES/HECTARE

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

CROP RES	CC SOWDT	N RES (0)	(50)
FO RA SB	24 AUG	5.31	5.34
	24 SEPT	5.71	5.22
PH TA SB	24 AUG	5.96	6.04
	24 SEPT	5.04	5.19
RY GR SB	24 AUG	5.74	5.74
	24 SEPT	6.09	5.21
RYE SB	24 AUG	5.69	5.11
	24 SEPT	6.35	6.06
WH MU SB	24 AUG	5.19	5.53
	24 SEPT	5.87	5.98
WM+RY SB	24 AUG	6.26	5.84
	24 SEPT	6.35	5.88

N EXTRA	(0)	(APPLIED)	Mean
EXTRA			
CULT FAL	5.21	5.31	5.26
TUMBDOWN	6.02	5.65	5.84
Mean	5.61	5.48	5.55

GRAND MEAN 5.68

WINTER BARLEY

N EXTRA	(0)	(APPLIED)	Mean
	5.80	5.30	5.55

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

CROP RES	CC SOWDT	N RES	CROP RES CC SOWDT
0.347	0.200	0.083	0.491
CROP RES N RES	CC SOWDT N RES	CROP RES CC SOWDT N RES	N EXTRA
0.376	0.217	0.531	0.203
Except when comparing means with the same level(s) of			
CROP RES	0.203		
CC SOWDT		0.117	
CROP RES.CC SOWDT			0.288

EXTRA	N EXTRA EXTRA
0.491	0.531
Except when comparing means with the same level(s) of	
EXTRA	0.288

NOTE: Do not use SED for comparisons involving Winter Barley means.

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GRAIN TONNES/HECTARE

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	26	0.601	10.6
BLOCK.WP.SP	28	0.352	6.2

GRAIN MEAN DM% 88.3

STRAW TONNES/HECTARE

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

CC SOWDT	24 AUG	24 SEPT	Mean
CROP RES			
FO RA SB	2.32	2.51	2.42
PH TA SB	2.97	2.06	2.51
RY GR SB	2.20	2.43	2.31
RYE SB	2.57	2.72	2.65
WH MU SB	2.10	2.76	2.43
WM+RY SB	2.50	2.87	2.68

Mean 2.44 2.56 2.50

N RES	(0)	(50)	Mean
CROP RES			
FO RA SB	2.51	2.32	2.42
PH TA SB	2.38	2.64	2.51
RY GR SB	2.49	2.13	2.31
RYE SB	2.50	2.79	2.65
WH MU SB	2.49	2.37	2.43
WM+RY SB	2.73	2.64	2.68

Mean 2.52 2.48 2.50

N RES	(0)	(50)	Mean
CC SOWDT			
24 AUG	2.45	2.43	2.44
24 SEPT	2.58	2.53	2.56
Mean	2.52	2.48	2.50

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STRAW TONNES/HECTARE

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

	N RES	(0)	(50)
CROP RES	CC SOWDT		
FO RA SB	24 AUG	2.61	2.04
	24 SEPT	2.42	2.60
PH TA SB	24 AUG	2.85	3.08
	24 SEPT	1.92	2.20
RY GR SB	24 AUG	2.09	2.31
	24 SEPT	2.89	1.96
RYE SB	24 AUG	2.55	2.59
	24 SEPT	2.45	3.00
WH MU SB	24 AUG	2.17	2.02
	24 SEPT	2.81	2.71
WM+RY SB	24 AUG	2.44	2.56
	24 SEPT	3.01	2.72

N EXTRA	(0)	(APPLIED)	Mean
EXTRA			
CULT FAL	2.44	2.70	2.57
TUMBDOWN	2.99	2.77	2.88
Mean	2.72	2.74	2.73

GRAND MEAN 2.53

WINTER BARLEY

N EXTRA	(0)	(APPLIED)	Mean
	2.54	2.00	2.27

STRAW MEAN DM% 93.6

PLOT AREA HARVESTED 0.00264