ROTHAMSTED RESEARCH

Yields of the Field Experiments 1993

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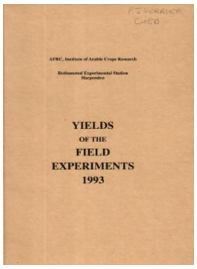

Crop Sequences

Rothamsted Research

Rothamsted Research (1994) *Crop Sequences ;* Yields Of The Field Experiments 1993, pp 53 - 106 **- DOI: https://doi.org/10.23637/ERADOC-1-48**

93/R/CS/10 and 93/W/CS/10

LONG TERM LIMING

Object: To study the effects of different amounts of lime, phosphate and sulphur on the yields and compositions of a sequence of crops - Rothamsted (R) Sawyers I and Woburn (W) Stackyard C.

Sponsors: S.P. McGrath, P.B. Barraclough, G.F.J. Milford, J.M. Day.

The 32nd year, w. lupins.

For previous years see 'Details' 1967, 1973 and 74-92/R&W/CS/10.

Design: 2 randomised blocks of 16 plots split into 2 sub plots.

Whole plot dimensions: 5.8 x 16.1 (R), 5.6 x 16.1 (W).

Treatments: All combinations of:-

Whole plots

1. **CHALK** Residual effects of ground chalk (tonnes CaCO3) (total applied 1962-87):

		Rothamsted total		Woburn total	
R	W	1962-78	1982-87	1962-78	1982-87
0	0	0	0	0	0
15	9	7	8	6	3
24.5	25.5	15	9.5	14	11.5
52.5	45.5	30	22.5	23	22.5

2. **P** Residual effects of P fertilizer applied:

	Until 1978	1981	1982	1983		1988	
	R & W	R & W	R & W	R	W	R	W
0	0	0	0	0	0	0	0
P1	0	P1	P1	0	P2	P1	P1
P2	P	P1	0	P2	P2	P1	P1
P3	P	P3	P1	P2	P4	P3	P3

Rates 1981-83 and 1988 P1, P2, P3, P4 = 25, 50, 75, 100 kg P as superphosphate

Sub plots

3. **SULPHUR** Sulphur (kg S, as calcium sulphate):

0
30

NOTES: (1) Until 1978 test P was applied cumulatively, rates varied with crop, none in 1979 and 1980. K was also applied cumulatively, to P1 and P3 plots. Since 1981 K has been applied basally (none in 1986, 1987, 1989, 1990 and 1993).
(2) Test manganese was applied cumulatively, 1987-90.

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/10 and 93/W/CS/10

Experimental diary:

Sawyers I (R):

29-Sep-92 : B : Ploughed.
07-Oct-92 : B : Rotary harrowed, CH 304/70, inoculated with rhizobium, drilled at 100 kg.
13-Oct-92 : B : Opogard 500 FW at 2.8 l in 200 l.
16-Apr-93 : **T** : **SULPHUR** 30: 30 kg S as gypsum.
22-Jun-93 : B : Power Dimethoate 40 at 1.7 l in 200 l.
02-Jul-93 : B : Mistral at 1.0 l in 200 l.
: B : Sportak 45 at 1.1 l in 200 l.
06-Sep-93 : B : Stefes Diquat at 3.0 l with Vassgro Spreader at 0.30 l in 260 l.
10-Oct-93 : B : Combine harvested.

Stackyard C (W):

02-Oct-92 : B : Rotary harrowed, CH 304/70, inoculated with rhizobium, drilled at 100 kg.
12-Oct-92 : B : Opogard 500 FW at 1.8 l and Scythe at 3.0 l in 200 l.
22-Mar-93 : B : Ploughed (crop failed).
08-Jul-93 : B : Rotary cultivated.

NOTES: (1) At Rothamsted plant samples were taken in early June from transects across plots for a detailed study of the relation between soil pH gradient and plant growth. Harvested grain samples were taken for sulphur analysis.
(2) At Woburn the crop failed and no yields were taken.
(3) At Rothamsted, most **CHALK** 0 plots failed. They have been omitted from the analysis.

93/R/CS/10 SAWYERS I (R)

GRAIN TONNES/HECTARE

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

P	0	P1	P2	P3	Mean
CHALK					
15	2.34	2.24	1.95	1.75	2.07
24.5	1.82	1.13	1.67	1.46	1.52
52.5	1.25	1.49	1.26	1.32	1.33
Mean	1.80	1.62	1.63	1.51	1.64

SULPHUR	0	30	Mean
CHALK			
15	1.90	2.23	2.07
24.5	1.44	1.60	1.52
52.5	1.19	1.47	1.33
Mean	1.51	1.77	1.64

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/10 SAWYERS I (R)

GRAIN TONNES/HECTARE

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

SULPHUR	0	30	Mean
P			
O	1.63	1.97	1.80
P1	1.58	1.65	1.62
P2	1.40	1.86	1.63
P3	1.44	1.58	1.51
Mean	1.51	1.77	1.64

CHALK	P	SULPHUR	0	30
15	O		2.12	2.55
	P1		2.17	2.30
	P2		1.67	2.23
	P3		1.64	1.85
24.5	O		1.62	2.03
	P1		1.16	1.09
	P2		1.56	1.78
	P3		1.42	1.50
52.5	O		1.15	1.34
	P1		1.40	1.57
	P2		0.96	1.57
	P3		1.25	1.39

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

CHALK	P	SULPHUR	CHALK P
0.161	0.186	0.091	0.323

CHALK SULPHUR	P SULPHUR	CHALK P SULPHUR
0.196	0.226	0.392

Except when comparing means with the same level(s) of

CHALK	0.157
P	0.181
CHALK.P	0.314

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	11	0.323	19.7
BLOCK.WP.SP	12	0.314	19.2

GRAIN MEAN DM% 70.3

SUB PLOT AREA HARVESTED 0.00149

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/140

CHEMICAL REFERENCE PLOTS

Object: To study the persistence in soil of agricultural chemicals applied annually, singly and in combination, and their effects on soil microflora and on yield of continuous s. barley - Long Hoos V 3.

Sponsors: R.H. Bromilow, A.A. Evans, P.H. Nicholls.

The 20th year, s. barley.

For previous years see 74-92/R/CS/140.

Design: Single replicate of 32 plots.

Whole plot dimensions: 4.06 x 4.57.

Treatments, applied cumulatively every year except as stated:

All combinations of:-

1. **WEEDKLLR** — Weedkiller in autumn:

NONE	None
GLYPHOS	Glyphosate at 1.4 kg to barley stubble each autumn from 1979 to 1984, at 0.72 kg in 1985, at 0.54 kg in 1986, at 1.3 kg in 1987 and at 1.5 kg in 1988 to 1992.

2. **FUNGCIDE[1]** — Fungicide in autumn:

NONE	None
TRIADIM	Triadimefon at 0.25 kg in autumn 1981, 1982, 1984 to 1992, 0.28 kg in autumn 1983

3. **FUNGCIDE[2]** — Fungicide in spring:

NONE	None
BENOMYL	Benomyl at 4 kg to the seedbed

4. **INSCTCDE** — Insecticide:

NONE	None
CHLORFEN	Chlorfenvinphos at 2 kg to the seedbed

5. **NEMACIDE** — Nematicide:

NONE	None
ALDICARB	Aldicarb at 6 kg to the seedbed

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/140

Experimental diary:

28-Sep-92 : **T** : **WEEDKLLR** GLYPHOS: Glyphosate at 1.5 kg in 220 l.
: **T** : **FUNGCIDE[1]** TRIADIM: Triadimefon at 0.25 kg in 220 l.
08-Oct-92 : B : PK as (0:18:36) at 1390 kg.
21-Jan-93 : B : Ploughed.
08-Mar-93 : B : 34.5% N at 440 kg.
: B : Spring-tine cultivated.
09-Mar-93 : **T** : **FUNGCIDE[2]** BENOMYL: Benomyl at 4.0 kg in 5000 l, applied by watering can.
: **T** : **INSCTCDE** CHLORFEN: Chlorfenvinphos at 2.0 kg as granules, applied by hand.
: **T** : **NEMACIDE** ALDICARB: Aldicarb at 6.0 kg as granules, applied by hand.
11-Mar-93 : B : Heavy spring-tine cultivated, rotary harrowed twice, Alexis, undressed, drilled at 400 seeds per square metre.
28-May-93 : B : Ally at 30 g and Starane 2 at 0.50 l in 200 l.
13-Aug-93 : B : Combine harvested.

