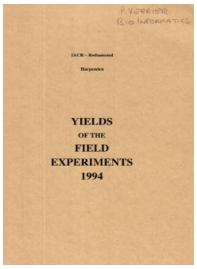
ROTHAMSTED RESEARCH

Yields of the Field Experiments 1994

Full Table of Content



Crop Sequences

Rothamsted Research

Rothamsted Research (1995) *Crop Sequences ;* Yields Of The Field Experiments 1994, pp 52 - 92 **- DOI: https://doi.org/10.23637/ERADOC-1-49**

94/R/CS/10 and 94/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 33rd year, w. lupins.

For previous years see 'Details' 1967, 1973 and 74-93/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), applied cumulatively since 1991:

0
30

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/10 and 94/W/CS/10

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, 1993 and 1994).
(2) Test manganese was applied cumulatively, 1987-90.

Experimental diary:

Sawyers I (R):
16-Oct-93 : B : Ploughed.
19-Oct-93 : B : Disced.
20-Oct-93 : B : Spring-tine cultivated, CH304/70 drilled at 40 seeds per m^2.
26-Oct-93 : B : Opogard 500 FW at 2.8 l in 200 l.
16-Feb-94 : B : Atlas Simazine at 1.0 l in 200 l.
13-Jun-94 : **T** : **SULPHUR** 30: 30 kg S as gypsum.
06-Sep-94 : B : Barclay Gallup at 4.0 l in 200 l.

Stackyard C (W):
16-Sep-93 : B : Ploughed.
24-Sep-93 : B : Rotary harrowed, CH304/70 drilled at 40 seeds per m^2.
18-Feb-94 : B : Atlas Simazine at 1.0 l in 200 l.
10-Mar-94 : **T** : **SULPHUR** 30: 30 kg S as gypsum.
09-May-94 : B : Sportak 45 at 1.5 l in 200 l.

NOTE: Due to poor winter survival at Rothamsted and to excessive grazing damage at Woburn, both crops were abandoned in summer and no yields were taken.

https://doi.org/10.23637/ERADOC-1-49

94/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 21st year, s. barley.

For previous years see 74-93/R/CS/140.

Design: Single replicate of 32 plots.

Whole plot dimensions: 4.06 x 4.57.

Treatments: Applied cumulatively every year until 1993, none in 1994.

All combinations of:-

1. **WEEDKLLR** Weedkiller in autumn:

   (NONE) None
   (GLYPHOS) Glyphosate to barley stubble each autumn

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

   (NONE) None
   (TRIADIM) Triadimefon in autumn

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

   (NONE) None
   (BENOMYL) Benomyl to the seedbed

4. **INSCTCDE** Insecticide:

   (NONE) None
   (CHLORFEN) Chlorfenvinphos to the seedbed

5. **NEMACIDE** Nematicide:

   (NONE) None
   (ALDICARB) Aldicarb to the seedbed

Experimental diary:

03-Nov-93 : B : Ploughed.
17-Mar-94 : B : Spring-tine cultivated, rotary harrowed, Alexis undressed, drilled at 350 seeds per m^2, rolled.
19-Apr-94 : B : 34.5% N at 428 kg.
02-Jun-94 : B : Oxytril CM at 1.5 l with Duplosan New System CMPP at 2.0 l in 200 l.
08-Aug-94 : B : Combine harvested.

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/140

NOTE: Samples of topsoil were taken from representative plots in August 1994 for the estimation of pesticide residues. The influence of treatment history on the breakdown rates of the chemicals was examined in these samples.

GRAIN TONNES/HECTARE

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

FUNGCIDE[1]	(NONE)	(TRIADIM)	Mean
WEEDKLLR			
(NONE)	5.29	5.35	5.32
(GLYPHOS)	5.19	5.25	5.22
Mean	5.24	5.30	5.27

FUNGCIDE[2]	(NONE)	(BENOMYL)	Mean
WEEDKLLR			
(NONE)	5.25	5.39	5.32
(GLYPHOS)	5.08	5.36	5.22
Mean	5.16	5.37	5.27

FUNGCIDE[2]	(NONE)	(BENOMYL)	Mean
FUNGCIDE[1]			
(NONE)	5.24	5.24	5.24
(TRIADIM)	5.09	5.51	5.30
Mean	5.16	5.37	5.27

INSCTCDE	(NONE)	(CHLORFEN)	Mean
WEEDKLLR			
(NONE)	5.45	5.20	5.32
(GLYPHOS)	5.34	5.09	5.22
Mean	5.39	5.14	5.27

INSCTCDE	(NONE)	(CHLORFEN)	Mean
FUNGCIDE[1]			
(NONE)	5.24	5.23	5.24
(TRIADIM)	5.55	5.05	5.30
Mean	5.39	5.14	5.27

INSCTCDE	(NONE)	(CHLORFEN)	Mean
FUNGCIDE[2]			
(NONE)	5.24	5.09	5.16
(BENOMYL)	5.55	5.20	5.37
Mean	5.39	5.14	5.27

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/140

GRAIN TONNES/HECTARE

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

NEMACIDE	(NONE)	(ALDICARB)	Mean
WEEDKLLR			
(NONE)	5.39	5.26	5.32
(GLYPHOS)	5.25	5.18	5.22
Mean	5.32	5.22	5.27

NEMACIDE	(NONE)	(ALDICARB)	Mean
FUNGCIDE[1]			
(NONE)	5.31	5.17	5.24
(TRIADIM)	5.32	5.28	5.30
Mean	5.32	5.22	5.27

NEMACIDE	(NONE)	(ALDICARB)	Mean
FUNGCIDE[2]			
(NONE)	5.20	5.13	5.16
(BENOMYL)	5.43	5.31	5.37
Mean	5.32	5.22	5.27

NEMACIDE	(NONE)	(ALDICARB)	Mean
INSCTCDE			
(NONE)	5.39	5.40	5.39
(CHLORFEN)	5.24	5.05	5.14
Mean	5.32	5.22	5.27

	FUNGCIDE[1]	(NONE)		(TRIADIM)	
WEEDKLLR	**FUNGCIDE[2]**	(NONE)	(BENOMYL)	(NONE)	(BENOMYL)
(NONE)		5.23	5.35	5.27	5.43
(GLYPHOS)		5.25	5.12	4.91	5.59

	FUNGCIDE[1]	(NONE)		(TRIADIM)	
WEEDKLLR	**INSCTCDE**	(NONE)	(CS)	(NONE)	(CS)
(NONE)		5.35	5.23	5.54	5.16
(GLYPHOS)		5.14	5.23	5.55	4.94

	FUNGCIDE[2]	(NONE)		(BENOMYL)	
WEEDKLLR	**INSCTCDE**	(NONE)	(CS)	(NONE)	(CS)
(NONE)		5.23	5.27	5.66	5.13
(GLYPHOS)		5.25	4.90	5.43	5.28

