

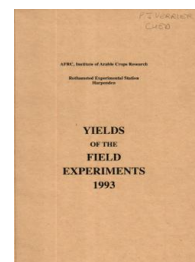
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93/W/CS/347 Green Crops for Set-aside - Ryegrass, Clover, Tumbledown, W. Wheat, S. Wheat

Rothamsted Research

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93/W/CS/347

GREEN CROPS FOR SET-ASIDE

Object: To obtain information on the establishment and maintenance of sown crops and unsown vegetation in three-year and five-year set-aside. Effects on soil nitrate and leaching after ploughing are also studied - Woburn, Horsepool Lane Close II.

Sponsors: R.D. Prew, E.T.G. Bacon, M.V. Hewitt, D.P. Yeoman.

Design: Treatment phase: 3 randomised blocks of 6 plots.
Test phase: 3 randomised blocks of 6 plots split into 2 x 2 criss-cross.

Whole plot dimensions: 6.5 x 26.0.

The fourth year, ryegrass, clover, tumbledown, w. and s. wheat.

For previous years see 90-92/W/CS/347.

Treatments:

Treatment phase

Whole plots

CROPS	Crops, cumulative since 1990:
RY LF	Ryegrass, cuttings left in situ
RY+CL LF	Ryegrass + clover, cuttings left in situ
RY+CL RE	Ryegrass + clover, cuttings removed
RY+N RE	Ryegrass given 100 kg N in spring, cuttings removed
TU LF	Tumbledown, natural regrowth, cuttings left in situ
ARABLE	W. wheat, in arable sequence w. wheat, w. wheat, w. oats, w. wheat

Test phase (1st year w. and s. wheat):

Whole plots (criss-cross)

1. **PREVCROP** Crops, cumulative 1990 to 1992 (as **CROPS**):

RY LF
RY+CL LF
RY+CL RE
RY+N RE
TU LF
ARABLE

2. **N** Nitrogen in spring:

NO	None
N OPT	Optimum

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split

3. WHEAT Time of ploughing and drilling:

W	Winter
S	Spring

NOTES: (1) In 1993 three blocks were sown to winter- or spring-sown wheat and split to test for nitrogen. Remaining three blocks continued in treatment crops.
 (2) Yields were taken from the w. and s. wheat and from the ley plots, from which cuttings were removed.
 (3) Ryegrass and clover were sown in autumn 1989.

Experimental diary:

Treatment phase:

14-Oct-92 : T : CROPS ARABLE: Ploughed, rotary harrowed twice.
 05-Nov-92 : T : CROPS ARABLE: Mercia, dressed Cerevax, broadcast by hand at 500 seeds per square metre.
 05-Mar-93 : T : CROPS ARABLE: Rotary cultivated (w. wheat failed).
 : T : CROPS RY LF, RY+CL LF, RY+CL RE, RY+N RE: Chain harrowed.
 08-Mar-93 : T : CROPS ARABLE: Rotary harrowed, Cadenza, dressed Cerevax Extra, drilled at 500 seeds per square metre.
 10-Mar-93 : T : CROPS ARABLE: Rolled.
 18-Mar-93 : T : CROPS RY+N RE: 27% N applied at 370 kg.
 : T : CROPS ARABLE: 27% N applied at 148 kg.
 19-Mar-93 : T : CROPS RY+CL RE: Triple superphosphate at 75 kg and muriate of potash at 282 kg.
 : T : CROPS RY+N RE: Triple superphosphate at 79 kg and muriate of potash at 317 kg.
 14-Apr-93 : T : CROPS ARABLE: 34.5% N at 464 kg.
 26-May-93 : T : CROPS RY LF, RY+L LF, RY+CL RE, RY+N RE, TU LF: Cut.
 02-Jun-93 : T : CROPS RY+CL RE, RY+N RE: Cuttings removed.
 30-Jun-93 : T : CROPS RY LF, RY+CL LF, RY+CL RE, RY+N RE, TU LF: Cut.
 01-Jul-93 : T : CROPS RY+CL RE, RY+N RE: Cuttings removed.
 27-Aug-93 : T : CROPS ARABLE: Combine harvested.
 22-Sep-93 : T : CROPS RY LF, RY+CL LF, TU LF: Cut.
 : T : CROPS RY+CL RE, RY+N RE: Cut and removed.