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/140

GRAIN TONNES/HECTARE

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

FUNGCIDE[1]	NONE	TRIADIM	Mean
WEEDKLLR			
NONE	3.99	4.17	4.08
GLYPHOS	4.31	4.32	4.31
Mean	4.15	4.24	4.20

FUNGCIDE[2]	NONE	BENOMYL	Mean
WEEDKLLR			
NONE	3.94	4.23	4.08
GLYPHOS	4.35	4.28	4.31
Mean	4.14	4.25	4.20

FUNGCIDE[2]	NONE	BENOMYL	Mean
FUNGCIDE[1]			
NONE	4.16	4.15	4.15
TRIADIM	4.13	4.36	4.24
Mean	4.14	4.25	4.20

INSCTCDE	NONE	CHLORFEN	Mean
WEEDKLLR			
NONE	4.07	4.10	4.08
GLYPHOS	4.31	4.32	4.31
Mean	4.19	4.21	4.20

INSCTCDE	NONE	CHLORFEN	Mean
FUNGCIDE[1]			
NONE	4.21	4.10	4.15
TRIADIM	4.17	4.32	4.24
Mean	4.19	4.21	4.20

INSCTCDE	NONE	CHLORFEN	Mean
FUNGCIDE[2]			
NONE	4.07	4.22	4.14
BENOMYL	4.31	4.19	4.25
Mean	4.19	4.21	4.20

NEMACIDE	NONE	ALDICARB	Mean
WEEDKLLR			
NONE	4.22	3.94	4.08
GLYPHOS	4.53	4.10	4.31
Mean	4.38	4.02	4.20

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93/R/CS/140

GRAIN TONNES/HECTARE

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

NEMACIDE	NONE	ALDICARB	Mean
FUNGCIDE[1]			
NONE	4.30	4.01	4.15
TRIADIM	4.46	4.03	4.24
Mean	4.38	4.02	4.20

NEMACIDE	NONE	ALDICARB	Mean
FUNGCIDE[2]			
NONE	4.39	3.90	4.14
BENOMYL	4.37	4.14	4.25
Mean	4.38	4.02	4.20

NEMACIDE	NONE	ALDICARB	Mean
INSCTCDE			
NONE	4.33	4.05	4.19
CHLORFEN	4.42	3.99	4.21
Mean	4.38	4.02	4.20

	FUNGCIDE[1]	NONE		TRIADIM	
WEEDKLLR	**FUNGCIDE[2]**	NONE	BENOMYL	NONE	BENOMYL
NONE		3.92	4.06	3.95	4.39
GLYPHOS		4.39	4.24	4.31	4.32

	FUNGCIDE[1]	NONE		TRIADIM	
WEEDKLLR	**INSCTCDE**	NONE	CHLORFEN	NONE	CHLORFEN
NONE		4.00	3.99	4.14	4.20
GLYPHOS		4.42	4.21	4.20	4.43

	FUNGCIDE[2]	NONE		BENOMYL	
WEEDKLLR	**INSCTCDE**	NONE	CHLORFEN	NONE	CHLORFEN
NONE		3.86	4.02	4.28	4.17
GLYPHOS		4.28	4.42	4.35	4.21

	FUNGCIDE[2]	NONE		BENOMYL	
FUNGCIDE[1]	**INSCTCDE**	NONE	CHLORFEN	NONE	CHLORFEN
NONE		4.10	4.21	4.31	3.99
TRIADIM		4.03	4.23	4.32	4.40

	FUNGCIDE[1]	NONE		TRIADIM	
WEEDKLLR	**NEMACIDE**	NONE	ALDICARB	NONE	ALDICARB
NONE		4.02	3.96	4.42	3.92
GLYPHOS		4.57	4.06	4.50	4.13

	FUNGCIDE[2]	NONE		BENOMYL	
WEEDKLLR	**NEMACIDE**	NONE	ALDICARB	NONE	ALDICARB
NONE		4.10	3.78	4.35	4.11
GLYPHOS		4.68	4.02	4.39	4.17

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93/R/CS/140

GRAIN TONNES/HECTARE

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

FUNGCIDE[2]	NONE		BENOMYL	
FUNGCIDE[1] NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
NONE	4.35	3.96	4.24	4.06
TRIADIM	4.43	3.84	4.49	4.22

INSCTCDE	NONE		CHLORFEN	
WEEDKLLR NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
NONE	4.14	4.00	4.31	3.88
GLYPHOS	4.53	4.09	4.53	4.10

INSCTCDE	NONE		CHLORFEN	
FUNGCIDE[1] NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
NONE	4.39	4.03	4.20	3.99
TRIADIM	4.28	4.07	4.64	3.99

INSCTCDE	NONE		CHLORFEN	
FUNGCIDE[2] NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
NONE	4.29	3.85	4.49	3.95
BENOMYL	4.38	4.25	4.35	4.03

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

Margins of two factor tables	0.073
Two factor tables	0.104
Three factor tables	0.146

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

Stratum	d.f.	s.e.	cv%
WP	6	0.207	4.9

GRAIN MEAN DM% 85.8

PLOT AREA HARVESTED 0.00069

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93/R/CS/302

EYESPOT RESISTANCE TO MBC

Object: To study the development of resistance to MBC fungicides in eyespot and the ability of resistant strains to survive, spread and infect - Meadow.

Sponsor: G.L. Bateman.

The ninth year, w. wheat.

For previous years see 85-92/R/CS/302.

Design: 2 randomised blocks of 4 plots split into 6 sub plots.

Whole plot dimensions: 12.0 x 24.0.

Treatments: All combinations of:-

Whole plots

1.	**FUNGCIDE**	Fungicides applied cumulatively 1985-93:
	NONE	None
	CARB	Carbendazim at 0.25 kg
	PRO	Prochloraz at 0.40 kg from 1985 to 1992, 0.50 kg in 1993
	CARB+PRO	Carbendazim at 0.25 kg + prochloraz at 0.40 kg from 1985 to 1992, 0.50 kg in 1993

Sub plots

2.	**EYE INOC**	Eyespot inoculum, applied in first year only:
	NATURAL	Natural background population (duplicated)
	W 19R 1S	Inoculated with wheat strains in proportion 19 resistant to one sensitive
	W 1R 19S	As above but one resistant to 19 sensitive
	R 19R 1S	Inoculated with rye strains, 19 resistant to one sensitive
	R 1R 19S	As above but one resistant to 19 sensitive

NOTE: The eyespot inoculum was colonised on oat seed and this was broadcast in October, 1984.

Experimental diary:

13-Aug-92 : B : Deep-tine cultivated with vibrating tines 60 cm apart and 45 cm deep.
08-Sep-92 : B : Ploughed, furrow pressed.
29-Sep-92 : B : Rotary harrowed, Mercia, dressed Cerevax, drilled at 380 seeds per square metre.
08-Dec-92 : **T** : **FUNGCIDE** CARB: Tripart Defensor FL at 0.50 l in 200 l.
: **T** : **FUNGCIDE** PRO: Sportak 45 at 1.1 l in 200 l.
: **T** : **FUNGCIDE** CARB+PRO: Tripart Defensor FL at 0.50 l and Sportak 45 at 1.1 l in 200 l.