	FUNGCIDE[2]	(NONE)		(BENOMYL)	
FUNGCIDE[1]	**INSCTCDE**	(NONE)	(CS)	(NONE)	(CS)
(NONE)		5.13	5.35	5.36	5.12
(TRIADIM)		5.36	4.82	5.73	5.29

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/140

GRAIN TONNES/HECTARE

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

	FUNGCIDE[1]	(NONE)		(TRIADIM)	
WEEDKLLR	NEMACIDE	(NONE)	(AL)	(NONE)	(AL)
(NONE)		5.38	5.20	5.39	5.31
(GLYPHOS)		5.24	5.13	5.25	5.24

	FUNGCIDE[2]	(NONE)		(BENOMYL)	
WEEDKLLR	NEMACIDE	(NONE)	(AL)	(NONE)	(AL)
(NONE)		5.30	5.20	5.47	5.31
(GLYPHOS)		5.10	5.05	5.39	5.32

	FUNGCIDE[2]	(NONE)		(BENOMYL)	
FUNGCIDE[1]	NEMACIDE	(NONE)	(AL)	(NONE)	(AL)
(NONE)		5.31	5.17	5.31	5.16
(TRIADIM)		5.09	5.09	5.55	5.47

	INSCTCDE	(NONE)		(CHLORFEN)	
WEEDKLLR	NEMACIDE	(NONE)	(AL)	(NONE)	(AL)
(NONE)		5.46	5.43	5.32	5.08
(GLYPHOS)		5.33	5.36	5.17	5.01

	INSCTCDE	(NONE)		(CHLORFEN)	
FUNGCIDE[1]	NEMACIDE	(NONE)	(AL)	(NONE)	(AL)
(NONE)		5.27	5.21	5.35	5.12
(TRIADIM)		5.51	5.58	5.14	4.97

	INSCTCDE	(NONE)		(CHLORFEN)	
FUNGCIDE[2]	NEMACIDE	(NONE)	(AL)	(NONE)	(AL)
(NONE)		5.20	5.28	5.20	4.97
(BENOMYL)		5.58	5.51	5.28	5.12

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

Margins of two factor tables	0.109
Two factor tables	0.154
Three factor tables	0.218

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

Stratum	d.f.	s.e.	cv%
WP	6	0.308	5.8

GRAIN MEAN DM% 87.9

PLOT AREA HARVESTED 0.00069

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/309 and 94/W/CS/309

LONG-TERM STRAW INCORPORATION

Object: To study the effects of rotational ploughing and time of sowing after the incorporation or burning of straw on soil conditions and pests, diseases, weeds and yield of w. wheat - Rothamsted (R) Great Knott III and Woburn (W) Far Field I.

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

The tenth year, w. wheat.

For previous years see 85-93/R&W/CS/309.

Design: 4 randomised blocks of 12 plots split into 2 sub plots (R).
2 randomised blocks of 12 plots split into 2 sub plots (W).

Whole plot dimensions: 9.0 x 28.0 (R).
9.0 x 30.0 (W).

Treatments: All combinations of:-

Whole plots

1. **STRAWCUL** Treatment of straw of previous crop and type of cultivation up to 1994 (before the space) and subsequently (after the space):

BT1 BT	
BT1T2 CT	
BP2 BP	
BT1P2 CP	
CT1 CT	
CT1 CP	
CT1T2 CT	(duplicated)
CP2 CP	(duplicated)
CT1P2 CT	(duplicated)

Sub-plots

2. **SOW DATE** Date of sowing:

E	Early
L	Late

NOTES: (1) The following codes are used:
B Straw burnt
C Straw chopped and spread
T1 Cultivated to 10 cm depth
T1P2 Cultivated to 10 cm depth, ploughed to 20 cm
T1T2 Cultivated to 10 cm depth and again tc 20 cm
P2 Ploughed to 20 cm depth

https://doi.org/10.23637/ERADOC-1-49 *pp 8*

94/R/CS/309 and 94/W/CS/309

NOTES: (2) In 1994 T plots were cultivated to 10 cm and P plots were ploughed to 20 cm depth.
(3) In the experimental diary only the code after the space is used. i.e. BT, CT, BP, CP.

Experimental diary:

Great Knott III (R).

19-Aug-93 : **T** : **STRAWCUL** CT, CP: Straw chopped.
27-Aug-93 : **T** : **STRAWCUL** BT, BP: Straw burnt, ash incorporated with discs.
18-Sep-93 : B : Sting CT at 2.0 l in 200 l.
27-Sep-93 : **T** : **STRAWCUL** BT, CT: Heavy spring-tine cultivated to 10 cm.
: **T** : **STRAWCUL** BP, CP: Ploughed to 20 cm.
19-Oct-93 : B : Disced, spring-tine cultivated.
20-Oct-93 : **T** : **SOW DATE** E: Rotary harrowed, Soissons, dressed Cerevax, drilled at 380 seeds per m^2.
08-Nov-93 : **T** : **SOW DATE** L: Rotary harrowed, Soissons, dressed Cerevax, drilled at 380 seeds per m^2.
17-Nov-93 : B : Optimol at 15 kg.
09-Mar-94 : B : 34.5% N at 118 kg.
12-Apr-94 : B : 34.5% N at 448 kg.
: B : Starane 2 at 0.75 l with Wildcat at 1.25 l in 200 l.
01-May-94 : B : Halo at 2.0 l with Tripart Brevis at 2.5 l in 200 l.
19-May-94 : B : Ally at 30 g with Cheetah Super at 3.0 l and Starane 2 at 0.75 l in 200 l.
31-May-94 : B : Bombardier at 1.0 l with Cyclone at 1.0 l in 200 l.
05-Aug-94 : B : Combine harvested.

Far Field I (W).

27-Aug-93 : **T** : **STRAWCUL** BT, BP: Straw burnt.
22-Sep-93 : **T** : **STRAWCUL** BT, CT: Heavy spring-tine cultivated to 10 cm.
22-Sep-93 : **T** : **STRAWCUL** BP, CP: Ploughed to 20 cm.
19-Oct-93 : B : Scythe at 4.0 l in 200 l.
20-Oct-93 : **T** : **SOW DATE** E: Rotary harrowed, Soissons, dressed Panoctine, drilled at 350 seeds per m^2.
08-Nov-93 : **T** : **SOW DATE** L: Rotary harrowed, Soissons, dressed Panoctine, drilled at 350 seeds per m^2.
28-Feb-94 : B : Draza at 5.5 kg.
14-Mar-94 : B : 34.5% N at 116 kg.
17-Mar-94 : **T** : **SOW DATE** L: Rotary harrowed, Soissons, dressed Rappor, drilled at 500 seeds per m^2.
04-May-94 : B : 34.5% N at 348 kg.
06-May-94 : B : Ally at 30 g with Oxytril CM at 1.0 l and Halo at 1.5 l in 200 l.
30-May-94 : B : Cyclone at 1.0 l with Bravo 500 at 1.0 l in 200 l.
14-Jun-94 : B : Hostathion at 0.84 l in 200 l.
28-Jun-94 : B : Halo at 2.0 l in 200 l.
16-Aug-94 : B : Combine harvested.

