ROTHAMSTED RESEARCH

Yields of the Field Experiments 1990

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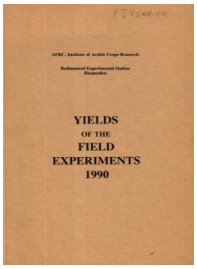

Crop Sequences

Rothamsted Research

Rothamsted Research (1991) *Crop Sequences ;* Yields Of The Field Experiments 1990, pp 54 - 103 **- DOI: https://doi.org/10.23637/ERADOC-1-42**

90/R/CS/10 and 90/W/CS/10

LONG TERM LIMING

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

Sponsors: S.P. McGrath, J. McEwen, D.P. Yeoman.

The 29th year, s. beans.

For previous years see 'Details' 1967, 1973 and 74-89/R&W/CS/10.

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

Whole plot dimensions: 6.40 x 18.3.

Treatments: All combinations of:-

Whole plots

1. **CHALK** Residual effects of ground chalk (tonnes $CaCO_3$) (total applied 1962-87):

R	W	Rothamsted total 1962-78	Rothamsted total 1982-87	Woburn total 1962-78	Woburn total 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 R & W	1981 R & W	1982 R & W	1983 R	1983 W	1988 R	1988 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 P1, P2, P3, P4 = 25, 50, 75, 100 kg P as superphosphate

Sub plots

3. **MANGNESE** Manganese in 1990, cumulative to earlier applications:

0	None
MN	Manganese sprays

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 and 1990).
(2) Manganese was applied at 0.19 kg Mn, as 'Vytel', in 200 l on 30 Apr, 1990 (R), at 0.096 kg Mn in 220 l on 30 Apr (W) repeated at 0.096 kg Mn in 200 l on 5 June (R).

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/10 and 90/W/CS/10

Basal applications:

Sawyers I (R): Weedkillers: Simazine at 0.17 kg and trietazine at 1.2 kg in 200 l. Insecticides: Phorate at 2.2 kg. Deltamethrin at 7.5 g in 200 l applied on two occasions. Pirimicarb at 0.14 kg in 200 l.

Stackyard C (W): Weedkillers: Glyphosate at 1.4 kg in 220 l. Simazine at 0.14 kg and trietazine at 0.97 kg in 220 l. Paraquat at 0.60 kg ion. Insecticide: Phorate at 1.8 kg.

Seed: Alfred, sown at 260 kg (R), 250 kg (W).

Cultivations, etc.:-

Sawyers I (R): Tine cultivated with vibrating tines 60 cm apart, 45 cm deep: 23 Aug, 1989. Ploughed: 24 Nov. Spring-time cultivated: 5 Mar, 1990. Rotary harrowed, phorate applied, rotary harrowed, seed sown, harrowed and rolled: 6 Mar. Simazine and trietazine applied: 12 Mar. Deltamethrin applied: 2 and 17 May. Pirimicarb applied: 5 June. Combine harvested: 15 Aug.

Stackyard C (W): Glyphosate applied: 1 Sept, 1989. Ploughed: 5 Jan, 1990. Phorate applied, power harrowed with crumbler attached, seed sown: 5 Mar. Simazine and trietazine applied: 13 Mar. Paraquat applied: 25 May.

NOTES: (1) At Woburn the crop established poorly as a result of bird damage. The few remaining plants were destroyed with weedkiller in May.

(2) At Rothamsted leaf samples were taken just after pod set to measure nutrient contents.

(3) At Rothamsted the components of yield were measured at maturity.

(4) At Rothamsted, most **CHALK** 0 plots failed and yields of the rest of these plots were negligible. They have been omitted from the analysis.

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

GRAIN TONNES/HECTARE

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

P	0	P1	P2	P3	Mean
CHALK					
15	1.64	1.82	1.93	2.27	1.91
24.5	2.10	2.74	2.66	2.79	2.57
52.5	2.52	3.07	3.21	3.38	3.05
Mean	2.09	2.54	2.60	2.81	2.51

MANGNESE	O	MN	Mean
CHALK			
15	2.01	1.82	1.91
24.5	2.59	2.56	2.57
52.5	3.10	3.00	3.05
Mean	2.56	2.46	2.51

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

GRAIN TONNES/HECTARE

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

MANGNESE	O	MN	Mean
P			
0	2.15	2.02	2.09
P1	2.62	2.46	2.54
P2	2.61	2.60	2.60
P3	2.88	2.75	2.81
Mean	2.56	2.46	2.51

CHALK	MANGNESE P	O	MN
15	0	1.71	1.57
	P1	1.87	1.76
	P2	1.95	1.92
	P3	2.49	2.05
24.5	0	2.15	2.05
	P1	2.83	2.64
	P2	2.57	2.75
	P3	2.81	2.78
52.5	0	2.59	2.45
	P1	3.16	2.99
	P2	3.30	3.11
	P3	3.33	3.43

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

CHALK	P	MANGNESE	CHALK P
0.156	0.180	0.056	0.311

CHALK MANGNESE	P MANGNESE	CHALK P MANGNESE
0.170	0.196	0.340

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

CHALK	0.097
P	0.112
CHALK.P	0.193

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	11	0.311	12.4
BLOCK.WP.SP	12	0.193	7.7

GRAIN MEAN DM% 68.7

SUB PLOT AREA HARVESTED 0.00200

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90/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 17th year, s. barley.

For previous years see 74-89/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 and 1989.
2.	**FUNGCIDE[1]**	Fungicide in autumn:
	NONE	None
	TRIADIM	Triadimefon at 0.25 kg in autumn 1981, 1982, 1984 to 1989, 0.28 kg in autumn 1983
3.	**FUNGCIDE[2]**	Fungicide in spring:
	NONE	None
	BENOMYL	Benomyl at 4 kg to 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

NOTE: Glyphosate and triadimefon were applied in 220 l on 3 Oct, 1989. Other treatments were applied on 13 Mar, 1990.