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/302

Experimental diary:

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   10-Feb-93 : B : Panther at 2.0 l in 200 l.
   08-Mar-93 : B : 34.5% N at 120 kg.
   15-Apr-93 : T : FUNGICIDE CARB: Tripart Defensor FL at 0.50 l in 200 l.
             : T : FUNGICIDE PRO: Sportak 45 at 1.1 l in 200 l.
             : T : FUNGICIDE CARB+PRO: Tripart Defensor FL at 0.50 l and
                   Sportak 45 at 1.1 l in 200 l.
   21-Apr-93 : B : 34.5% N at 370 kg.
   13-May-93 : B : 34.5% N at 120 kg.
   18-May-93 : B : Starane 2 at 0.50 l with Codacide Oil at 2.5 l in 200 l.
   25-May-93 : B : Commando at 3.0 l in 70 l.
   16-Aug-93 : B : Combine harvested.
```

NOTE: Eyespot and sharp eyespot were assessed on plants sampled in early July. Isolates of the eyespot fungus were identified by type (W and R) and assessed for resistance to carbendazim.

GRAIN TONNES/HECTARE

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

EYE INOC / **FUNGICIDE**	NATURAL	W 19R 1S	W 1R 19S	R 19R 1S	R 1R 19S	Mean
NONE	7.54	7.78	7.74	7.09	7.28	7.50
CARB	7.20	7.49	7.11	7.40	7.58	7.33
PRO	6.90	7.29	7.44	7.61	7.71	7.31
CARB+PRO	7.82	7.39	7.61	8.03	7.95	7.77
Mean	7.36	7.49	7.48	7.53	7.63	7.48

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

EYE INOC	**FUNGICIDE*** **EYE INOC**	
0.230	0.460	min.rep
0.199	0.399	max-min

	EYE INOC
max-min	NATURAL v any of the remainder
min.rep	any of the remainder

* Within the same level of **FUNGICIDE** only

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP.SP	24	0.460	6.2

GRAIN MEAN DM% 86.2

SUB PLOT AREA HARVESTED 0.00137

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/309 and 93/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, A.D. Todd, B.R. Kerry, D.G. Christian, E.T.G. Bacon, J.F. Jenkyn, R.J. Gutteridge, W. Powell.

Associate sponsor: D.S. Powlson.

The ninth year, w. wheat.

For previous years see 85-92/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

NOTE: In 1993 treatments were applied to straw from previous w. rape.

Experimental diary:
Great Knott III (R):

24-Jul-92	**T**	**STRAW** BURNT: Straw baled and removed.
	T	**STRAW** CHOPPED: Straw chopped and spread.
18-Aug-92	B	Gramoxone 100 at 2.0 l with Farmon Blue at 0.10 l in 200 l.
12-Oct-92	**T**	**CULTIVTN** TN10TN20: Heavy spring-tine cultivated to 10 cm and chisel ploughed to 20 cm.
	T	**CULTIVTN** TN10PL20: Heavy spring-tine cultivated to 10 cm and ploughed to 20 cm.
	T	**CULTIVTN** TINE 10: Heavy spring-tine cultivated to 10cm.
	T	**CULTIVTN** PLOUGH20: Ploughed to 20 cm.
16-Oct-92	B	Rotary harrowed, Soissons, dressed Cerevax, drilled at 400 seeds per square metre.

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93/R/CS/309 and 93/W/CS/309

Experimental diary:

Great Knott III (R):

22-Oct-92 : B : Draza at 5.5 kg.
13-Nov-92 : B : Avadex BW Granular at 22.5 kg.
24-Nov-92 : B : Draza at 5.5 kg.
24-Feb-93 : B : Panther at 2.0 l in 200 l.
08-Mar-93 : B : 34.5% N at 120 kg.
15-Apr-93 : B : Halo at 2.0 l and Tripart Brevis at 2.25 l in 200 l.
16-Apr-93 : B : 34.5% N at 460 kg.
22-Jun-93 : B : Corbel at 0.50 l and Radar at 0.50 l in 200 l.
19-Aug-93 : B : Combine harvested.

Far Field I (W):

27-Jul-92 : **T** : **STRAW** CHOPPED: Straw chopped and spread.
28-Jul-92 : **T** : **STRAW** BURNT: Straw baled and removed.
11-Aug-92 : B : Stubble topped, subsoiled to 45 cm with tines 1.5 m apart.
29-Sep-92 : B : Roundup at 4.0 l in 200 l.
05-Oct-92 : **T** : **CULTIVTN** TINE 10: Heavy spring-tine cultivated to 10 cm.
: **T** : **CULTIVTN** TN10TN20: Heavy spring-tine cultivated to 10 cm, deep-tine cultivated to 20 cm
07-Oct-92 : **T** : **CULTIVTN** TINE 10, TN10TN20: Disced twice to 10cm.
: **T** : **CULTIVTN** PLOUGH20: Ploughed to 20 cm.
09-Oct-92 : B : Rotary harrowed, Soissons, dressed Cerevax, drilled at 350 seeds per square metre.
: B : Avadex BW at 4.2 l in 200 l.
12-Oct-92 : B : Pre-Empt at 5.0 l and Scythe at 3.0 l in 200 l.
16-Oct-92 : B : Draza at 5.5 kg.
16-Mar-93 : B : 34.5% N at 120 kg.
15-Apr-93 : B : Starane 2 at 1.0 l with New 5C Cycocel at 2.5 l in 200 l.
30-Apr-93 : B : 34.5% N at 460 kg.
18-May-93 : B : Halo at 2.0 l and Mistral at 0.25 l in 200 l.
22-Jun-93 : B : Ashlade Mancozeb FL at 3.0 l and Corbel at 0.5 l in 200 l.
14-Aug-93 : B : Combine harvested.

NOTES: (1) At Rothamsted and Woburn on the **STRAW** BURNT plots previous w. rape straw proved difficult to burn and was subsequently removed.

(2) Because of excessive weeds the yield from one plot at Rothamsted was lost with treatment **STRAW** CHOPPED, **CULTIVTN** TINE 10. An estimated value was used in the analysis. Plot cut 17-May-93 and cuttings removed; topped 17-June-93 and roundup at 5.0 l in 200 l applied 02-Jul-93.

(3) Establishment counts were made in autumn and shoot numbers and total dry matter were measured in spring. Components of yield were measured and numbers of volunteer ears counted. Fungal diseases were measured at intervals during the season.

https://doi.org/10.23637/ERADOC-1-48

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

GRAIN TONNES/HECTARE

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

CULTIVTN	TINE 10	TN10PL20	TN10TN20	PLOUGH20	Mean
STRAW					
BURNT	9.54	9.65	10.04	9.64	9.72
CHOPPED	9.26	8.82	8.88	8.62	8.90
Mean	9.35	9.09	9.27	8.96	9.17

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

STRAW	CULTIVTN	STRAW CULTIVTN	
		0.918	min.rep
0.398	0.530	0.795	max-min
		0.649	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	36	1.298	14.2

GRAIN MEAN DM% 86.4

PLOT AREA HARVESTED 0.00588

https://doi.org/10.23637/ERADOC-1-48

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

GRAIN TONNES/HECTARE

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

CULTIVTN STRAW	TINE 10	TN10PL20	TN10TN20	PLOUGH20	Mean
BURNT	7.80	8.32	8.98	8.61	8.43
CHOPPED	5.82	8.96	5.67	8.98	7.36
Mean	6.48	8.75	6.77	8.85	7.71

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

STRAW	CULTIVTN	STRAW CULTIVTN	
		1.335	min.rep
0.578	0.771	1.156	max-min
		0.944	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	1.335	17.3

GRAIN MEAN DM% 83.5

PLOT AREA HARVESTED 0.00636

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/311

EFFECTS OF SHALLOW STRAW INCORPORATION

Object: To study the effects of shallow straw incorporation on pests and diseases and on the establishment, growth and yield of winter wheat - West Barnfield I.

Sponsors: R.D. Prew, D.G. Christian, R.J. Gutteridge, E.T.G. Bacon, J.F. Jenkyn, B.R. Kerry, W. Powell, A.D. Todd.

The ninth year, s. wheat.

For previous years see 85-92/R/CS/311.

Design: Single replicate of 3 x 2 x 2 x 2 x 2.

Whole plot dimensions: 9.0 x 57.0.

Treatments: Combinations of:-

Whole plots

1.	**STRAW**	Treatments to straw of previous wheat:
	BURNT	Burnt
	BALED	Baled and removed
	CHOPPED	Chopped
2.	**CULTTIME[92]**	Residual effect of time of cultivation, to 10 cm depth:
	(EARLY)	As soon as possible after harvest
	(LATER)	At least 14 days after EARLY

Sub plots

3.	**FUNGCIDE[92]**	Residual effect of fungicides:
	(0)	None
	(FULL)	Full programme:- Triadimefon and carbendazim in winter, prochloraz in spring plus propiconazole alone and with chlorothalonil in summer
4.	**INSCTCDE[92]**	Residual effect of insecticides:
	(0)	None
	(CYP+PR)	Cypermethrin in autumn and pirimicarb in summer
5.	**MOLLCIDE[92]**	Residual effect of molluscicide:
	(0)	None
	(METHCB)	Methiocarb after drilling

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/311

Experimental Diary:

18-Aug-92	: **T** :	**STRAW** BALED: Straw baled and removed.
	: **T** :	**STRAW** BURNT: Straw burnt and ash incorporated with discs.