NOTES: (1) At Woburn the late sowing failed owing to poor establishment and subsequent damage by birds. These plots were re-drilled to w. wheat in spring.

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/309 and 94/W/CS/309

NOTES: (2) Establishment counts were made in winter, shoot numbers and total DM were measured in spring and components of yield were measured in summer. Numbers of grass weeds were counted in March and numbers of ears of grass weeds were counted in July. Crops were sampled in June or July to measure diseases affecting the stem bases and roots.

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

GRAIN TONNES/HECTARE

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

SOW DATE	E	L	Mean
STRAWCUL			
BT1 BT	8.40	9.30	8.85
BT1T2 CT	7.66	8.74	8.20
BP2 BP	9.72	9.86	9.79
BT1P2 CP	9.71	9.83	9.77
CT1 CT	6.97	7.85	7.41
CT1 CP	9.95	9.78	9.86
CT1T2 CT	6.60	7.80	7.20
CP2 CP	9.58	9.69	9.64
CT1P2 CT	8.42	9.26	8.84
Mean	8.47	9.07	8.77

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

STRAWCUL	**SOW DATE**	**STRAWCUL SOW DATE**	
0.394		0.523	min.rep
0.341	0.140	0.453	max-min
0.279		0.370	max.rep
Except when comparing means with the same level(s) of **STRAWCUL**		0.486	min.rep
		0.421	max-min
		0.344	max.rep

	STRAWCUL
min.rep	Any of the remainder
max-min	CT1T2 CT or CP2 CP or CT1P2 CT v any of the remainder
max.rep	CT1T2 CT or CP2 CP or CT1P2 CT

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	36	0.557	6.4
BLOCK.WP.SP	39	0.688	7.8

GRAIN MEAN DM% 84.9

SUB PLOT AREA HARVESTED 0.00644

https://doi.org/10.23637/ERADOC-1-49

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

GRAIN TONNES/HECTARE

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

SOW DATE	E	L	Mean
STRAWCUL			
BT1 BT	3.37	3.12	3.25
BT1T2 CT	2.34	3.11	2.73
BP2 BP	5.94	4.06	5.00
BT1P2 CP	5.22	3.13	4.17
CT1 CT	4.58	3.34	3.96
CT1 CP	8.02	4.12	6.07
CT1T2 CT	3.07	3.14	3.11
CP2 CP	5.35	3.65	4.50
CT1P2 CT	3.68	3.06	3.37
Mean	4.47	3.38	3.93

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

STRAWCUL	**SOW DATE**	**STRAWCUL SOW DATE**	
0.712		0.974	min.rep
0.617	0.271	0.843	max-min
0.504		0.689	max.rep
Except when comparing means with the same level(s) of			
STRAWCUL		0.939	min.rep
		0.813	max-min
		0.664	max.rep

	STRAWCUL
min.rep	Any of the remainder
max-min	CT1T2 CT or CP2 CP or CT1P2 CT v any of the remainder
max.rep	CT1T2 CT or CP2 CP or CT1P2 CT

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	14	0.712	18.1
BLOCK.WP.SP	15	0.939	23.9

GRAIN MEAN DM% 84.6

SUB PLOT AREA HARVESTED 0.00638

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/311

EFFECTS OF SHALLOW STRAW INCORPORATION

Object: To study the effects of straw incorporation by rotational ploughing, with shallow cultivation in the intervening years, on diseases and yield of winter wheat - West Barnfield I.

Sponsors: J.F. Jenkyn, R.J. Gutteridge, A.D. Todd.

The tenth year, w. wheat.

For previous years see 85-93/R/CS/311.

Design: 6 x 4 criss-cross split into 2 sub-plots. Originally a single replicate of 3 x 2 x 2 x 2 x 2.

Whole plot dimensions: 4.5 x 12.0.

Treatments: Combinations of:-

Whole plots

1. **STRAW** Treatments to straw of previous wheat:

BURNT	Burnt (duplicated)
BALED	Baled and removed (duplicated)
CHOPPED	Chopped (duplicated)

Criss-cross with

2. **CULTIVTN**

SHA CULT	Shallow tine cultivated to 10 cm depth (triplicated)
PLOUGHED	Ploughed to 23 cm depth

Experimental diary:

26-Aug-93 : **T** : **STRAW** BALED: Straw baled and removed.
: **T** : **STRAW** CHOPPED: Straw chopped with trailed chopper.
27-Aug-93 : **T** : **STRAW** BURNT: Straw burnt and ash incorporated with discs.
02-Sep-93 : B : PK as (0:18:36) at 300 kg.
18-Oct-93 : **T** : **CULTIVTN** PLOUGHED: Ploughed.
25-Oct-93 : **T** : **CULTIVTN** SHA CULT: Heavy spring-tine cultivated twice.
26-Oct-93 : B : Heavy spring-tine cultivated.
27-Oct-93 : B : Heavy spring-tine cultivated, rotary harrowed, Soissons, dressed Cerevax, drilled at 380 seeds per m^2.
28-Oct-93 : B : Draza at 5.5 kg.
19-Apr-94 : B : Briotril Plus 19/19 at 2.0 l with Hytane 500 SC at 2.0 l in 200 l.
23-Jun-94 : B : Cyclone at 1.0 l with Mallard 750 EC at 0.5 l in 200 l.
06-Aug-94 : B : Combine harvested.

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/311

NOTE: Established plants were counted in January. Numbers of ears of volunteers and grass weeds were counted in July and components of yield were measured. Crop was sampled in July to measure diseases affecting the stem bases and roots.

GRAIN TONNES/HECTARE

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

CULTIVTN	SHA CULT	PLOUGHED	Mean
STRAW			
BU	8.94	9.19	9.00
BA	5.16	8.44	5.98
CH	5.33	8.47	6.11
Mean	6.48	8.70	7.03

GRAIN MEAN DM% 86.5

SUB PLOT AREA HARVESTED 0.00276

https://doi.org/10.23637/ERADOC-1-49

94/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 seventh year, w. barley, w. oats, w. triticale, w. wheat, s. barley.

For previous years see 88-93/R/CS/323

Design: 3 randomised blocks of 26 plots.

Whole plot dimensions: 3.0 x 10.0.