Basal applications: Manures: 'Nitram' at 440 kg. Muriate of potash at 520 kg. Weedkillers: Bromoxynil at 0.20 kg, ioxynil at 0.20 kg and mecoprop at 1.6 kg in 220 l.

Seed: Klaxon, seed not dressed, sown at 160 kg.

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90/R/CS/140

Cultivations, etc.:- K applied: 24 Aug, 1989. Ploughed: 28 Nov. Spring-tine cultivated, N applied: 12 Mar, 1990. Rotary harrowed, seed sown: 13 Mar. Rolled: 14 Mar. Weedkillers applied: 23 May. Combine harvested: 1 Aug.

GRAIN TONNES/HECTARE

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

FUNGCIDE[1] **WEEDKLLR**	NONE	TRIADIM	Mean
NONE	4.45	4.43	4.44
GLYPHOS	4.50	4.41	4.45
Mean	4.47	4.42	4.45

FUNGCIDE[2] **WEEDKLLR**	NONE	BENOMYL	Mean
NONE	4.44	4.44	4.44
GLYPHOS	4.40	4.51	4.45
Mean	4.42	4.48	4.45

FUNGCIDE[2] **FUNGCIDE[1]**	NONE	BENOMYL	Mean
NONE	4.51	4.44	4.47
TRIADIM	4.33	4.52	4.42
Mean	4.42	4.48	4.45

INSCTCDE **WEEDKLLR**	NONE	CHLORFEN	Mean
NONE	4.55	4.34	4.44
GLYPHOS	4.46	4.45	4.45
Mean	4.50	4.39	4.45

INSCTCDE **FUNGCIDE[1]**	NONE	CHLORFEN	Mean
NONE	4.46	4.49	4.47
TRIADIM	4.54	4.30	4.42
Mean	4.50	4.39	4.45

INSCTCDE **FUNGCIDE[2]**	NONE	CHLORFEN	Mean
NONE	4.41	4.43	4.42
BENOMYL	4.60	4.36	4.48
Mean	4.50	4.39	4.45

NEMACIDE **WEEDKLLR**	NONE	ALDICARB	Mean
NONE	4.42	4.47	4.44
GLYPHOS	4.36	4.55	4.45
Mean	4.39	4.51	4.45

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90/R/CS/140

GRAIN TONNES/HECTARE

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

NEMACIDE	NONE	ALDICARB	Mean
FUNGCIDE[1]			
NONE	4.41	4.54	4.47
TRIADIM	4.36	4.48	4.42
Mean	4.39	4.51	4.45

NEMACIDE	NONE	ALDICARB	Mean
FUNGCIDE[2]			
NONE	4.39	4.44	4.42
BENOMYL	4.38	4.58	4.48
Mean	4.39	4.51	4.45

NEMACIDE	NONE	ALDICARB	Mean
INSCTCDE			
NONE	4.53	4.47	4.50
CHLORFEN	4.24	4.55	4.39
Mean	4.39	4.51	4.45

FUNGCIDE[1]	NONE		TRIADIM	
WEEDKLLR FUNGCIDE[2]	NONE	BENOMYL	NONE	BENOMYL
NONE	4.42	4.48	4.46	4.40
GLYPHOS	4.60	4.39	4.19	4.63

FUNGCIDE[1]	NONE		TRIADIM	
WEEDKLLR INSCTCDE	NONE	CHLORFEN	NONE	CHLORFEN
NONE	4.54	4.36	4.56	4.31
GLYPHOS	4.39	4.61	4.53	4.29

FUNGCIDE[2]	NONE		BENOMYL	
WEEDKLLR INSCTCDE	NONE	CHLORFEN	NONE	CHLORFEN
NONE	4.43	4.45	4.67	4.22
GLYPHOS	4.39	4.40	4.53	4.49

FUNGCIDE[2]	NONE		BENOMYL	
FUNGCIDE[1] INSCTCDE	NONE	CHLORFEN	NONE	CHLORFEN
NONE	4.44	4.58	4.49	4.39
TRIADIM	4.38	4.27	4.71	4.32

FUNGCIDE[1]	NONE		TRIADIM	
WEEDKLLR NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
NONE	4.39	4.51	4.44	4.43
GLYPHOS	4.43	4.57	4.28	4.54

FUNGCIDE[2]	NONE		BENOMYL	
WEEDKLLR NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
NONE	4.54	4.34	4.29	4.59
GLYPHOS	4.25	4.55	4.47	4.56

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90/R/CS/140

GRAIN TONNES/HECTARE

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

	FUNGCIDE[2]	NONE		BENOMYL	
FUNGCIDE[1]	**NEMACIDE**	NONE	ALDICARB	NONE	ALDICARB
NONE		4.47	4.55	4.35	4.53
TRIADIM		4.31	4.34	4.41	4.62

	INSCTCDE	NONE		CHLORFEN	
WEEDKLLR	**NEMACIDE**	NONE	ALDICARB	NONE	ALDICARB
NONE		4.65	4.45	4.19	4.48
GLYPHOS		4.42	4.50	4.29	4.61

	INSCTCDE	NONE		CHLORFEN	
FUNGCIDE[1]	**NEMACIDE**	NONE	ALDICARB	NONE	ALDICARB
NONE		4.54	4.39	4.28	4.69
TRIADIM		4.53	4.56	4.20	4.40

	INSCTCDE	NONE		CHLORFEN	
FUNGCIDE[2]	**NEMACIDE**	NONE	ALDICARB	NONE	ALDICARB
NONE		4.40	4.42	4.39	4.47
BENOMYL		4.67	4.53	4.09	4.62

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

Margins of two factor tables	0.061
Two factor tables	0.086
Three factor tables	0.122

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

Stratum	d.f.	s.e.	cv%
WP	6	0.173	3.9

GRAIN MEAN DM% 85.4

PLOT AREA HARVESTED 0.00073

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90/R/CS/212

SEASONAL EFFECTS OF TAKE-ALL

Object: To study the incidence of take-all (Gaeumannomyces graminis) in continuous w. wheat and in first, second and third w. wheats after a break - Great Harpenden I.