	: **T** :	**STRAW** CHOPPED: Straw chopped with trailed straw chopper.
13-Oct-92	: B :	Gramoxone 100 at 2.0 l with Vassgro Spreader at 0.10 l in 200 l.
09-Mar-93	: B :	Cultivated by rotary grubber to 10 cm, spring-tine cultivated.
10-Mar-93	: B :	Rotary harrowed, Canon, dressed Cerevax, drilled at 400 seeds per square metre.
12-Mar-93	: B :	Rolled.
23-Apr-93	: B :	34.5% N at 290 kg.
18-May-93	: B :	Ally at 30 g and Starane 2 at 1.0 l in 200 l.
25-Aug-93	: B :	Combine harvested.

NOTES: (1) Owing to prolonged wet weather in the autumn winter wheat was not sown and was replaced by spring wheat.
(2) Foot and root rots were measured in July. Fertile ears were counted in June and thousand grain weights were measured at harvest.

GRAIN TONNES/HECTARE

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

CULTTIME[92]	(EARLY)	(LATER)	Mean
STRAW			
BURNT	6.47	6.58	6.53
BALED	6.02	6.38	6.20
CHOPPED	5.73	6.22	5.97
Mean	6.07	6.40	6.23

FUNGCIDE[92]	(0)	(FULL)	Mean
STRAW			
BURNT	6.37	6.69	6.53
BALED	5.97	6.43	6.20
CHOPPED	5.90	6.04	5.97
Mean	6.08	6.39	6.23

FUNGCIDE[92]	(0)	(FULL)	Mean
CULTTIME[92]			
(EARLY)	5.87	6.27	6.07
(LATER)	6.29	6.50	6.40
Mean	6.08	6.39	6.23

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/311

GRAIN TONNES/HECTARE

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

INSCTCDE[92]	(O)	(CYP+PR)	Mean
STRAW			
BURNT	6.54	6.51	6.53
BALED	6.10	6.30	6.20
CHOPPED	5.96	5.98	5.97
Mean	6.20	6.27	6.23

INSCTCDE[92]	(O)	(CYP+PR)	Mean
CULTTIME[92]			
(EARLY)	6.06	6.08	6.07
(LATER)	6.35	6.45	6.40
Mean	6.20	6.27	6.23

INSCTCDE[92]	(O)	(CYP+PR)	Mean
FUNGCIDE[92]			
(O)	6.00	6.16	6.08
(FULL)	6.40	6.37	6.39
Mean	6.20	6.27	6.23

MOLLCIDE[92]	(O)	(METHCB)	Mean
STRAW			
BURNT	6.50	6.56	6.53
BALED	6.36	6.04	6.20
CHOPPED	5.90	6.05	5.97
Mean	6.25	6.22	6.23

MOLLCIDE[92]	(O)	(METHCB)	Mean
CULTTIME[92]			
(EARLY)	6.08	6.07	6.07
(LATER)	6.43	6.37	6.40
Mean	6.25	6.22	6.23

MOLLCIDE[92]	(O)	(METHCB)	Mean
FUNGCIDE[92]			
(O)	6.04	6.13	6.08
(FULL)	6.47	6.31	6.39
Mean	6.25	6.22	6.23

MOLLCIDE[92]	(O)	(METHCB)	Mean
INSCTCDE[92]			
(O)	6.26	6.15	6.20
(CYP+PR)	6.25	6.28	6.27
Mean	6.25	6.22	6.23

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/311

GRAIN TONNES/HECTARE

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

FUNGCIDE[92]	INSCTCDE[92]	MOLLCIDE[92]	STRAW* FUNGCIDE[92]
0.077	0.077	0.077	0.134

CULTTIME[92]* FUNGCIDE[92]	STRAW* INSCTCDE[92]	CULTTIME[92]* INSCTCDE[92]	FUNGCIDE[92] INSCTCDE[92]
0.109	0.134	0.109	0.109

STRAW* MOLLCIDE[92]	CULTTIME[92]* MOLLCIDE[92]	FUNGCIDE[92] MOLLCIDE[92]	INSCTCDE[92] MOLLCIDE[92]
0.134	0.109	0.109	0.109

* Within the same level of **STRAW**, **CULTTIME[92]** or **STRAW.CULTTIME[92]** only

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

Stratum	d.f.	s.e.	cv%
WP.SP	27	0.268	4.3

GRAIN MEAN DM% 83.5

SUB PLOT AREA HARVESTED 0.00276

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/323

CEREAL SEQUENCES AND TAKE-ALL

Object: To study the effects on take-all (*Gaeumannomyces graminis*) and yield of different cereals grown in various cereal sequences - West Barnfield II.

Sponsors: R.J. Gutteridge, D. Hornby, R.D. Prew.

The sixth year, w. barley, w. oats, w. triticale, w. wheat.

For previous years see 88-92/R/CS/323

Design: 3 randomised blocks of 26 plots.

Whole plot dimensions: 3.0 x 10.0.

CROPSEQ Crop sequences (1988, 1989, 1990, 1991, 1992 and 1993 respectively):

TTTTTT
OTTTOT
TOTTTO
TTOTTT
TTTOTT
WWWWWW
OWWWOW
WOWWWO
WWOWWW
WWWOWW
BBBBBB
OBBBOB
BOBBBO
BBOBBB
BBBOBB
WTWTWT
WBWBWB
TBTBTB
SBSBSB
WWTTTW
WWBBBW
TTBBBT
TTWWWT
BBWWWB
BBTTTB
WWSSSW

W = W. wheat
S = S. barley
B = W. barley
O = W. oats
T = W. triticale

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/323

Experimental Diary:

05-Sep-92	B		Scythe at 3.0 l in 200 l.
09-Sep-92	B		Ploughed, to finish.
16-Sep-92	B		Disced and rolled.
21-Sep-92	B		PK as (0:18:36) at 300 kg..
28-Sep-92	B		Sting CT at 2.0 l in 200 l.
01-Oct-92	B		Re-ploughed.
06-Oct-92	T		**CROPSEQ** Barley plots: Rotary harrowed, Magie, dressed Cerevax, drilled at 350 seeds per square metre.
	T		**CROPSEQ** Oat plots: Rotary harrowed, Image, dressed Ceresol, drilled at 350 seeds per square metre.
	T		**CROPSEQ** Triticale plots: Rotary harrowed, Lasko, dressed Cerevax, drilled at 400 seeds per square metre.
	T		**CROPSEQ** Wheat plots: Rotary harrowed, Mercia, dressed Cerevax, drilled at 380 seeds per square metre.
04-Mar-93	B		34.5%N at 90 kg.
15-Mar-93	T		**CROPSEQ** Barley plots: Tigress at 2.5 l in 200 l.
15-Apr-93	T		**CROPSEQ** Oats and triticale plots: 34.5% N at 368 kg.
	T		**CROPSEQ** Barley plots: 34.5% N at 435 kg.
	T		**CROPSEQ** Wheat plots: 34.5% N at 493 kg.
	T		**CROPSEQ** Wheat plots: Cheetah R at 2.0 l in 220 l.
	T		**CROPSEQ** Triticale plots: Hoegrass at 3.0 l in 220 l.
21-Apr-93	B		Ally at 30 g and Starane 2 at 1.0 l in 200 l.
18-May-93	B		Calirus at 2.0 l and Corbel at 0.50 l in 200 l.
08-Jun-93	T		**CROPSEQ** Wheat plots: Halo at 2.0 l and Mistral at 0.50 l in 200 l.
09-Jun-93	T		**CROPSEQ** Oat plots: Mistral at 1.0 l in 200 l.
02-Aug-93	T		**CROPSEQ** Barley plots: Combine harvested.
10-Aug-93	B		**CROPSEQ** Wheat, oats, triticale plots: Combine harvested.

NOTE: Plant samples were taken in April, June and July for take-all and eyespot assessments. Soil cores were taken after harvest to assess take-all infectivity.

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/323

GRAIN TONNES/HECTARE

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

CROPSEQ	
TTTTTT	5.39
OTTTOT	5.77
TOTTTO	7.30
TTOTTT	4.99
TTTOTT	5.42
WWWWWW	5.90
OWWWOW	8.16
WOWWWO	6.60
WWOWWW	5.96
WWWOWW	7.78
BBBBBB	4.21
OBBBOB	6.63
BOBBBO	5.97
BBOBBB	4.02
BBBOBB	5.58
WTWTWT	5.18
WBWBWB	5.76
TBTBTB	5.38
SBSBSB	4.82
WWTTTW	6.25
WWBBBW	6.07
TTBBBT	4.26
TTWWWT	3.92
BBWWWB	5.76
BBTTTB	5.78
WWSSSW	5.91
Mean	5.72

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

CROPSEQ
0.661

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	50	0.810	14.2

GRAIN MEAN DM% 83.7

PLOT AREA HARVESTED 0.00228

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/326 and 93/W/CS/326

AMOUNTS OF STRAW

Object: To study the effects of a range of amounts of straw incorporated into the soil on w.wheat - Rothamsted (R) Great Knott III, Woburn (W) Far Field I.

Sponsors: R.D. Prew, D.G. Christian, J.F. Jenkyn, E.T.G. Bacon.

The seventh year, w. wheat.

For previous years see 87-92/R&W/CS/326.

Design: 4 randomised blocks of 4 plots (R).
3 randomised blocks of 4 plots (W).

Whole plot dimensions: 3.0 x 13.5 (R).
3.0 x 14.5 (W).

Treatments:

STRAW Amounts of straw (rape straw in autumn 1992) incorporated into seedbed (t per ha 85% DM), cumulative to previous annual dressings:

		R	W
NONE	None	-	-
NORMAL	Normal	2.7	2.7
2 NORMAL	Twice normal	5.4	5.4
4 NORMAL	Four times normal	10.8	10.8

Experimental diary:

Great Knott III (R)

06-Aug-92 : **T** : **STRAW** NORMAL, 2 NORMAL, 4 NORMAL: Straw applied.
07-Aug-92 : B : Straw and stubble chopped..
18-Aug-92 : B : Gramoxone 100 at 2.0 l with Farmon Blue at 0.1 l in 200 l.
14-Oct-92 : B : Ploughed.
16-Oct-92 : B : Rotary harrowed, Soissons, dressed Cerevax, drilled at 400 seeds per square metre.
22-Oct-92 : B : Draza at 5.5 kg.
13-Nov-92 : B : Avadex BW Granular at 22.5 kg.
24-Nov-92 : B : Draza at 5.5 kg.
24-Feb-93 : B : Panther at 2.0 l in 200 l.
08-Mar-93 : B : 34.5% N at 120 kg.
15-Apr-93 : B : Halo at 2.0 l with Tripart Brevis at 2.2 l in 200 l.
16-Apr-93 : B : 34.5% N at 460 kg.
22-Jun-93 : B : Corbel at 0.50 l and Radar at 0.50 l in 200 l.
19-Aug-93 : B : Combine harvested.

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93/R/CS/326 and 93/W/CS/326

Experimental diary:

Far Field I (W)