Test Phase:

17-Sep-92 : T : WHEAT W: Ploughed.
 14-Oct-92 : T : WHEAT W: Rotary harrowed twice.
 16-Oct-92 : T : WHEAT W: Cadenza, dressed Cerevax Extra, drilled at 400 seeds per square metre.
 17-Oct-92 : T : WHEAT W: Club at 5.5 kg.
 05-Mar-93 : T : WHEAT S: Ploughed.
 08-Mar-93 : T : WHEAT S: Rotary harrowed, Cadenza, dressed Cerevax Extra, drilled at 500 seeds per square metre, harrowed.
 10-Mar-93 : T : WHEAT W, S: Rolled.
 17-Mar-93 : T : WHEAT W, S: N OPT: 27% N broadcast by hand at 148 kg.
 29-Mar-93 : T : WHEAT S: N N OPT: PREVCROP: RY LF, RY+CL LF, RY+CL RE, RY+N RE, TU LF, ARABLE: 27% N broadcast by hand at 389, 222, 352, 444, 444, 333 kg respectively.

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Experimental diary:

Test Phase:

14-Apr-93 : T : **WHEAT** W: N N OPT: **PREVCROP**: RY LF, RY+CL LF, RY+CL RE, RY+N RE, TU LF, ARABLE: 27% N broadcast by hand at 537, 370, 500, 593, 593, 481 kg respectively.
 18-May-93 : T : **WHEAT** W: Cheetah R at 3.0 l, Halo at 2.0 l and Mistral at 0.25 l in 200 l.
 27-Aug-93 : T : **WHEAT** W, S: Combine harvested.

NOTES: (1) Soil nitrogen was measured in autumn 1992 and spring 1993. Ground cover, plant numbers, plant height and growth stages were estimated in spring and autumn 1993.
 (2) Samples were taken in spring and summer to assess foot and root rots.

TREATMENT PHASE

GRASS

1ST CUT (26/5/93) DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	3.24	4.09	3.67

1ST CUT MEAN DM% 19.2

2ND CUT (30/6/93) DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	1.30	0.46	0.88

2ND CUT MEAN DM% 26.7

3RD CUT (22/9/93) DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	2.65	1.03	1.84

3RD CUT MEAN DM% 20.9

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GRASS

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	7.19	5.58	6.39

TOTAL OF 3 CUTS MEAN DM% 22.3

PLOT AREA HARVESTED 0.00264

W. WHEAT

GRAIN TONNES/HECTARE 6.36

GRAIN MEAN DM% 83.1

PLOT AREA HARVESTED 0.00572

TEST PHASE

GRAIN TONNES/HECTARE

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

N	NO	N OPT	Mean
PREVCROP			
RY LF	2.05	4.32	3.18
RY+CL LF	3.48	5.48	4.48
RY+CL RE	3.41	6.02	4.72
RY+N RE	2.54	5.62	4.08
TU LF	2.38	5.74	4.06
ARABLE	2.73	3.54	3.14
Mean	2.77	5.12	3.94

WHEAT	W	S	Mean
PREVCROP			
RY LF	3.81	2.56	3.18
RY+CL LF	4.69	4.28	4.48
RY+CL RE	5.51	3.93	4.72
RY+N RE	4.29	3.87	4.08
TU LF	4.30	3.82	4.06
ARABLE	3.45	2.83	3.14
Mean	4.34	3.55	3.94

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GRAIN TONNES/HECTARE

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

	WHEAT	W	S	Mean
	N			
	NO	2.52	3.01	2.77
	N OPT	6.16	4.08	5.12
	Mean	4.34	3.55	3.94

	WHEAT	W	S	
PREVCROP	N	NO	N OPT	NO N OPT
RY LF		2.01	5.61	2.08 3.03
RY+CL LF		2.92	6.45	4.04 4.51
RY+CL RE		3.64	7.38	3.19 4.67
RY+N RE		1.99	6.58	3.08 4.65
TU LF		2.13	6.47	2.62 5.01
ARABLE		2.44	4.45	3.03 2.62

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

PREVCROP	WHEAT	PREVCROP
		WHEAT
	0.564	0.144 0.617
Except when comparing means with the same level(s) of		
PREVCROP		0.353

PREVCROP*	WHEAT*	PREVCROP*
		WHEAT
	N	N
	0.743	0.188 0.811
Except when comparing means with the same level(s) of		
PREVCROP	0.740	0.820
WHEAT		0.415
PREVCROP.WHEAT		0.797
PREVCROP.N		0.461

* Within the same level of N only

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP1	10	0.691	17.5
BLOCK.WP1.SP	12	0.432	11.0
BLOCK.WP1.WP2	10	0.837	21.2
BLOCK.WP1.SP.WP2	12	0.513	13.0

GRAIN MEAN DM% 83.2

SUB PLOT AREA HARVESTED 0.00220