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

The 13th year, s. beans, w. wheat.

For previous years see 78-89/R/CS/212.

Design: 3 randomised blocks of 8 plots.

Whole plot dimensions: 5.33 x 10.0.

Treatments:

PREVCROP Previous crops before w. wheat 1990:

	78	79	80	81	82	83	84	85	86	87	88	89
W12	W	W	W	W	W	W	W	W	W	W	W	W
BE2 W3	W	BE	W	W	BE	W	W	BE	BE	W	W	W
BE1 W3	W	W	W	W	W	W	W	W	BE	W	W	W
BE1 W5	BE	W	W	BE	W	W	BE	W	W	W	W	W
BE1 W6	W	W	BE	W	W	BE	W	W	W	W	W	W
BE1 W1	W	BE	W	W	BE	W	W	BE	W	W	BE	W
BE1	W	W	BE	W	W	BE	W	W	BE	W	W	BE

BE = s. beans, W = w. wheat

NOTE: One additional crop sequence was in s. beans 1990, yields not taken.

Standard applications:

W. wheat: Manure: 'Nitram' at 410 kg. Weedkillers: Isoproturon at 1.7 kg in 200 l. Fluroxypyr at 0.15 kg with bromoxynil at 0.24 kg, clopyralid at 0.05 kg applied with the prochloraz in 200 l. Fungicides: Prochloraz at 0.40 kg. Propiconazole at 0.12 kg with carbendazim at 0.25 kg and maneb at 1.6 kg in 200 l. Insecticide: Deltamethrin at 6.2 g in 200 l.

Seed: W. wheat: Avalon, sown at 180 kg.
S. beans: Alfred, sown at 260 kg.

Cultivations, etc.:-

Both crops: Ploughed: 31 Aug, 1989. Rotary harrowed twice: 2 Oct. Rotary harrowed: 3 Oct.

W. wheat: Seed sown: 4 Oct, 1989. Isoproturon applied: 20 Nov. Insecticide applied: 22 Feb, 1990. N applied: 17 Apr. Remaining weedkillers with prochloraz applied: 25 Apr. Remaining fungicides applied: 14 June. Combine harvested: 10 Aug.

S. beans: Spring-tine cultivated, rotary harrowed, seed sown: 6 Mar, 1990. Combine harvested: 16 Aug.

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/212

NOTE: Plant and soil samples were taken frequently during the season to assess take-all. Additional soil samples were taken to measure the suppressiveness of the soil to the take-all fungus.

GRAIN TONNES/HECTARE

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

PREVCROP

W12	4.15
BE2 W3	3.65
BE1 W3	4.19
BE1 W5	4.05
BE1 W6	4.27
BE1 W1	4.71
BE1	5.98
Mean	4.43

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

PREVCROP
0.286

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.350	7.9

GRAIN MEAN DM% 89.2

PLOT AREA HARVESTED 0.00220

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90/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 sixth year, w. wheat.

For previous years see 85-89/R/CS/302.

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

Whole plot dimensions: 12.0 x 24.0.

Treatments: All combinations of:-

Whole plots

1. **FUNGCIDE** Fungicides applied cumulatively to 1985, 1986, 1987, 1988 and 1989 treatments:

NONE	None
CARB	Carbendazim at 0.25 kg
PRO	Prochloraz at 0.40 kg
CARB+PRO	Carbendazim at 0.15 kg + prochloraz at 0.40 kg

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

NOTES: (1) Fungicide treatments were applied in 200 l on 24 Nov, 1989 and 30 Mar, 1990.
(2) The eyespot inoculum was colonised on oat seed and this was broadcast in October, 1984.

Basal applications: Manure: 'Nitram' at 580 kg. Weedkillers: Glyphosate at 0.27 kg in 200 l. Chlorotoluron at 3.0 kg with cyanazine at 0.75 kg in 200 l. Fluroxypyr at 0.15 kg with bromoxynil at 0.34 kg and clopyralid at 0.07 kg in 200 l. Insecticide: Deltamethrin at 6.2 g in 200 l.

Seed: Avalon, sown at 180 kg.

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/302

Cultivations, etc.:- Heavy spring-tine cultivated: 22 Aug, 1989. Glyphosate applied: 14 Sept. Ploughed: 22 Sept. Rotary harrowed twice, seed sown: 3 Oct. Chlorotoluron with cyanazine applied: 23 Nov. Deltamethrin applied: 22 Feb, 1990. N applied: 18 Apr. Fluroxypyr, bromoxynil and clopyralid applied: 30 Apr. Combine harvested: 10 Aug.

NOTE: Eyespot and sharp eyespot were assessed at fortnightly intervals from May - July on the EYE INOC NATURAL plots only.

GRAIN TONNES/HECTARE

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

EYE INOC / **FUNGCIDE**	NATURAL	W 19R 1S	W 1R 19S	R 19R 1S	R 1R 19S	Mean
NONE	5.03	5.03	4.23	4.87	5.07	4.88
CARB	4.74	4.53	4.50	4.64	4.99	4.69
PRO	4.66	4.26	4.79	4.57	4.69	4.60
CARB+PRO	4.89	4.70	4.80	4.91	4.88	4.84
Mean	4.83	4.63	4.58	4.75	4.91	4.75

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

EYE INOC	**FUNGCIDE*** **EYE INOC**	
0.191	0.381	min.rep
0.165	0.330	max-min

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

* Within the same level of **FUNGCIDE** only

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP.SP	24	0.381	8.0

GRAIN MEAN DM% 90.1

SUB PLOT AREA HARVESTED 0.00138

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/309 and 90/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, E.T.G. Bacon, D.G. Christian, R.J. Gutteridge, J.F. Jenkyn, B.R. Kerry, W. Powell, A.D. Todd.