10-Aug-92	: **T**	:	**STRAW** NORMAL, 2 NORMAL, 4 NORMAL: Straw applied.
	: B	:	Straw and stubble chopped.
11-Aug-92	: B	:	Subsoiled to 45 cm with tines 1.5 m apart.
29-Sep-92	: B	:	Roundup at 4.0 l in 200 l.
05-Oct-92	: B	:	Heavy spring-tine cultivated to 20 cm.
07-Oct-92	: B	:	Disced twice to 10 cm.
09-Oct-92	: B	:	Rotary harrowed, Soissons, dressed Cerevax, drilled at 350 seeds per square metre.
	: B	:	Avadex BW Granular at 4.2 l in 200 l.
12-Oct-92	: B	:	Pre-Empt at 5.0 l with Scythe at 3.0 l in 200 l.
16-Oct-92	: B	:	Draza at 5.5 kg.
16-Mar-93	: B	:	34.5% N at 120 kg.
15-Apr-93	: B	:	Starane 2 at 1.0 l with New 5C Cycocel at 2.5 l in 200 l.
30-Apr-93	: B	:	34.5% N at 460 kg.
18-May-93	: B	:	Halo at 2.0 l and Mistral at 0.25 l in 200 l.
22-Jun-93	: B	:	Ashlade Mancozeb FL at 3.0 l and Corbel at 0.50 l in 200 l.
14-Aug-93	: B	:	Combine harvested.

NOTES: (1) Establishment counts were made in autumn. Shoot numbers and dry weights in spring, fertile ear numbers at anthesis and harvest index were measured.

(2) Foot and root rots were assessed in summer.

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/326 GREAT KNOTT III (R)

GRAIN TONNES/HECTARE

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

STRAW	
NONE	10.01
NORMAL	9.94
2 NORMAL	10.09
4 NORMAL	10.20
Mean	10.06

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

STRAW
0.186

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	9	0.263	2.6

GRAIN MEAN DM% 84.8

PLOT AREA HARVESTED 0.00306

https://doi.org/10.23637/ERADOC-1-48

93/W/CS/326 FAR FIELD I (W)

GRAIN TONNES/HECTARE

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

	STRAW
NONE	8.99
NORMAL	8.46
2 NORMAL	8.36
4 NORMAL	8.65
Mean	8.61

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

STRAW
0.685

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	6	0.839	9.7

GRAIN MEAN DM% 82.7

PLOT AREA HARVESTED 0.00316

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/331

TAKE-ALL INOCULATION

Object: To compare a range of methods of artificially inoculating take-all (*Gaeumannomyces graminis*) and seed treatments and to relate amounts of disease established to the yield and grain quality of w. wheat - Great Harpenden I.

Sponsors: D. Hornby, G.L. Bateman, R.J. Gutteridge.

The fifth year, w. wheat, w.oats.

For previous years see 89-92/R/CS/331

Design: 4 randomised blocks of 9 plots.

Whole plot dimensions: 3.0 x 22.0.

Treatments:

INOC+SDT	Methods of inoculating take-all to w. wheat in the first year (1989), none since, plus levels of seed treatment to control take-all:
NONE O W	None (w. oats 1993, alternating with w. wheat)
NONE W O	None (w. wheat 1993, alternating with w. oats)
NONE W W	None (continuous w. wheat)
I PRE PL	Infective inoculum applied to soil surface pre-ploughing
I PRE SO	Infective inoculum applied by fertilizer drill to 10 cm depth before rotary harrowing and sowing wheat
I CD	Infective inoculum drilled with the seed
SEEDTR 0	No seed treatment
SEEDTR 1	Seed treatment at 100 g a.i.
SEEDTR 2	Seed treatment at 150 g a.i.

NOTE: Experimental seed treatment was applied at a.i. rates per 100 kg w. wheat seed drilled.

Experimental diary:

21-Sep-92 : B : Ploughed and furrow pressed.
07-Oct-92 : B : Heavy spring-tine cultivated.
08-Oct-92 : **T** : **INOC+SDT**: SEEDTR 0, SEEDTR 1, SEEDTR 2: Rotary harrowed, Riband drilled at 380 seeds per square metre.
: **T** : **INOC+SDT** NONE O W: Rotary harrowed, Image, dressed Ceresol, drilled at 350 seeds per square metre.
: **T** : **INOC+SDT** NONE W O, NONE W W, I PRE PL, I PRE SO, I CD: Rotary harrowed, Mercia, dressed Cerevax, drilled at 380 seeds per square metre.
05-Mar-93 : B : 34.5% N at 120 kg.
12-Mar-93 : B : Hytane 500 FW at 3.0 l and Stomp 400 at 2.5 l in 200 l.
16-Apr-93 : B : 34.5% N at 460 kg.
30-Apr-93 : B : Cheetah R at 2.5 l and Starane 2 at 1.0 l in 200 l.
04-Jun-93 : B : Mistral at 0.50 l in 200 l.
18-Aug-93 : B : Combine harvested.

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93/R/CS/331

NOTE: Plant samples were taken on five occasions from March to July for take-all assessment. Soil cores were taken after harvest to assess take-all infectivity.

GRAIN TONNES/HECTARE

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

INOC+SDT	
NONE W O	7.92
NONE W W	7.37
I PRE PL	7.53
I PRE SO	7.62
I CD	7.06
SEEDTR 0	8.93
SEEDTR 1	9.30
SEEDTR 2	9.52
Mean	8.15

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

INOC+SDT
0.264

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	21	0.374	4.6

GRAIN MEAN DM% 85.9

PLOT AREA HARVESTED 0.00501

https://doi.org/10.23637/ERADOC-1-48

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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93/W/CS/347

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.

https://doi.org/10.23637/ERADOC-1-48

93/W/CS/347

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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93/W/CS/347

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

https://doi.org/10.23637/ERADOC-1-48

93/W/CS/347

GRAIN TONNES/HECTARE

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

WHEAT / N	W	S	Mean
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* N	WHEAT* N	PREVCROP* WHEAT 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

https://doi.org/10.23637/ERADOC-1-48 *pp 33*

93/R/CS/354

SOWING DATES AND TAKE-ALL

Object: To study the effects of sequences of sowing dates and volunteers on take-all (*Gaeumannomyces graminis*) and yield of winter wheat - Little Knott I.

Sponsors: R.J. Gutteridge, D. Hornby.

The third year, w. wheat.

For previous years see 91-92/R/CS/354

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

SOW SEQ	Sequences of sowing date in 1991, 1992 and 1993 and level of volunteers in 1992 and 1993:
E E E	Early in 1991, 1992 and 1993
E L L	Early in 1991, late in 1992 and 1993
E L+ L+	Early in 1991, late in 1992 and 1993, volunteers encouraged in second and third years
L E E	Late in 1991, early in 1992 and 1993
L L* L*	Late in 1991, 1992 and 1993, volunteers controlled in second and third years

NOTE: On E L+ L+ volunteers simulated by sowing 50 kg wheat seed after cultivations on 15 Sept.

Experimental diary:

02-Sep-92 : B : Ploughed and furrow pressed.
15-Sep-92 : B : Rotary harrowed.
: **T** : **SOW SEQ** E E E, L E E: Rotary harrowed, Mercia, dressed Cerevax, drilled at 380 seeds per square metre.
14-Oct-92 : **T** : **SOW SEQ** L L* L*: Rotary harrowed to control volunteers.
: **T** : **SOW SEQ:** E L L, E L+ L+, L L* L*: Rotary harrowed, Mercia, dressed Cerevax, drilled at 380 seeds per square metre.
11-Mar-93 : B : Hytane 500 FW at 3.0 l and Stomp 400 at 2.5 l in 200 l.
15-Mar-93 : B : PK as (0:18:36) at 1250 kg.
20-Apr-93 : B : 34.5% N at 460 kg.
03-Jun-93 : B : Cheetah R at 2.5 l and Calixin at 0.70 l in 200 l.
08-Jun-93 : B : Halo at 2.0 l in 200 l.
17-Aug-93 : B : Combine harvested.

NOTE: Plant samples were taken in April and July for take-all assessment. Soil cores were taken after harvest to assess take-all infectivity.

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93/R/CS/354

GRAIN TONNES/HECTARE

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

SOW SEQ	E E E	E L L	E L+ L+	L E E	L L* L*	Mean
	7.93	7.54	7.05	7.49	7.75	7.55

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

SOW SEQ
0.335

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.474	6.3

GRAIN MEAN DM% 87.1

PLOT AREA HARVESTED 0.00228

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/355

RATES OF N AND MINERALIZATION

Object: To study the cumulative effects of rates of nitrogen fertilizer on soil mineralization capacity and yields of continuous winter wheat - Claycroft.