CROPSEQ Crop sequences (1988 to 1994 respectively):

TTTTTTT
OTTTOTT
TOTTTOT
TTOTTTO
TTTOTTT
WWWWWWW
OWWWOWW
WOWWWOW
WWOWWWO
WWWOWWW
BBBBBBB
OBBBOBB
BOBBBOB
BBOBBBO
BBBOBBB
WTWTWTW
WBWBWBW
TBTBTBT
SBSBSBS
WWTTTWW
WWBBBWW
TTBBBTT
TTWWWTT
BBWWWBB
BBTTTBB
WWSSSWW

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

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/323

Experimental diary:

02-Sep-93	B	PK as (0:18:36) at 300 kg.
09-Sep-93	B	Ploughed.
23-Sep-93	B	Spring-tine cultivated.
23-Sep-93	T	**CROPSEQ** W. barley plots: Rotary harrowed, Magie, dressed Cerevax, drilled at 400 seeds per m^2.
24-Sep-93	T	**CROPSEQ** Oats plots: Rotary harrowed, Image, dressed Ceresol, drilled at 350 seeds per m^2.
	T	**CROPSEQ** Triticale plots: Rotary harrowed, Lasko, dressed Cerevax, drilled at 400 seeds per m^2.
	T	**CROPSEQ** Wheat plots: Rotary harrowed, Mercia, dressed Cerevax, drilled at 380 seeds per m^2.
	B	Glytex at 2.25 kg in 200 l.
08-Mar-94	T	**CROPSEQ** W. barley, oats, triticale and wheat plots: 34.5% N at 87 kg.
16-Mar-94	T	**CROPSEQ** S. barley plots: Rotary harrowed, Klaxon undressed, drilled at 350 seeds per m^2.
12-Apr-94	T	**CROPSEQ** Triticale plots: Hoegrass at 3.0 l with Starane 2 at 0.75 l in 220 l.
14-Apr-94	T	**CROPSEQ** Oats and triticale plots: 34.5% N at 346 kg.
	T	**CROPSEQ** W. barley plots: 34.5% N at 428 kg.
	T	**CROPSEQ** Wheat plots: 34.5% N at 496 kg.
	T	**CROPSEQ** S. barley plots: 34.5% N at 346 kg.
09-May-94	T	**CROPSEQ** W. barley plots: Starane 2 at 0.75 l with Tigress at 2.5 l in 200 l.
31-May-94	B	Mistral at 0.5 l with Radar at 0.5 l in 200 l.
01-Jun-94	T	**CROPSEQ** S. barley plots: Duplosan New System CMPP at 1.4 l with Oxytril CM at 1.0 l in 200 l.
26-Jul-94	T	**CROPSEQ** W. barley plots: Combine harvested.
02-Aug-94	T	**CROPSEQ** S. barley, wheat, oats and 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-1-49

94/R/CS/323

GRAIN TONNES/HECTARE

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

CROPSEQ	
TTTTTTT	5.35
OTTTOTT	5.04
TOTTTOT	6.23
TTOTTTO	6.95
TTTOTTT	5.91
WWWWWWW	4.70
OWWWOWW	4.84
WOWWWOW	5.01
WWOWWWO	6.55
WWWOWWW	6.65
BBBBBBB	6.46
OBBBOBB	7.15
BOBBBOB	5.23
BBOBBBO	6.60
BBBOBBB	6.48
WTWTWTW	5.27
WBWBWBW	6.25
TBTBTBT	6.98
SBSBSBS	5.09
WWTTTWW	6.64
WWBBBWW	5.65
TTBBBTT	5.87
TTWWWTT	5.18
BBWWWBB	6.46
BBTTTBB	7.04
WWSSSWW	5.28
Mean	5.96

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

CROPSEQ
0.632

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	50	0.774	13.0

GRAIN MEAN DM% 84.8

PLOT AREA HARVESTED 0.00226

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/326 and 94/W/CS/326

AMOUNTS OF STRAW

Object: To study the effects of different 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 eighth year, w. wheat.

For previous years see 87-93/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 incorporated into the seedbed (t per ha 85% DM), cumulative to previous annual dressings:

		R	W
NONE	None	-	-
NORMAL	Normal	5.3	2.8
2 NORMAL	Twice normal	10.6	5.6
4 NORMAL	Four times normal	21.2	11.2

Experimental diary:

Great Knott III (R)

25-Aug-93 : **T** : **STRAW** NORMAL, 2 NORMAL, 4 NORMAL: Straw applied.
: **T** : **STRAW** NONE: Straw removed.
: B : Straw and stubble chopped.
27-Sep-93 : B : Ploughed.
19-Oct-93 : B : Disced, spring-tine cultivated.
20-Oct-93 : B : Rotary harrowed, Soissons, dressed Cerevax, drilled at 380 seeds per m^2.
17-Nov-93 : B : Optimol at 15 kg.
09-Mar-94 : B : 34.5% N at 118 kg.
12-Apr-94 : B : 34.5% N at 448 kg.
: B : Starane 2 at 0.75 l with Wildcat at 1.25 l in 200 l.
01-May-94 : B : Halo at 2.0 l with Tripart Brevis at 2.5 l in 200 l.
24-May-94 : B : Ally at 30 g with Cheetah Super at 1.5 l and Starane 2 at 0.75 l in 200 l.
31-May-94 : B : Bombardier at 1.0 l with Cyclone at 1.0 l in 200 l.
06-Aug-94 : B : Combine harvested.

Far Field I (W)

17-Aug-93 : **T** : **STRAW** NORMAL, 2 NORMAL, 4 NORMAL: Straw applied.
: **T** : **STRAW** NONE: Straw removed.
20-Aug-93 : B : Straw and stubble chopped.
22-Sep-93 : B : Tine cultivated to 10 cm.
19-Oct-93 : B : Scythe at 4.0 l in 200 l.

https://doi.org/10.23637/ERADOC-1-49 *pp 17*

94/R/CS/326 and 94/W/CS/326

Experimental diary:

Far Field I (W)

20-Oct-93 : B : Rotary harrowed, Soissons, dressed Panoctine, drilled at 350 seeds per m^2.
28-Feb-94 : B : Draza at 5.5 kg.
14-Mar-94 : B : 34.5% N at 116 kg.
04-May-94 : B : 34.5% N at 348 kg.
06-May-94 : B : Ally at 30 g with Oxytril CM at 1.0 l and Halo at 1.5 l in 200 l.
30-May-94 : B : Cyclone at 1.0 l with Bravo 500 at 1.0 l in 200 l.
14-Jun-94 : B : Hostathion at 0.84 l in 200 l.
16-Aug-94 : B : Combine harvested.

NOTE: Establishment counts were made in winter. In summer fertile ear numbers and harvest index were measured.