Associate sponsor: D.S. Powlson.

The sixth year, w. wheat.

For previous years see 85-89/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	Tine cultivated to 10 cm depth
TN10PL20	Tine cultivated to 10 cm depth, ploughed to 20 cm
TN10TN20	Tine cultivated to 10 cm depth and again to 20 cm
PLOUGH20	Ploughed to 20 cm depth

NOTES: (1) Straw was chopped by trailed straw chopper and spread on 8 Aug, 1989 (R), 22 Aug (W) and burnt, 9 Aug (R), 24 Aug (W).
(2) A heavy spring-tine cultivator was used to cultivate to 10 cm depth, on 15 Aug (R), 30 Aug and 21 Sept (W). A chisel plough was used to cultivate to 20 cm depth, on 16 Aug (R) and a deep-tine cultivator to 20 cm on 11 and 21 Sept (W).
(3) Ploughed plots were ploughed to 20 cm depth, on 15 Aug (R), 11 Sept (W).

Basal applications:
Great Knott III (R): Manures: 'Nitram' at 120 kg, followed by 580 kg. Weedkillers: Paraquat at 0.40 kg ion with a wetting agent, 'Enhance' at 100 ml, in 200 l. Chlorotoluron at 3.0 kg with cyanazine at 0.75 kg in 400 l. Isoproturon at 2.1 kg in 200 l. Fluroxypyr at 0.20 kg with fenoxaprop-ethyl at 0.18 kg in 200 l. Fungicides: Chlorothalonil at 1.0 kg with propiconazole at 0.12 kg in 200 l.

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/309 and 90/W/CS/309

Basal applications:
Far Field I (W): Manures: 'Nitram' at 120 kg, followed by 560 kg. Weedkillers: Glyphosate at 0.36 kg in 220 l. Isoproturon at 1.5 kg with isoxaben at 0.075 kg in 220 l. Metsulfuron-methyl at 6.0 g in 220 l. Fungicides: Chlorothalonil at 0.50 kg with propiconazole at 0.12 kg in 300 l.

Seed: Pastiche, sown at 180 kg.

Cultivations, etc.:-
Great Knott III (R): Paraquat and wetting agent applied: 2 Oct, 1989. Rotary harrowed: 4 Oct. Seed sown: 5 Oct. Harrowed and rolled: 6 Oct. Chlorotoluron and cyanazine applied: 22 Nov. Isoproturon applied: 23 Feb, 1990. N applied: 2 Mar and 12 Apr. Fluroxypyr and fenoxaprop-ethyl applied: 30 Apr. Fungicides applied: 31 May. Combine harvested: 13 Aug.
Far Field I (W): Subsoiled with vibrating tines 50 cm apart and 40 cm deep, glyphosate applied: 6 Oct, 1989. Rotary harrowed with crumbler attached, seed sown: 7 Oct. Isoproturon and isoxaben applied: 11 Dec. N applied: 23 Feb, 1990 and 5 Apr. Metsulfuron-methyl applied: 24 Apr. Fungicides applied: 22 May. Combine harvested: 6 Aug.

NOTES: (1) Small yields from CHOPPED TINE 10 and CHOPPED TN10TN20 at Rothamsted were attributed to the much smaller plant populations occuring on these treatments following the application of the weedkillers on 22 Nov.
(2) Establishment counts were made in autumn and total dry matter was measured in spring.
(3) Pests and fungal diseases were assessed at intervals during the season.
(4) Components of yield were measured and numbers of volunteer ears counted.

https://doi.org/10.23637/ERADOC-1-42

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

GRAIN TONNES/HECTARE

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

CULTIVTN	TINE 10	TN10PL20	TN10TN20	PLOUGH20	Mean
STRAW					
BURNT	6.72	6.35	6.00	6.32	6.35
CHOPPED	3.47	6.22	4.83	6.18	5.18
Mean	4.55	6.26	5.22	6.23	5.57

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

STRAW	CULTIVTN	STRAW CULTIVTN	
		0.529	min.rep
0.229	0.305	0.458	max-min
		0.374	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	37	0.748	13.4

GRAIN MEAN DM% 90.3

PLOT AREA HARVESTED 0.00621

https://doi.org/10.23637/ERADOC-1-42

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

GRAIN TONNES/HECTARE

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

CULTIVTN / STRAW	TINE 10	TN10PL20	TN10TN20	PLOUGH20	Mean
BURNT	5.69	3.45	5.84	3.87	4.71
CHOPPED	4.67	4.82	5.54	4.26	4.82
Mean	5.01	4.36	5.64	4.13	4.79

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

STRAW	CULTIVTN	STRAW CULTIVTN	
		0.637	min.rep
0.276	0.368	0.552	max-min
		0.451	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	0.637	13.3

GRAIN MEAN DM% 90.7

PLOT AREA HARVESTED 0.00638

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/311

EFFECTS OF SHALLOW STRAW INCORPORATION

Object: To study the effects of shallow straw incorporation on straw decomposition, toxin production, 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, R. Moffitt, W. Powell, A.D. Todd.

The sixth year, w. wheat.

For previous years see 85-89/R/CS/311.

