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93/W/CS/386 Cover Crops and Nitrogen - Forage Rape, Phacelia, Ryegrass, Rye, White Mustard, Tumbledown, W. Wheat, S. Wheat

Rothamsted Research

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93/W/CS/386

COVER CROPS AND NITROGEN

Object: To assess how effectively cover crops take up nitrogen and to assess how much of that nitrogen is subsequently available to the following crop - Woburn, Stackyard A I.

Sponsors: D.G. Christian, A.J. Macdonald, P.R. Poulton.

The first year, w. and s. barley, forage rape, phacelia, ryegrass, rye, white mustard.

Design: 3 blocks of 9 plots split into 2 sub plots.

Plot dimensions: 9.0 x 12.0.

Treatments: All combinations of:-

Whole plots

LANDTRT	Cover crops, sown in autumn, tumbledown and fallow. All plots ploughed in spring and sown to s. barley.
FALLOWSB	Fallow
FO RA SB	Forage rape
PHACL SB	Phacelia
RYGRS SB	Ryegrass
RYE SB	Rye
RY+MU SB	Rye and white mustard
TUMDN SB	Tumbledown
MUSTD SB	White mustard

Sub plots

2. **N** Nitrogen fertilizer (kg N) to s. barley:

0
75

plus one extra treatment

Whole plots

1. **EXTRA**

W BARLEY W. barley sown in autumn, taken to maturity

Sub plots

2. **N EXTRA** Nitrogen fertilizer (kg N) to w. barley:

0
150

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NOTE: The tumbledown fallow was given 50 kg of seed from the previous w. wheat crop to ensure volunteers.

Experimental diary:

19-Aug-92 : T : LANDTRT FO RA SB, PHACL SB, RYGRS SB, RYE SB, RY+MU SB,
TUMDN SB: Cultivated twice to 5 cm with Bomford
Dynadrive.
: T : LANDTRT FO RA SB: Ember broadcast at 30 kg.
: T : LANDTRT RYGRS SB: Perennial ryegrass broadcast at 25 kg.
: T : LANDTRT PHACL SB: Phacelia broadcast at 30 kg.
: T : LANDTRT RY+MU SB: Rye broadcast at 90 kg and w. mustard
broadcast at 15 kg.
: T : LANDTRT RYE SB: Amando broadcast at 180 kg.
: T : LANDTRT TUMDN SB: Beaver broadcast at 50 kg.
: T : LANDTRT MUSTD SB: White mustard broadcast at 30 kg.
14-Sep-92 : T : LANDTRT FALLOWSB: Ploughed.
: T : EXTRA W BARLEY: Ploughed.
: T : LANDTRT FALLOWSB: Rotary harrowed.
16-Sep-92 : T : EXTRA W BARLEY: Rotary harrowed, Puffin, dressed Cerevax
Extra, drilled at 340 seeds per square metre.
10-Mar-93 : T : LANDTRT: All plots ploughed, rolled.
12-Mar-93 : T : LANDTRT: All plots rotary harrowed, Alexis, dressed
Cerevax Extra, drilled at 350 seeds per square metre.
06-Apr-93 : T : N EXTRA 150: 27.5% N applied at 545 kg.
08-Apr-93 : T : N: 75: 27.5% N applied at 273 kg.
22-Jun-93 : T : LANDTRT: All plots sprayed Dorin at 1.0 l in 200 l.
16-Aug-93 : B : Combine harvested.

Previous crops: Grass 1991, w. wheat 1992.

- NOTES:**
- (1) In November and March crop samples were taken to measure plant populations, dry weights and nitrogen content. At harvest ear numbers and thousand grain weights were assessed.
 - (2) In autumn, winter and spring soil and soil water samples were taken for N analysis.
 - (3) EXTRA W BARLEY plots were not harvested.

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GRAIN TONNES/HECTARE

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

	N	0	75	Mean
LANDTRT				
FALLOWSB		3.36	4.55	3.96
FO RA SB		3.08	4.26	3.67
PHACL SB		3.90	5.30	4.60
RYGRS SB		3.17	5.02	4.09
RYE SB		2.86	5.28	4.07
RY+MU SB		1.53	5.11	3.32
TUMDN SB		2.47	4.84	3.66
MUSTD SB		3.26	4.62	3.94
Mean		2.95	4.87	3.91

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

	LANDTRT	N	LANDTRT
	0.384	0.156	0.495
Except when comparing means with the same level(s) of			
LANDTRT			0.442

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	14	0.470	12.0
BLOCK.WP.SP	16	0.541	13.8

GRAIN MEAN DM% 85.6

SUB PLOT AREA HARVESTED 0.00082