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

GRAIN TONNES/HECTARE

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

STRAW	NONE	NORMAL	2 NORMAL	4 NORMAL	Mean
	9.78	9.69	9.71	9.67	9.71

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

STRAW
0.123

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	9	0.173	1.8

GRAIN MEAN DM% 86.2

PLOT AREA HARVESTED 0.00310

https://doi.org/10.23637/ERADOC-1-49

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

GRAIN TONNES/HECTARE

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

STRAW	NONE	NORMAL	2 NORMAL	4 NORMAL	Mean
	4.48	5.03	4.59	4.11	4.55

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

STRAW
1.258

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	6	1.540	33.8

GRAIN MEAN DM% 86.1

PLOT AREA HARVESTED 0.00319

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/331

TAKE-ALL INOCULATION

Object: To compare a range of methods of artificially inoculating take-all (*Gaeumannomyces graminis*), to assess the residual effects of a seed treatment 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 sixth year, w. wheat, w. oats.

For previous years see 89-93/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 in the fifth year (1993) to control take-all:
NONE O W	None (w. oats 1994, alternating with w. wheat)
NONE W O	None (w. wheat 1994, 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 (cv. Riband) seed drilled.

Experimental diary:

13-Sep-93 : B : Ploughed.
21-Oct-93 : B : Heavy spring-tine cultivated.
22-Oct-93 : **T** : **INOC+SDT** NONE O W: Image, dressed Panoctine Plus, drilled at 350 seeds per m^2.
: **T** : **INOC+SDT** All plots except NONE O W: Mercia, dressed Cerevax, drilled at 380 seeds per m^2.
26-Oct-93 : **T** : **INOC+SDT** NONE O W: Glytex at 2.25 kg in 200 l.
21-Dec-93 : B : Draza at 5.5 kg.
09-Mar-94 : B : 34.5% N at 118 kg.
19-Apr-94 : B : 34.5% N at 448 kg.
09-May-94 : **T** : **INOC+SDT** All plots except NONE O W: Ally at 30 g with Cheetah Super at 3.0 l and Starane 2 at 0.75 l in 200 l.
: B : Halo at 2.0 l with New 5C Cycocel at 2.5 l in 200 l.
20-May-94 : B : 34.5% N at 100 kg.

https://doi.org/10.23637/ERADOC-1-49 *pp 20*

94/R/CS/331

Experimental diary:
17-Jun-94 : B : Hostathion at 840 ml in 200 l.
23-Jun-94 : B : Cyclone at 1.0 l with Mallard 750 EC at 0.5 l in 200 l.
15-Aug-94 : **T** : **INOC+SDT** All plots except NONE O W: Combine harvested.
23-Aug-94 : **T** : **INOC+SDT** NONE O W: Combine harvested.

NOTE: Plant samples were taken in July for take-all assessments.

GRAIN TONNES/HECTARE

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

INOC+SDT	
NONE W O	8.71
NONE W W	8.29
I PRE PL	8.48
I PRE SO	8.56
I CD	8.02
SEEDTR 0	8.51
SEEDTR 1	8.19
SEEDTR 2	8.40
Mean	8.40

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

INOC+SDT
0.295

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	21	0.418	5.0

GRAIN MEAN DM% 84.9

PLOT AREA HARVESTED 0.00506

https://doi.org/10.23637/ERADOC-1-49

94/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, J.F. Jenkyn, R.J. Gutteridge.

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 fifth year, ryegrass, clover, tumbledown, w. oats and w. wheat.

For previous years see 90-93/W/CS/347.

Treatments:

Treatment phase (5th year)

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. oats, in arable sequence w. wheat, w. wheat, w. oats, w. wheat, w. oats

Test phase (2nd year, w. wheat):

Whole plots

1. **PREVCROP** Previous crops, cumulative 1990 to 1992 (as **CROPS** above):

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

https://doi.org/10.23637/ERADOC-1-49 *pp 22*

94/W/CS/347

Sub-plots (**N** criss-cross, **WHEAT** split-plots)

2. **N** Fertilizer nitrogen, cumulative to 1993, applied in spring:

NO	None
N OPT	Optimum

3. **WHEAT** Residual effects of time of ploughing and drilling w. wheat in autumn 1992 and spring 1993:

(W)	Winter
(S)	Spring

NOTES: (1) Among the three blocks still in the treatment phase, yields were taken from the w. oats plots and from the ley plots from which the cuttings were removed.
(2) The other three blocks were sown to winter-sown or spring-sown wheat in 1993 and were also split to test for nitrogen. These blocks were sown to a second wheat test crop in 1994.

Experimental diary:

Treatment phase:

02-Sep-93 : **T** : **CROPS** ARABLE: Sting CT at 8.0 l in 200 l.
08-Sep-93 : **T** : **CROPS** ARABLE: Ploughed.
20 Oct-93 : **T** : **CROPS** ARABLE: PK as (0:18:36) at 694 kg, spring-tine cultivated.
22-Oct-93 : **T** : **CROPS** ARABLE: Rotary harrowed, Image, dressed Rappor Plus, drilled at 425 seeds per m^2.
02-Nov-93 : **T** : **CROPS** ARABLE: Glytex at 2.25 l in 200 l.
12-Apr-94 : **T** : **CROPS** RY+CL RE: Triple superphosphate at 39 kg and muriate of potash at 137 kg.
: **T** : **CROPS** RY+N RE: Triple superphosphate at 26 kg, muriate of potash at 106 kg and 27% N at 370 kg.
20-Apr-94 : **T** : **CROPS** ARABLE: 27% N at 370 kg.
29-May-94 : **T** : **CROPS** ARABLE: Tilt 250 EC at 0.5 l in 200 l.
01-Jun-94 : **T** : **CROPS** RY LF, RY+CL LF, RY+CL RE, RY+N RE, TU LF: Cut.
: **T** : **CROPS** RY+CL RE, RY+N RE: Cuttings removed.
13-Jul-94 : **T** : **CROPS** RY LF, RY+CL LF, RY+CL RE, RY+N RE, TU LF: Cut.
: **T** : **CROPS** RY+CL RE, RY+N RE: Cuttings removed.
05-Aug-94 : **T** : **CROPS** ARABLE: Combine harvested.
22-Sep-94 : **T** : **CROPS** RY LF, RY+CL LF, RY+CL RE, RY+N RE, TU LF: Cut.
: **T** : **CROPS** RY+CL RE, RY+N RE: Cuttings removed.

Test phase:

02-Sep-93 : **T** : Sting CT at 8.0 l in 200 l.
08-Sep-93 : **T** : Ploughed.
19-Oct-93 : **T** : PK as (0:18:36) at 694 kg.
20-Oct-93 : **T** : Spring-tine cultivated.
23-Oct-93 : **T** : Rotary harrowed twice, Cadenza, dressed Cerevax, drilled at 325 seeds per m^2.
02-Nov-93 : **T** : Glytex at 2.25 l in 200 l.
21-Mar-94 : **T** : **N** N OPT: 27% N at 148 kg.
03-May-94 : **T** : **N** N OPT: 27% N at 592 kg.

https://doi.org/10.23637/ERADOC-1-49 *pp 23*

94/W/CS/347

Experimental diary:

30-May-94 : **T** : Ally at 30 g with Starane 2 at 0.75 l in 200 l.
: **T** : Cyclone at 1.0 l with Mistral at 0.50 l in 200 l.
08-Jul-94 : **T** : Aphox at 280 g in 200 l.
20-Aug-94 : **T** : Combine harvested.