Design: Single replicate of 3 x a half replicate of 2 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 on 16 Aug, 1989
	BALED	Baled and removed on 16 Aug
	CHOPPED	Chopped on 16 Aug
2. **CULTTIME**		Time of cultivation, to 10 cm depth:
	EARLY	Cultivated by rotary grubber on 16 Aug, 1989
	LATER	Cultivated by rotary grubber on 30 Aug

Sub plots

3. **AUTN RES**		Residues of autumn N last applied autumn 1988, kg N per annum:
	(0)	
	(50)	
4. **FUNGCIDE**		Fungicides:
	0	None
	FULL	Full programme:- Triadimefon at 0.12 kg and carbendazim at 0.25 kg in 200 l on 24 Nov, 1989. Prochloraz at 0.40 kg and carbendazim at 0.15 kg in 200 l on 9 Apr, 1990 Propiconazole at 0.125 kg in 200 l on 17 May Propiconazole at 0.125 kg with carbendazim at 0.25 kg and maneb at 1.6 kg in 200 l on 14 June
5. **INSCTCDE**		Insecticides:
	0	None
	CYP+PIR	Cypermethrin at 25 g in 200 l on 1 Nov, 1989 Pirimicarb at 0.14 kg in 200 l on 14 June

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/311

6. **MOLLCIDE** Molluscicide:

0	None
METHCARB	Methiocarb at 0.22 kg on 6 Oct, 1989

NOTE: STRAW BURNT plots were disced the same day after burning.

Basal applications: Manures: 'Nitram' at 120 kg and later at 580 kg. Weedkillers: Glyphosate at 0.27 kg in 200 l. Chlorotoluron at 3.0 kg with cyanazine at 0.75 kg in 200 l. Bromoxynil at 0.34 kg and clopyralid at 0.07 kg with fluroxypyr at 0.15 kg in 200 l.

Seed: Pastiche, sown at 200 kg.

Cultivations, etc.:- Glyphosate applied: 21 Sept, 1989. Rotary harrowed, seed sown: 5 Oct. Chlorotoluron with cyanazine applied: 10 Nov. First N applied: 2 Mar, 1990. Second N applied: 12 Apr. Remaining weedkillers applied: 3 May. Combine harvested: 11 Aug.

NOTE: Growth was measured and incidence of pests and diseases was assessed at intervals during the season. Ears of volunteers were counted prior to harvest and components of yield were measured.

GRAIN TONNES/HECTARE

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

CULTTIME	EARLY	LATER	Mean
STRAW			
BURNT	7.48	7.91	7.69
BALED	6.29	6.87	6.58
CHOPPED	5.55	7.01	6.28
Mean	6.44	7.27	6.85

AUTN RES	(0)	(50)	Mean
STRAW			
BURNT	7.73	7.65	7.69
BALED	6.50	6.66	6.58
CHOPPED	6.28	6.29	6.28
Mean	6.84	6.87	6.85

AUTN RES	(0)	(50)	Mean
CULTTIME			
EARLY	6.44	6.44	6.44
LATER	7.23	7.30	7.27
Mean	6.84	6.87	6.85

FUNGCIDE	O	FULL	Mean
STRAW			
BURNT	7.65	7.74	7.69
BALED	6.50	6.66	6.58
CHOPPED	6.27	6.30	6.28
Mean	6.81	6.90	6.85

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/311

GRAIN TONNES/HECTARE

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

FUNGCIDE	O	FULL	Mean
CULTTIME			
EARLY	6.40	6.48	6.44
LATER	7.21	7.32	7.27
Mean	6.81	6.90	6.85

FUNGCIDE	O	FULL	Mean
AUTN RES			
(0)	6.83	6.85	6.84
(50)	6.79	6.95	6.87
Mean	6.81	6.90	6.85

INSCTCDE	O	CYP+PIR	Mean
STRAW			
BURNT	7.47	7.92	7.69
BALED	6.50	6.67	6.58
CHOPPED	5.92	6.65	6.28
Mean	6.63	7.08	6.85

INSCTCDE	O	CYP+PIR	Mean
CULTTIME			
EARLY	6.11	6.77	6.44
LATER	7.14	7.39	7.27
Mean	6.63	7.08	6.85

INSCTCDE	O	CYP+PIR	Mean
AUTN RES			
(0)	6.63	7.05	6.84
(50)	6.63	7.11	6.87
Mean	6.63	7.08	6.85

INSCTCDE	O	CYP+PIR	Mean
FUNGCIDE			
O	6.63	6.98	6.81
FULL	6.62	7.18	6.90
Mean	6.63	7.08	6.85

MOLLCIDE	O	METHCARB	Mean
STRAW			
BURNT	7.68	7.71	7.69
BALED	6.55	6.62	6.58
CHOPPED	6.22	6.35	6.28
Mean	6.81	6.89	6.85

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/311

GRAIN TONNES/HECTARE

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

MOLLCIDE	O	METHCARB	Mean
CULTTIME			
EARLY	6.37	6.51	6.44
LATER	7.26	7.27	7.27
Mean	6.81	6.89	6.85

MOLLCIDE	O	METHCARB	Mean
AUTN RES			
(0)	6.83	6.85	6.84
(50)	6.80	6.94	6.87
Mean	6.81	6.89	6.85

MOLLCIDE	O	METHCARB	Mean
FUNGCIDE			
O	6.70	6.91	6.81
FULL	6.93	6.87	6.90
Mean	6.81	6.89	6.85

MOLLCIDE	O	METHCARB	Mean
INSCTCDE			
O	6.52	6.73	6.63
CYP+PIR	7.10	7.05	7.08
Mean	6.81	6.89	6.85

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

AUTN RES	FUNGCIDE	INSCTCDE	MOLLCIDE
0.072	0.072	0.072	0.072

STRAW*	CULTTIME*	STRAW*	CULTTIME*
AUTN RES	AUTN RES	FUNGCIDE	FUNGCIDE
0.125	0.102	0.125	0.102

AUTN RES	STRAW*	CULTTIME*	AUTN RES
FUNGCIDE	INSCTCDE	INSCTCDE	INSCTCDE
0.102	0.125	0.102	0.102

FUNGCIDE	STRAW*	CULTTIME*	AUTN RES
INSCTCDE	MOLLCIDE	MOLLCIDE	MOLLCIDE
0.102	0.125	0.102	0.102

FUNGCIDE	INSCTCDE
MOLLCIDE	MOLLCIDE
0.102	0.102

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

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/311

GRAIN TONNES/HECTARE

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

Stratum	d.f.	s.e.	cv%
WP.SP	20	0.250	3.6

GRAIN MEAN DM% 90.5

SUB PLOT AREA HARVESTED 0.00276

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/323

CEREAL SEQUENCES AND TAKE-ALL

Object: To study the effects on take-all (Gaeumannomyces graminis) and yield of including triticale in cereal sequences - West Barnfield II.