Sponsor: P.R. Poulton.

The third year, w. wheat.

For previous years see 91-92/R/CS/355.

Design: 3 randomised blocks of 7 plots.

Whole plot dimensions: 21.0 x 23.0.

Treatments:

N	Nitrogen fertilizer (kg N) as 34.5% N:
0	
50	
100	
150	
200	
250	
300	

Experimental diary:

15-Sep-92	: B	:	Ploughed.
17-Sep-92	: B	:	Disced.
17-Oct-92	: B	:	Heavy spring-tine cultivated twice.
19-Oct-92	: B	:	Rotary harrowed twice, Mercia, dressed Cerevax, drilled at 380 seeds per square metre.
20-Mar-93	: B	:	Ally at 30 g and Cheetah R at 2.0 l in 200 l.
19-Apr-93	: T	:	**N** 50: 34.5% N at 145 kg.
	: T	:	**N** 100: 34.5% N at 290 kg.
	: T	:	**N** 150: 34.5% N at 435 kg.
	: T	:	**N** 200: 34.5% N at 580 kg.
	: T	:	**N** 250: 34.5% N at 725 kg.
	: T	:	**N** 300: 34.5% N at 870 kg.
28-May-93	: B	:	Starane 2 at 0.75 l and Halo at 2.0 l in 200 l.
20-Aug-93	: B	:	Combine harvested.

NOTES: Samples were taken before harvest to measure straw and stubble yields. Grain, straw and stubble samples were taken for chemical analysis.

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/355

GRAIN TONNES/HECTARE

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

N	
0	2.71
50	4.39
100	5.92
150	6.94
200	7.14
250	7.18
300	7.03
Mean	5.90

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

N
0.286

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.351	5.9

GRAIN MEAN DM% 87.7

PLOT AREA HARVESTED 0.00483

https://doi.org/10.23637/ERADOC-1-48

93/W/CS/356

SET-ASIDE STUDY

Object: To compare different treatments of land temporarily withdrawn from arable cropping and to study their effects on nitrate leaching and on subsequent wheat crops - Woburn, Horsepool Lane Close I.

Sponsors: R.D. Prew, E.T.G. Bacon, M.V. Hewitt, D.P. Yeoman, J.F. Jenkyn, R.J. Gutteridge, W. Powell, J. Ashby.

Associate sponsors: D.L.O. Smith, I. Shield.

The third year, w. wheat.

For previous years see 91-92/W/CS/356.

Design: 3 randomised blocks of 7 plots split into 8 sub plots.

Whole plot dimensions: 10.0 x 24.0.

Treatments: All combinations of:-

Whole plots

1. **LAND TRT[91]** Land treatment in 1991, after w. wheat 1990 (all treatments ploughed autumn 1991 before two w. wheat test crops):

(CA WW)	Cultivated in autumn, sown to w. wheat
(CA RA)	Cultivated in autumn, sown to ryegrass in autumn, topped in spring
(SA CA FA)	Straw chopped and spread in autumn, cultivated in autumn, sown to forage rape in autumn, topped in spring
(CA CS)	Cultivated in autumn, cultivated in spring
(SA CS)	Straw chopped and spread in autumn, cultivated in spring
(WT)	Weeds topped
(WT CS TS)	Weeds topped, cultivated in spring, trefoil sown in spring, topped

Sub plots

2. **N RES** Nitrogen fertilizer (kg N) applied spring 1992:

(0)
(80)
(120)
(160)
(200)
(240)
(280)

NOTE: An additional fallow sub plot was present, systematically arranged on one side of each whole plot.

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93/W/CS/356

Experimental diary:

W. wheat:

29-Sep-92 : B : Roundup at 4.0 l in 200 l.
08-Oct-92 : B : Ploughed.
13-Oct-92 : B : Rotary harrowed.
14-Oct-92 : B : Rotary harrowed, Mercia dressed Cerevax, drilled at 380 seeds per square metre.
26-Mar-93 : B : 34.5% N at 120 kg.
15-Apr-93 : B : Ally at 30 g and New 5C Cycocel at 2.5 l in 200 l.
06-May-93 : B : 34.5% N at 460 kg.
18-May-93 : B : Cheetah R at 3.0 l, Halo at 2.0 l and Mistral at 0.25 l in 200 l.
22-Jun-93 : B : Dorin at 1.0 l in 200 l.
02-Jul-93 : B : Starane 2 at 1.0 l in 300 l.
18-Aug-93 : B : Combine harvested.

Fallow:

29-Sep-92 : B : Roundup at 4.0 l in 200 l.
08-Oct-92 : B : Ploughed.
02-Apr-93 : B : Rotary cultivated.
08-Jul-93 : B : Rotary cultivated.

NOTE: Plant counts were made in winter and summer. Foliar diseases and foot and root rots were assesed.

https://doi.org/10.23637/ERADOC-1-48

93/W/CS/356

GRAIN TONNES/HECTARE

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

N RES	(0)	(80)	(120)	(160)	(200)	(240)	(280)	Mean
LAND TRT[91]								
(CA WW)	4.49	5.06	5.44	5.30	5.30	4.76	4.73	5.01
(CA RA)	6.17	5.49	6.06	5.47	4.66	5.08	5.17	5.44
(SA CA FA)	5.74	6.31	7.54	6.80	7.47	7.11	7.46	6.92
(CA CS)	7.00	4.72	6.79	5.74	7.49	6.18	7.42	6.48
(SA CS)	4.08	4.30	5.01	4.48	3.71	4.37	5.45	4.48
(WT)	7.46	7.18	7.86	7.59	8.67	8.02	8.05	7.83
(WT CS TS)	4.82	7.27	7.45	6.12	5.39	6.45	5.36	6.12
Mean	5.68	5.76	6.59	5.93	6.10	6.00	6.23	6.04

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

LAND TRT[91]	N RES	LAND TRT[91] N RES
1.460	0.337	1.677

Except when comparing means with the same level(s) of
LAND TRT[91] 0.891

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	1.788	29.6
BLOCK.WP.SP	84	1.091	18.1

GRAIN MEAN DM% 86.6

SUB PLOT AREA HARVESTED 0.00199

https://doi.org/10.23637/ERADOC-1-48

93/W/CS/375

TAKE-ALL EPIDEMICS

Object: To determine whether severe take-all (*Gaeumannomyces graminis*) can be caused by artificial inoculum in winter wheat and to determine the distribution of such infection within the crop - Woburn, Butt Close I.

Sponsors: G. L. Bateman, D. Hornby.

The second year, w. wheat

For previous year see 92/W/CS/375

Design: 3 randomised blocks of 6 x 2, plus 2 extra plots.

Whole plot dimensions: 2.5 x 6.0.

Treatments: All combinations of:-

1. **SOW DATE[92]** Date of sowing in autumn 1991:

(E)	Early
(L)	Late (4 weeks later)

2. **INOCULTN[92]** Weight (kg) of inoculated oat seed applied by combine drill in autumn 1991 and spring 1992:

	Autumn (E)	Autumn (L)	Spring
(0)	Nil	Nil	-
(1)	Nil	200	-
(2)	200	200	-
(3)	400	200	-
(30)	400	200	Nil
(3S)	400	200	500

plus 2 extra plots, systematically arranged with treatments 0 and 2.

NOTE: INOCULTN[92] (0), (1), (30): Nil occurs where empty drill was drawn across plots.

Experimental diary:

21-Sep-92 : B : Ploughed.
07-Oct-92 : B : Rotary harrowed, Mercia, undressed, drilled at 380 seeds per square metre.
15-Mar-93 : B : 34.5% N at 120 kg.
15-Apr-93 : B : Ally at 30 g and Deloxil at 1.0 l in 200 l.
29-Apr-93 : B : 34.5% N at 460 kg.
01-Jun-93 : B : Mistral at 0.50 l and Halo at 2.0 l in 200 l.
17-Aug-93 : B : Combine harvested.

NOTE: Plant samples were taken for take-all assessment in spring and summer.

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93/W/CS/375

GRAIN TONNES/HECTARE

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

INOCULTN	(0)	(1)	(2)	(3)	(30)	(3S)	Mean
SOW DATE							
(E)	2.97	2.61	3.41	3.21	4.11	3.69	3.33
(L)	4.33	3.95	4.24	3.40	4.30	4.68	4.15
Mean	3.65	3.28	3.83	3.30	4.20	4.19	3.74

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

SOW DATE	**INOCULTN**	**SOW DATE INOCULTN**
0.222	0.384	0.543

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	22	0.665	17.8

GRAIN MEAN DM% 86.3

PLOT AREA HARVESTED 0.00130

https://doi.org/10.23637/ERADOC-1-48 *pp 42*

93/R/CS/380

COVER CROPS AND 15N

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 - Webbs.

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

The second year, w. barley.

Design: 3 blocks of 5 plots split into 2 sub plots.

Whole plot dimensions: 6.0 x 12.0.

Treatments: All combinations of:-

Whole plots

1. **LAND TRT[92]** Cover crops, tumbledown and fallow ploughed and sown to s. barley in 1992; w. barley in 1993:

FO RA SB	Forage rape
RYE SB	Rye
TUMDN SB	Tumbledown
FALLOWSB	Fallow

Sub plots

2. **N RES[92]** Nitrogen fertilizer (kg N) to s. barley in 1992:

(0)
(75)

plus one extra treatment

Whole plot

1. **EXTRA[92]**

W BARLEY	W. barley taken to maturity in 1992

Sub plot

2. **N EXTRA[92]** Nitrogen fertilizer (kg N) to w. barley in 1992:

(0)
(150)

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93/R/CS/380

Experimental diary:

```
   18-Aug-92 : B : Straw baled.
   16-Sep-92 : B : Ploughed, furrow pressed.
             : B : Scythe at 2.0 l with Farmon Blue at 0.20 l in 200 l.
   17-Sep-92 : B : Rotary harrowed, Puffin, dressed Cerevax, drilled at
                   380 seeds per square metre.
   15-Apr-93 : B : 34.5% N at 370 kg.
   10-May-93 : B : Ally at 30 g and Starane 2 at 1.0 l in 200 l.
   20-Jul-93 : B : Harvested by hand.
```

NOTES: (1) Plots were labelled with 15N in autumn 1991. Samples of soil, soil water and w. barley were taken to measure residual 15N.

(2) Yields were taken on **N RES[92]** (75) and **N EXTRA[92]** (150) plots only.

GRAIN TONNES/HECTARE

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

LAND TRT[92]	FO RA SB	RYE SB	TUMDN SB	FALLOWSB	Mean
	4.20	4.13	3.36	3.64	3.83

EXTRA[92] 5.05

GRAND MEAN 4.08

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

LAND TRT[92] **& EXTRA[92]**
0.718

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	8	0.879	21.6

GRAIN MEAN DM% 87.6

SUB PLOT AREA HARVESTED 0.00015

https://doi.org/10.23637/ERADOC-1-48

93/W/CS/381

N UPTAKE AND COVER CROPS

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, Road Piece.

Sponsor: D.G. Christian.

The second year, w. barley.

For previous year see 92/W/CS/381.

Design: 3 blocks of 5 plots plus a single replicate of 3 extra plots, split into 2.

Whole plot dimensions: 9.0 x 12.0.

Treatments: All combinations of:-

Whole plots

1. **LAND TRT[92]** Land treatments over winter, ploughed and conventionally drilled to linseed in spring 1992:

(FO RA LN)	Forage rape
(RYE LN)	Rye
(TUMDN LN)	Tumbledown plus w. barley
(FALLW LN)	Fallow
(STUBL LN)	Stubble

Sub plots

2. **N RES[92]** Nitrogen fertilizer (kg N) to linseed in spring 1992:

(0)
(75)

plus three extra unreplicated treatments, direct drilled to linseed in spring 1992 and split for N:

1. **EXTRA[92]**

(EX FR LN)	Forage rape
(EX RY LN)	Rye
(EX TD LN)	Tumbledown plus w. barley

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93/W/CS/381

Experimental diary:

```
   06-Oct-92 : B : Ploughed.
   12-Oct-92 : B : Rotary harrowed, Puffin, dressed Cerevax Extra, drilled
                   at 380 seeds per square metre.
   15-Mar-93 : B : 34.5% N at 120 kg.
   15-Apr-93 : B : Ally at 30 g and Deloxil at 1.0 l in 200 l
   30-Apr-93 : B : 34.5% N at 350 kg.
   01-Jun-93 : B : Mistral at 0.5 l and Bayleton at 0.5 kg in 200 l.
   03-Aug-93 : B : Combine harvested.
```

NOTE: Crop samples were taken at harvest to determine ear numbers, thousand grain weights and nitrogen content.

MAIN EXPERIMENT

GRAIN TONNES/HECTARE

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

N RES[92]	(0)	(75)	Mean
LAND TRT[92]			
FO RA LN	6.38	6.33	6.35
RYE LN	6.12	6.30	6.21
TUMDN LN	5.93	6.34	6.13
FLLOW LN	6.39	6.41	6.40
STUBL LN	6.54	6.00	6.27
Mean	6.27	6.27	6.27

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

LAND TRT	**N RES**	**LAND TRT N RES**
0.163	0.154	0.293
Except when comparing means with the same level(s) of **LAND TRT**		0.344

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	8	0.200	3.2
BLOCK.WP.SP	10	0.422	6.7

GRAIN MEAN DM% 86.8

SUB PLOT AREA HARVESTED 0.00121

https://doi.org/10.23637/ERADOC-1-48

93/W/CS/381

EXTRA PLOTS

GRAIN TONNES/HECTARE

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

N RES[92]	(0)	(75)	Mean
EXTRA[92]			
(EX FR LN)	6.69	6.71	6.70
(EX RY LN)	5.18	6.21	5.69
(EX RD LN)	6.17	6.39	6.28
Mean	6.01	6.43	6.22

GRAIN MEAN DM% 85.9

SUB PLOT AREA HARVESTED 0.00121

https://doi.org/10.23637/ERADOC-1-48

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 ferilizer (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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93/W/CS/386

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.

https://doi.org/10.23637/ERADOC-1-48

93/W/CS/386

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 N**
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

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/399

COVER CROPS AND N CYCLING

Object: To assess how effectively cover crops take up nitrogen and to assess how much of that nitrogen is subsequently made available to the following crop - Webbs.

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

The first year, forage rape, rye, tumbledown, w. and s. barley.

Design: 3 blocks of 5 plots split into 2 sub plots.

Whole plot dimensions: 9.0 x 12.0.

Treatments:

Whole plots

1. **LAND TRT** 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
RYE SB	Rye
TUMBDN SB	Tumbledown

Sub plots

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

0
75

plus one extra treatment

Whole plot

1. **EXTRA**

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

Sub plot

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

0
150

NOTE: **LAND TRT** TUMBDN SB was given 50 kg of seed from the previous s. barley crop to ensure volunteers.

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/399

Experimental diary:

20-Aug-92 : **T** : **LAND TRT** FO RA SB, RYE SB, TUMBDN SB: Shallow cultivated with Bomford Dynadrive.
21-Aug-92 : **T** : **LAND TRT** FO RA SB: Forage rape broadcast at 30 kg.
: **T** : **LAND TRT** RYE SB: Amando broadcast at 180 kg.
: **T** : **LAND TRT** TUMBDN SB: S. barley (cv Alexis) broadcast at 50 kg.
: **T** : **LAND TRT** FO RA SB, RYE SB, TUMBDN SB: Rolled.
10-Sep-92 : **T** : **LAND TRT** FALLOWSB: Ploughed.
: **T** : **EXTRA** W BARLEY: Ploughed.
11-Sep-92 : **T** : **EXTRA** W BARLEY: Disced, rotary harrowed twice, Puffin, dressed Cerevax, drilled at 380 seeds per square metre.
16-Sep-92 : **T** : **LAND TRT** FALLOWSB: Rolled.
: **T** : **EXTRA** W BARLEY: Rolled.
19-Oct-92 : **T** : **LAND TRT** FO RA SB: Pilot at 75 ml with Cropspray 11E at 2.0 l in 200 l.
05-Mar-93 : **T** : **LAND TRT** FALLOWSB, FO RA SB, RYE SB, TUMBDN SB: Ploughed.
08-Mar-93 : **T** : **LAND TRT** FALLOWSB, FO RA SB, RYE SB, TUMBDN SB: Rotary harrowed twice, Alexis, dressed Cerevax Extra, drilled at 350 seeds per square metre.
14-Apr-93 : **T** : **N EXTRA** 150: 27% N at 556 kg.
06-May-93 : **T** : **N** 75: 27% N at 278 kg.
10-May-93 : B : Ally at 30 g and Starane 2 at 1.0 l in 200 l.
13-Aug-93 : B : Combine harvested.

Previous crops: S. barley 1991 and 1992.

NOTE: Plots were labelled with 15N in autumn. Crop, soil and soil water samples were taken for N analysis at various times during the season.

https://doi.org/10.23637/ERADOC-1-48

93/R/CS/399

GRAIN TONNES/HECTARE

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

SPRING BARLEY

N	NONE	APPLIED	Mean
LAND TRT			
FALLOWSB	2.49	3.65	3.07
FO RA SB	2.37	2.62	2.50
RYE SB	1.99	2.76	2.38
TUMBDN SB	2.74	3.21	2.98
Mean	2.40	3.06	2.73

WINTER BARLEY

N EXTRA	0	150	Mean
	1.61	3.24	2.42

GRAND MEAN 2.67

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

LAND TRT	**N**	**LAND TRT N & N EXTRA**
0.296	0.148	0.362

Except when comparing means with the same level(s) of **CROPS** 0.295

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	8	0.362	13.6
BLOCK.WP.SP	10	0.362	13.6

GRAIN MEAN DM% 84.7

SUB PLOT AREA HARVESTED 0.00082

https://doi.org/10.23637/ERADOC-1-48 *pp 53*

93/R/CS/401

NITROGEN INDICATORS

Object: To relate chlorophyll concentrations in individual leaves of w. wheat to nitrogen supply and crop yield - Long Hoos I/II.

Sponsors: P. B. Barraclough.

The first year, w. wheat.

Design: 3 blocks of 8 plots.

Plot dimensions: 3.0 x 15.0.

Treatments:

N	Spring nitrogen (kg N) at first node formation:
0	0
50	50
100	100
150	150
200	200
250	250
300	300
40X5	40 plus 40 at four subsequent weekly intervals (total 200)

Experimental diary:

11-Sep-92 : B : Disced.
16-Sep-92 : B : Disced.
17-Sep-92 : B : Rolled.
29-Sep-92 : B : Sting CT at 2.0 l in 200 l.
30-Sep-92 : B : Ploughed.
09-Oct-92 : B : Disced twice.
10-Oct-92 : B : Rotary harrowed, Hereward, dressed Cerevax, drilled at 400 seeds per square metre.
24-Nov-92 : B : Draza at 5.5 kg.
24-Feb-93 : B : Panther at 2.0 l in 200 l.
12-Mar-93 : B : PK as (0:18:36) at 1250 kg.
19-Apr-93 : **T** : **N** 50: 34.5% N at 145 kg.
: **T** : **N** 100: 34.5% N at 290 kg.
: **T** : **N** 150: 34.5% N at 435 kg.
: **T** : **N** 200: 34.5% N at 580 kg.
: **T** : **N** 250: 34.5% N at 725 kg.
: **T** : **N** 300: 34.5% N at 870 kg.
: **T** : **N** 40X5: 34.5% N at 116 kg.
06-May-93 : **T** : **N** 40X5: 34.5% N at 116 kg.
13-May-93 : **T** : **N** 40X5: 34.5% N at 116 kg.
20-May-93 : **T** : **N** 40X5: 34.5% N at 116 kg.
27-May-93 : **T** : **N** 40X5: 34.5% N at 116 kg.
03-Jun-93 : B : Cheetah R at 2.5 l and Calixin at 0.70 l in 200 l.
08-Jun-93 : B : Halo at 2.0 l in 200 l.
16-Aug-93 : B : Combine harvested.

https://doi.org/10.23637/ERADOC-1-48 *pp 54*

93/R/CS/401

Previous crops: W. wheat 1991, s. oats 1992.

NOTE: Leaf chlorophyll concentrations were measured weekly from the beginning of stem extension. Total N and nitrate concentrations were measured in individual plant parts during stem extension.

GRAIN TONNES/HECTARE

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

N RATE	
0	4.37
50	6.11
100	8.06
150	8.86
200	8.99
250	9.18
300	9.47
40X5	9.88
Mean	8.11

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

N RATE
0.242

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	14	0.297	3.7

GRAIN MEAN DM% 85.2

PLOT AREA HARVESTED 0.00230

https://doi.org/10.23637/ERADOC-1-48