NOTES: (1) Soil nitrogen was measured in autumn 1993 and spring 1994. In all crops of the treatment phase, ground cover, plant numbers, plant height and growth stages were estimated in spring 1994 and again in autumn 1994 before sowing the first wheat test crop.
(2) The wheat was sampled in June to measure diseases affecting the stem bases and roots.

TREATMENT PHASE

GRASS

1ST CUT (1/6/94) DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	4.32	3.05	3.68

1ST CUT MEAN DM% 20.9

PLOT AREA HARVESTED 0.00299

2ND CUT (13/7/94) DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	2.28	1.62	1.95

2ND CUT MEAN DM% 28.3

PLOT AREA HARVESTED 0.00264

3RD CUT (22/9/94) DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	0.96	0.37	0.67

3RD CUT MEAN DM% 28.4

PLOT AREA HARVESTED 0.00264

https://doi.org/10.23637/ERADOC-1-49 *pp 24*

94/W/CS/347

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	7.56	5.03	6.30

TOTAL OF 3 CUTS MEAN DM% 25.9

W. OATS

GRAIN TONNES/HECTARE 6.00

GRAIN MEAN DM% 87.7

PLOT AREA HARVESTED 0.00572

TEST PHASE

GRAIN TONNES/HECTARE

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

N	NO	N OPT	Mean
PREVCROP			
(RY LF)	3.40	7.35	5.38
(RY+CL LF)	2.97	7.26	5.11
(RY+CL RE)	3.02	7.37	5.19
(RY+N RE)	3.20	6.61	4.91
(TU LF)	2.56	7.39	4.97
(ARABLE)	2.20	5.86	4.03
Mean	2.89	6.97	4.93

WHEAT	(W)	(S)	Mean
PREVCROP			
(RY LF)	5.43	5.32	5.38
(RY+CL LF)	5.10	5.13	5.11
(RY+CL RE)	5.25	5.14	5.19
(RY+N RE)	4.81	5.01	4.91
(TU LF)	5.03	4.92	4.97
(ARABLE)	3.93	4.13	4.03
Mean	4.92	4.94	4.93

WHEAT	(W)	(S)	Mean
N			
NO	2.91	2.87	2.89
N OPT	6.93	7.01	6.97
Mean	4.92	4.94	4.93

https://doi.org/10.23637/ERADOC-1-49

94/W/CS/347

TEST PHASE

GRAIN TONNES/HECTARE

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

	WHEAT	(W)		(S)	
PREVCROP	N	NO	N OPT	NO	N OPT
(RY LF)		3.65	7.20	3.15	7.50
(RY+CL LF)		2.89	7.30	3.04	7.23
(RY+CL RE)		3.13	7.37	2.91	7.36
(RY+N RE)		3.14	6.47	3.27	6.75
(TU LF)		2.60	7.46	2.53	7.31
(ARABLE)		2.07	5.80	2.34	5.93

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

	PREVCROP	WHEAT	PREVCROP WHEAT
.	0.443	0.106	0.480
Except when comparing means with the same level(s) of			
PREVCROP			0.258

	PREVCROP* N	WHEAT* N	PREVCROP* WHEAT N
	0.565	0.165	0.615
Except when comparing means with the same level(s) of			
PREVCROP	0.532		0.592
WHEAT		0.157	
PREVCROP.WHEAT			0.578
PREVCROP.N			0.343

* Within the same level of **N** only

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP1	10	0.543	11.0
BLOCK.WP1.SP	12	0.317	6.4
BLOCK.WP1.WP2	10	0.693	14.1
BLOCK.WP1.SP.WP2	12	0.391	7.9

GRAIN MEAN DM% 83.6

SUB PLOT AREA HARVESTED 0.00279 (AVERAGE)

https://doi.org/10.23637/ERADOC-1-49

94/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 fourth year, w. wheat.

For previous years see 91-93/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 1991-1994 and level of volunteers in 1992-1994:
E E E E	Early in 1991, 1992, 1993 and 1994
E L L L	Early in 1991, late in 1992, 1993 and 1994
E L+ L+ L+	Early in 1991, late in 1992, 1993 and 1994, volunteers encouraged since 1992
L E E E	Late in 1991, early in 1992, 1993 and 1994
L L* L* L*	Late in 1991, 1992, 1993 and 1994, volunteers controlled since 1992

NOTE: On E L+ L+ L+, volunteers simulated by sowing 50 kg wheat seed after cultivations on 24 September, 1993.

Experimental diary:

13-Sep-93 : B : Ploughed.
23-Sep-93 : B : Rotary harrowed.
24-Sep-93 : **T** : **SOW SEQ** E E E E, L E E E: Rotary harrowed twice, Mercia, dressed Cerevax, drilled at 380 seeds per m^2.
15-Oct-93 : **T** : **SOW SEQ** L L* L* L*: Gramoxone 100 at 1.5 l with Vassgro Spreader at 220 ml in 220 l.
19-Oct-93 : **T** : **SOW SEQ** E L L L, E L+ L+ L+, L L* L* L*: Rotary harrowed, Mercia, dressed Cerevax, drilled at 380 seeds per m^2.
21-Dec-93 : B : Draza at 5.5 kg.
10-Mar-94 : B : 34.5% N at 118 kg.
19-Apr-94 : B : 34.5% N at 448 kg.
01-May-94 : B : Hytane 500 SC at 3.0 l with Starane 2 at 0.75 l and Wildcat at 1.25 l in 200 l.
19-May-94 : B : 34.5% N at 100 kg.
13-Jun-94 : B : Halo at 2.0 l with Mallard 750 EC at 0.5 l in 200 l.
17-Jun-94 : B : Hostathion at 840 ml in 200 l.
29-Jul-94 : B : Glyphogan at 4.0 l in 200 l.
16-Aug-94 : B : Combine harvested.

https://doi.org/10.23637/ERADOC-1-49 *pp 27*

94/R/CS/354

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

GRAIN TONNES/HECTARE

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

SOW	SEQ	
E	E E E	7.54
E	L L L	7.19
E	L+ L+ L+	7.15
L	E E E	7.37
L	L* L* L*	7.26
Mean		7.30

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

.	SOW	SEQ
	0.162	

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.229	3.1

GRAIN MEAN DM% 87.4

PLOT AREA HARVESTED 0.00226

https://doi.org/10.23637/ERADOC-1-49 *pp 28*

94/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 fourth year, w. wheat.