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

The third year, w. barley, w. oats, w. triticale, w. wheat, s. barley.

For previous years see 88-89/R/CS/323

Design: 3 randomised blocks of 26 plots.

Whole plot dimensions: 3.0 x 10.0.

CROPSEQ	Crop sequences (1988, 1989 and 1990 respectively):
SB WB SB	S. barley, w. barley, s. barley
WW WW SB	W. wheat, w. wheat, s. barley
WB WB WB	W. barley, w. barley, w. barley (duplicated)
WB WO WB	W. barley, w. oats, w. barley
WO WB WB	W. oats, w. barley, w. barley
WT WT WB	W. triticale, w. triticale, w. barley
WW WW WB	W. wheat, w. wheat, w. barley
WB WB WO	W. barley, w. barley, w. oats
WT WT WO	W. triticale, w. triticale, w. oats
WW WW WO	W. wheat, w. wheat, w. oats
WB WB WT	W. barley, w. barley, w. triticale
WT WB WT	W. triticale, w. barley, w. triticale
WT WO WT	W. triticale, w. oats, w. triticale
WO WT WT	W. oats, w. triticale, w. triticale
WT WT WT	W. triticale, w. triticale, w. triticale (duplicated)
WW WW WT	W. wheat, w. wheat, w. triticale
WB WB WW	W. barley, w. barley, w. wheat
WW WB WW	W. wheat, w. barley, w. wheat
WW WO WW	W. wheat, w. oats, w. wheat
WO WW WW	W. oats, w. wheat, w. wheat
WT WT WW	W. triticale, w. triticale, w. wheat
WW WT WW	W. wheat, w. triticale, w. wheat
WW WW WW	W. wheat, w. wheat, w. wheat (duplicated)

Standard applications: Manures: (0:18:36) at 300 kg. N at 30 kg to all cereals followed by N at 120 kg (s. barley), 170 kg (w. wheat), 150 kg (w. barley), 120 kg (w. triticale and w. oats), all as 'Nitram'. Weedkillers: Glyphosate at 0.27 kg in 200 l. Methabenzthiazuron at 1.6 kg in 200 l. Fluroxypyr at 0.20 kg with metsulfuron-methyl at 6.0 g in 200 l. Fungicides: Fenpropimorph at 0.75 kg in 200 l. Prochloraz at 0.40 kg in 200 l (to w. wheat only). Propiconazole at 0.12 kg with carbendazim at 0.25 kg and maneb at 1.6 kg in 200 l (to w. wheat and s. barley only).

SEED: W. barley: Magie, sown at 150 kg.
W. oats: Image, sown at 190 kg.
W. triticale: Lasko, sown at 180 kg.
W. wheat: Mercia, sown at 180 kg.
S. barley: Klaxon, sown at 160 kg.

https://doi.org/10.23637/ERADOC-1-42 *pp 22*

90/R/CS/323

Cultivations, etc.:- PK applied: 30 Aug, 1989. Heavy spring-tine cultivated: 1 Sept. Glyphosate applied: 14 Sept. Ploughed: 21 Sept. Rotary harrowed twice: 14 Oct. Rotary harrowed, w. cereals sown: 16 Oct. Methabenzthiazuron applied: 19 Oct. First N applied: 2 Mar, 1990. Second N (to s. barley only), rotary harrowed twice, seed sown (s. barley only): 7 Mar. Second N (to w. cereals) applied: 18 Apr. Fluroxypyr with metsulfuron-methyl applied: 27 Apr. Fenpropimorph applied: 1 May. Prochloraz (to w. wheat only) applied: 8 May. Propiconazole, carbendazim and maneb (to w. wheat and s. barley only) applied: 14 June. Combine harvested: 24 July (w. barley), 26 July (s. barley, w. oats and w. triticale) and 7 Aug (w. wheat).

NOTE: Plants were sampled in April, June and July to assess take-all, eyespot and sharp eyespot. Soil cores were taken after harvest to assess take-all infectivity.

W.WHEAT, W. BARLEY, S. BARLEY, W.TRITICALE, W.OATS

GRAIN TONNES/HECTARE

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

CROPSEQ	
SB WB SB	5.54
WW WW SB	5.73
WB WB WB	7.09
WB WO WB	7.85
WO WB WB	7.81
WT WT WB	7.19
WW WW WB	6.69
WB WB WO	7.32
WT WT WO	7.02
WW WW WO	6.96
WB WB WT	7.39
WT WB WT	7.34
WT WO WT	7.72
WO WT WT	7.49
WT WT WT	7.02
WW WW WT	6.65
WB WB WW	9.05
WW WB WW	8.67
WW WO WW	9.09
WO WW WW	8.90
WT WT WW	7.29
WW WT WW	6.89
WW WW WW	6.91
Mean	7.33

https://doi.org/10.23637/ERADOC-1-42 *pp 23*

90/R/CS/323

GRAIN TONNES/HECTARE

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

CROPSEQ	
0.393	min.rep
0.340	max-min
0.278	max.rep

	CROPSEQ
max.rep	WB WB WB v WT WT WT or WW WW WW
min.rep	any of the remainder
max-min	WB WB WB or WT WT WT or WW WW WW v any of the remainder

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	53	0.481	6.6

GRAIN MEAN DM% 88.8

PLOT AREA HARVESTED 0.00228

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/326 and 90/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: D.G. Christian, J.F. Jenkyn, E.T.G. Bacon, R.D. Prew.

The fourth year, w. wheat.

For previous years see 87-89/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 seedbed (t per ha 85% DM), cumulative to previous annual dressings:

		R	W
NONE	None	-	-
NORMAL	Normal	5.1	6.5
2 NORMAL	Twice normal	10.2	13.0
4 NORMAL	Four times normal	20.4	26.0

NOTES: (1) Straw treatments were applied on 9 Aug, 1989 (R) and (W) and chopped by trailed straw chopper and spread on 16 Aug (R), 22 Aug (W).
(2) At Rothamsted straw was incorporated by plough on 22 Aug. At Woburn it was heavy-tine cultivated in to 10 cm on 30 Aug, and rotary cultivated on 21 Sept.

Basal applications:
Great Knott III (R): Manures: 'Nitram' at 120 kg followed by 580 kg. Weedkillers: Paraquat at 0.40 kg ion with a wetting agent, 'Enhance' at 100 ml, in 200 l. Chlorotoluron at 3.0 kg with cyanazine at 0.75 kg in 400 l. Isoproturon at 2.1 kg in 200 l. Fluroxypyr at 0.20 kg with fenoxaprop-ethyl at 0.18 kg in 200 l. Fungicides: Chlorothalonil at 1.0 kg with propiconazole at 0.12 kg in 200 l.
Far Field I (W): Manures: 'Nitram' at 120 kg followed by 560 kg. Weedkillers: Glyphosate at 0.36 kg in 220 l. Isoproturon at 1.5 kg with isoxaben at 75 g in 220 l. Metsulfuron-methyl at 6.0 g in 220 l. Fungicides: Chlorothalonil at 0.50 kg with propiconazole at 0.12 kg in 300 l.

Seed: Pastiche, sown at 180 kg.

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/326 and 90/W/CS/326

Cultivations, etc.:-

Great Knott III (R): Ploughed: 22 Aug, 1989. Paraquat and wetting agent applied: 2 Oct. Rotary harrowed: 4 Oct. Seed sown: 5 Oct. Harrowed and rolled: 6 Oct. Chlorotoluron and cyanazine applied: 22 Nov. Isoproturon applied: 23 Feb, 1990. N applied: 2 Mar and 12 Apr. Fluroxypyr and fenoxaprop-ethyl applied: 30 Apr. Fungicides applied: 31 May. Combine harvested: 13 Aug.

Far Field I (W): Heavy-tine cultivated: 30 Aug, 1989 and 11 Sept. Rotary cultivated: 21 Sept. Subsoiled with vibrating tines 50 cm apart and 40 cm deep, glyphosate applied: 6 Oct. Rotary harrowed with crumbler attached, seed sown: 7 Oct. Isoproturon and isoxaben applied: 11 Dec. N applied: 23 Feb, 1990 and 5 Apr. Metsulfuron-methyl applied: 24 Apr. Fungicides applied: 22 May. Combine harvested: 6 Aug.

NOTES: (1) Establishment counts were made in autumn. Shoot numbers and dry weight at growth stage 30, fertile ear numbers after anthesis and harvest index were measured.

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

https://doi.org/10.23637/ERADOC-1-42

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

GRAIN TONNES/HECTARE

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

STRAW	
NONE	6.48
NORMAL	6.66
2 NORMAL	6.26
4 NORMAL	7.04
Mean	6.61

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

STRAW
0.310

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	9	0.439	6.6

GRAIN MEAN DM% 90.2

PLOT AREA HARVESTED 0.00305

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

GRAIN TONNES/HECTARE

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

STRAW	
NONE	6.76
NORMAL	6.54
2 NORMAL	6.37
4 NORMAL	6.40
Mean	6.52

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

STRAW
0.506

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	6	0.620	9.5

GRAIN MEAN DM% 89.9

PLOT AREA HARVESTED 0.00318

https://doi.org/10.23637/ERADOC-1-42 *pp 27*

90/R/CS/327

CONTROL OF STEM NEMATODE

Object: To study the effects of rates of carbofuran and row spacings on the incidence of stem nematode (Ditylenchus dipsaci) and yield of four varieties of lucerne - Long Hoos IV 3.

Sponsor: A.G. Whitehead.

The third year, lucerne.

For previous years see 88-89/R/CS/327.

Design: 2 randomised blocks of 20 plots.

Whole plot dimensions: 1.22 x 8.84.

Treatments: All combinations of:-

1. **VARIETY** Varieties:

   EUROPE
   EUVA
   VELA
   VERTUS

2. **CARBRATE** Rates of carbofuran (kg) in first year only:

   0.0
   1.5

3. **ROWSPACE** Spacings between rows (cm):

   15 15 (6 inches)
   30 30 (12 inches)

plus four extra treatments:

CA3 RO15 Varieties, given 3 kg carbofuran, on 15 cm row spacing, in first year only:

EUROPE
EUVA
VELA
VERTUS

NOTE: Carbofuran was applied to lucerne on 7 Apr, 1988 at sowing.

Basal applications: Manures: (0:18:36) at 500 kg.