For previous years see 91-93/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:

28-Sep-93 : B : Ploughed.
20-Oct-93 : B : Heavy spring-tine cultivated.
21-Oct-93 : B : Disced.
26-Oct-93 : B : Heavy spring-tine cultivated.
29-Oct-93 : B : Rotary harrowed twice, Mercia, dressed Cerevax, drilled at 380 seeds per m^2.
21-Dec-93 : B : Draza at 5.5 kg.
18-Apr-94 : **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.
19-Apr-94 : B : Starane 2 at 0.75 l with Wildcat at 1.25 l in 200 l.
01-May-94 : B : Halo at 2.0 l with Tripart Brevis at 2.5 l in 200 l.
31-May-94 : B : Cyclone at 1.0 l with Mallard 750 EC at 0.5 l in 200 l.
13-Jun-94 : B : Hostathion at 840 ml in 200 l.
29-Jul-94 : B : Glyphogan at 4.0 l in 200 l.
15-Aug-94 : B : Combine harvested.

NOTE: Crop samples were taken for chemical analysis.

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/355

GRAIN TONNES/HECTARE

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

N	
0	1.98
50	4.51
100	6.14
150	7.85
200	7.33
250	6.51
300	6.83
Mean	5.88

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

N
0.495

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.606	10.3

GRAIN MEAN DM% 86.7

PLOT AREA HARVESTED 0.00483

https://doi.org/10.23637/ERADOC-1-49 *pp 30*

94/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 third year, w. wheat

For previous years see 92 & 93/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

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)	200	200	-
(2)	400	400	-
(3)	600	600	-
(30)	600	600	Nil
(3S)	600	600	500

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

NOTES: (1) **INOCULTN[92]** (0), (30): Nil occurs where the empty drill was drawn across the plots.
(2) Some of the inoculation rates were incorrectly recorded in 1992 and 1993. These should be corrected using the above rates.

Experimental diary:

16-Sep-93 : B : Ploughed.
18-Oct-93 : B : Rotary harrowed, Mercia, undressed, drilled at 325 seeds per m^2.
14-Mar-94 : B : 34.5% N at 116 kg.
28-Apr-94 : B : 34.5% N at 464 kg.
09-May-94 : B : Ally at 30 g with Oxytril CM at 1.0 l and Halo at 1.5 l in 200 l.
30-May-94 : B : Cyclone at 1.0 l with Mistral at 0.5 l in 200 l.
14-Jun-94 : B : Hostathion at 0.84 l in 200 l.
15-Aug-94 : B : Combine harvested.

NOTE: Plant samples for take-all assessment were taken at the end of June.

https://doi.org/10.23637/ERADOC-1-49 *pp 31*

94/W/CS/375

GRAIN TONNES/HECTARE

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

INOCULTN[92]	(0)	(1)	(2)	(3)	(30)	(3S)	Mean
SOW DATE[92]							
(E)	3.66	2.92	3.89	3.81	3.46	4.10	3.64
(L)	3.28	4.64	4.38	4.51	4.40	3.38	4.10
Mean	3.47	3.78	4.13	4.16	3.93	3.74	3.87

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

SOW DATE[92]	**INOCULTN[92]**	**SOW DATE[92] INOCULTN[92]**
0.235	0.407	0.576

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	22	0.705	18.2

GRAIN MEAN DM% 86.1

PLOT AREA HARVESTED 0.00132

https://doi.org/10.23637/ERADOC-1-49

94/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 second year, w. barley.

For previous year see 93/W/CS/386.

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

Whole plot dimensions: 9.0 x 12.0.

Treatments: All combinations of:-

Whole plots

1. **CROPS** Cover crops, sown in autumn 1992, tumbledown and fallow; all, except (WB), ploughed in spring 1993 and sown to s. barley:

(FA)	Fallow
(FR)	Forage rape
(PH)	Phacelia
(RG)	Ryegrass
(RY)	Rye
(R+M)	Rye and white mustard
(TD)	Tumbledown
(WM)	White mustard
(WB)	W. barley taken to maturity

Sub-plots

2. **N** Nitrogen fertilizer (kg N) applied in spring 1993:

	S. barley	W. barley
(-)	None	None
(N)	75	150

Experimental diary:

24-Aug-93 : B : Deep tine cultivated.
11-Sep-93 : B : Dolomite at 7.5 t.
15-Sep-93 : B : Ploughed.
16-Oct-93 : B : Rotary harrowed, Puffin, dressed Panoctine Plus, drilled at 350 seeds per m^2.
14-Apr-94 : B : 34.5% N at 464 kg.
01-May-94 : B : Oxytril CM at 1.5 l with Duplosan New system CMPP at 2.0 l and Punch C at 0.5 l in 200 l.
29-May-94 : B : Radar at 0.5 l with Mistral at 0.5 l in 200 l.
26-Jul-94 : B : Combine harvested.

https://doi.org/10.23637/ERADOC-1-49 *pp 33*

94/W/CS/386

GRAIN TONNES/HECTARE

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

N / CROPS	(-)	(N)	Mean
(FA)	6.70	6.31	6.50
(FR)	6.80	6.77	6.78
(PH)	6.76	6.52	6.64
(RG)	6.49	6.70	6.59
(RY)	6.79	6.94	6.86
(R+M)	7.09	7.12	7.10
(TD)	6.51	6.48	6.50
(WM)	6.62	6.60	6.61
(WB)	6.62	6.95	6.79
Mean	6.71	6.71	6.71

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

CROPS	N	CROPS N
0.265	0.090	0.327

Except when comparing means with the same level(s) of CROPS 0.270

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	16	0.325	4.8
BLOCK.WP.SP	18	0.331	4.9

GRAIN MEAN DM% 87.5

https://doi.org/10.23637/ERADOC-1-49

94/W/CS/386

STRAW TONNES/HECTARE

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

N	(-)	(N)	Mean
CROPS			
(FA)	2.44	2.02	2.23
(FR)	3.38	3.16	3.27
(PH)	3.25	3.82	3.53
(RG)	2.93	2.78	2.85
(RY)	4.45	1.61	3.03
(R+M)	3.70	3.39	3.54
(TD)	3.96	3.60	3.78
(WM)	2.41	3.77	3.09
(WB)	2.77	3.54	3.16
Mean	3.25	3.08	3.17

STRAW MEAN DM% 89.2

SUB PLOT AREA HARVESTED 0.00083

https://doi.org/10.23637/ERADOC-1-49 *pp 35*

94/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 second year, w. barley.

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

Whole plot dimensions: 9.0 x 12.0.

Treatments: All plots ploughed in autumn 1993 and sown to w. barley:

Whole plots

1. **LAND TRT** — Residues of cover crops, sown in autumn 1992, tumbledown and fallow. Plots ploughed in spring 1993 and sown to s. barley:

(FALLOWSB)	Fallow
(FO RA SB)	Forage rape
(RYE SB)	Rye
(TUMBDN SB)	Tumbledown

Sub-plots

2. **N** — Residues of nitrogen fertilizer (kg N) to s. barley 1993:

(0)
(75)

plus one extra treatment

Whole plot

1. **EXTRA**

(W BARLEY) — Residues of w. barley, sown in autumn 1992, taken to maturity:

Sub-plot

2. **N EXTRA** — Residues of nitrogen fertilizer (kg N) to w. barley, sown in autumn 1992:

(0)
(150)

https://doi.org/10.23637/ERADOC-1-49 *pp 36*

94/R/CS/399

Experimental diary:

13-Sep-93 : B : Ploughed.
08-Oct-93 : B : Rotary harrowed, Puffin, dressed Cerevax Extra, drilled at 350 seeds per m^2.
12-Nov-93 : B : Optimol at 15 kg.
19-Apr-94 : B : 34.5% N at 346 kg.
19-Apr-94 : B : Briotril Plus 19/19 at 2.0 l with Hytane 500 SC at 2.0 l in 200 l.
06-May-94 : B : Radar at 0.5 l with Standon Tridemorph 750 at 0.5 l in 200 l.
31-May-94 : B : Mistral at 0.5 l with Radar at 0.5 l in 200 l.
25-Jul-94 : B : Combine harvested.

NOTE: Soil water samples were taken for N analysis during the winter. Soil and crop samples were taken for N analysis during the summer.

GRAIN TONNES/HECTARE

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

N	(0)	(75)	Mean
LAND TRT			
(FALLOWSB)	6.15	5.99	6.07
(FO RA SB)	6.37	6.01	6.19
(RYE SB)	6.74	6.87	6.80
(TUMBDN SB)	6.93	6.74	6.84
Mean	6.55	6.40	6.48

WINTER BARLEY

N EXTRA	(0)	(150)	Mean
	4.81	5.23	5.02

GRAND MEAN 6.19

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

LAND TRT	**N**	**LAND TRT N & N EXTRA**
0.512	0.154	0.557

Except when comparing means with the same level(s) of **CROPS** 0.309

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	8	0.627	10.1
BLOCK.WP.SP	10	0.379	6.1

GRAIN MEAN DM% 88.3 SUB PLOT AREA HARVESTED 0.00082

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/408

MISCANTHUS SINENSIS GIGANTEUS STUDY

Object: To quantify the biomass yield potential of *Miscanthus sinensis giganteus* - Road Piece West.

Sponsor: D.G. Christian.

The second year, grass.

Design: 3 randomised blocks of 3 plots.

Whole plot dimensions: 10.0 x 10.0.

Treatments:

NITROGEN	Rates of fertilizer nitrogen (kg N):
-	None
N1	60
N2	120

Experimental diary:

```
   02-Feb-94 : B : Hytane 500 SC at 4.0 l in 220 l.
   08-Apr-94 : B : Scythe at 5.0 l in 220 l.
   06-May-94 : B : Muriate of potash at 233 kg.
             : T : NITROGEN N1, N2: 34.5% N at 174 kg and 348 kg
                   respectively.
   22-Feb-95 : B : Cut
```

NOTE: Crop was transplanted on 25 May, 1993.

DRY MATTER TONNES/HECTARE

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

NITROGEN	-	N1	N2	Mean
	7.30	7.09	8.01	7.47

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

NITROGEN
0.997

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	4	1.222	16.4

MEAN DM% 49.4

PLOT AREA HARVESTED 0.00422

https://doi.org/10.23637/ERADOC-1-49 *pp 38*

94/R/CS/411

PANICUM STUDY

Object: To quantify the biomass yield potential of varieties of *Panicum* sp. - Road Piece West.

Sponsor: D.G. Christian.

The second year, grass.

Design: 3 blocks of 7 x 2 plots.

Whole plot dimensions: 5.0 x 2.0.

Treatments:

1.	**VARIETY**	Variety:
	CAVIN R	Cave in Rock
	KANLOW	Kanlow
	PATHFIND	Pathfinder
	SUNBURST	Sunburst
	FOREST B	Forest Burg
	NEBR 28	NEBR 28
	DAKOTAH	Dakotah
2.	**NITROGEN**	Rates of fertilizer nitrogen (kg N):
	-	None
	N1	60

Experimental diary:

06-Jan-94 : B : Gramoxone 100 at 3.0 l in 220 l.
02-Feb-94 : B : Gesaprim 500 SC at 3.0 l in 220 l.
12-May-94 : **T** : **NITROGEN** N1: 34.5% N at 174 kg.
07-Mar-95 : B : Cut.

NOTE: All varieties were drilled at 10 kg on 12 May 1993.

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/411

DRY MATTER TONNES/HECTARE

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

NITROGEN	-	N1	Mean
VARIETY			
CAVIN R	6.75	5.65	6.20
KANLOW	7.71	3.57	5.64
PATHFIND	6.89	5.43	6.16
SUNBURST	5.34	4.58	4.96
FOREST B	6.27	6.31	6.29
NEBR 28	5.95	5.36	5.66
DAKOTAH	4.41	3.96	4.18
Mean	6.19	4.98	5.58

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

VARIETY	NITROGEN	VARIETY NITROGEN
0.802	0.429	1.134

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	26	1.389	24.9

MEAN DM% 74.8

PLOT AREA HARVESTED 0.00003

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/429

WINTER RYE AS AN ENERGY CROP

Object: To measure the effects of different levels of nitrogen fertilizer on the biomass yield of w. rye - Road Piece West.

Sponsor: D.G. Christian.

Design: 3 randomised blocks of 5 plots.

Plot dimensions: 3.0 x 15.0.

Treatments:

NITROGEN	Nitrogen fertilizer (kg N), applied as 'Nitro-Chalk':
N0	None
N1	30
N2	60
N3	90
N4	120

Experimental diary:

```
13-Sep-93 : B : Ploughed.
15-Oct-93 : B : Rotary harrowed, Amando, dressed Baytan, drilled at 350
                seeds per m².
14-Dec-93 : B : Draza at 5.5 kg.
22-Apr-94 : T : N 30: 27% N at 111 kg.
          : T : N 60: 27% N at 222 kg.
          : T : N 90: 27% N at 333 kg.
          : T : N 120: 27% N at 444 kg.
23-Aug-94 : B : Combine harvested.
```

NOTE: Ear numbers were counted, dry matter yield measured and nutrient concentration analysed on crop samples taken at anthesis and pre-harvest.

GRAIN TONNES/HECTARE

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

NITROGEN	
N0	5.53
N1	5.72
N2	6.44
N3	7.15
N4	6.77
Mean	6.32

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

NITROGEN
0.616

https://doi.org/10.23637/ERADOC-1-49

94/R/CS/429

GRAIN TONNES/HECTARE

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	8	0.755	11.9

GRAIN MEAN DM% 84.0

PLOT AREA HARVESTED 0.00230

https://doi.org/10.23637/ERADOC-1-49 *pp 42*