Cultivations, etc.:- PK applied: 23 Nov, 1989. Cut: 15 May, 1990, 27 June, 16 Aug and 14 Nov.

https://doi.org/10.23637/ERADOC-1-42 *pp 28*

90/R/CS/327

1ST CUT (15/5/90) DRY MATTER TONNES/HECTARE

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

CARBRATE	0.0	1.5	Mean
VARIETY			
EUROPE	2.69	2.41	2.55
EUVA	3.72	2.92	3.32
VELA	1.73	1.88	1.81
VERTUS	4.60	4.60	4.60
Mean	3.18	2.95	3.07

ROWSPACE	15	30	Mean
VARIETY			
EUROPE	2.85	2.25	2.55
EUVA	3.38	3.26	3.32
VELA	1.82	1.79	1.81
VERTUS	5.12	4.08	4.60
Mean	3.29	2.85	3.07

ROWSPACE	15	30	Mean
CARBRATE			
0.0	3.32	3.05	3.18
1.5	3.26	2.64	2.95
Mean	3.29	2.85	3.07

	ROWSPACE	15	30
VARIETY	CARBRATE		
EUROPE	0.0	2.72	2.65
	1.5	2.98	1.85
EUVA	0.0	3.95	3.48
	1.5	2.80	3.04
VELA	0.0	1.40	2.05
	1.5	2.25	1.52
VERTUS	0.0	5.20	4.01
	1.5	5.03	4.16

CA3 RO15	EUROPE	EUVA	VELA	VERTUS	Mean
	2.51	3.59	2.76	4.70	3.39

GRAND MEAN 3.13

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

CA3 RO15	VARIETY	CARBRATE	ROWSPACE
0.474	0.237	0.168	0.168

VARIETY CARBRATE	VARIETY ROWSPACE	CARBRATE ROWSPACE	VARIETY CARBRATE ROWSPACE
0.335	0.335	0.237	0.474

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/327

1ST CUT (15/5/90) DRY MATTER TONNES/HECTARE

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	19	0.474	15.1

1ST CUT MEAN DM% 17.3

2ND CUT (27/6/90) DRY MATTER TONNES/HECTARE

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

CARBRATE	0.0	1.5	Mean
VARIETY			
EUROPE	2.70	2.42	2.56
EUVA	3.57	3.48	3.52
VELA	1.72	1.78	1.75
VERTUS	4.45	4.64	4.55
Mean	3.11	3.08	3.10

ROWSPACE	15	30	Mean
VARIETY			
EUROPE	2.79	2.33	2.56
EUVA	3.87	3.17	3.52
VELA	1.92	1.58	1.75
VERTUS	4.88	4.21	4.55
Mean	3.37	2.82	3.10

ROWSPACE	15	30	Mean
CARBRATE			
0.0	3.21	3.01	3.11
1.5	3.52	2.64	3.08
Mean	3.37	2.82	3.10

ROWSPACE	15	30
VARIETY	**CARBRATE**	
EUROPE	0.0	2.74	2.66
	1.5	2.84	2.00
EUVA	0.0	3.65	3.48
	1.5	4.09	2.87
VELA	0.0	1.76	1.68
	1.5	2.09	1.48
VERTUS	0.0	4.71	4.20
	1.5	5.05	4.23

CA3 RO15	EUROPE	EUVA	VELA	VERTUS	Mean
	2.45	3.68	2.45	4.31	3.22

GRAND MEAN 3.12

https://doi.org/10.23637/ERADOC-1-42 *pp 30*

90/R/CS/327

2ND CUT (27/6/90) DRY MATTER TONNES/HECTARE

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

CA3 RO15	VARIETY	CARBRATE	ROWSPACE
0.383	0.191	0.135	0.135

VARIETY CARBRATE	VARIETY ROWSPACE	CARBRATE ROWSPACE	VARIETY CARBRATE ROWSPACE
0.271	0.271	0.191	0.383

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	19	0.383	12.3

2ND CUT MEAN DM% 19.2

3RD CUT (16/8/90) DRY MATTER TONNES/HECTARE

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

CARBRATE / VARIETY	0.0	1.5	Mean
EUROPE	3.36	2.75	3.05
EUVA	3.86	4.01	3.94
VELA	2.01	1.90	1.96
VERTUS	4.27	4.71	4.49
Mean	3.38	3.34	3.36

ROWSPACE / VARIETY	15	30	Mean
EUROPE	3.31	2.80	3.05
EUVA	4.20	3.67	3.94
VELA	1.91	2.00	1.96
VERTUS	4.58	4.40	4.49
Mean	3.50	3.22	3.36

ROWSPACE / CARBRATE	15	30	Mean
0.0	3.50	3.26	3.38
1.5	3.51	3.18	3.34
Mean	3.50	3.22	3.36

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/327

3RD CUT (16/8/90) DRY MATTER TONNES/HECTARE

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

VARIETY	ROWSPACE / CARBRATE	15	30
EUROPE	0.0	3.31	3.42
	1.5	3.31	2.18
EUVA	0.0	4.49	3.24
	1.5	3.91	4.11
VELA	0.0	1.85	2.18
	1.5	1.98	1.82
VERTUS	0.0	4.34	4.21
	1.5	4.82	4.59

CA3 RO15	EUROPE	EUVA	VELA	VERTUS	Mean
	3.85	4.54	2.71	3.72	3.70

GRAND MEAN 3.43

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

CA3 RO15	VARIETY	CARBRATE	ROWSPACE
0.603	0.301	0.213	0.213

VARIETY CARBRATE	VARIETY ROWSPACE	CARBRATE ROWSPACE	VARIETY CARBRATE ROWSPACE
0.426	0.426	0.301	0.603

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	19	0.603	17.6

3RD CUT MEAN DM% 27.5

4TH CUT (14/11/90) DRY MATTER TONNES/HECTARE

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

CARBRATE / VARIETY	0.0	1.5	Mean
EUROPE	0.63	0.39	0.51
EUVA	0.66	0.70	0.68
VELA	0.19	0.14	0.17
VERTUS	0.72	0.82	0.77
Mean	0.55	0.51	0.53

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/327

4TH CUT (14/11/90) DRY MATTER TONNES/HECTARE

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

ROWSPACE	15	30	Mean
VARIETY			
EUROPE	0.63	0.40	0.51
EUVA	0.81	0.54	0.68
VELA	0.14	0.19	0.17
VERTUS	0.73	0.80	0.77
Mean	0.58	0.48	0.53

ROWSPACE	15	30	Mean
CARBRATE			
0.0	0.60	0.51	0.55
1.5	0.56	0.46	0.51
Mean	0.58	0.48	0.53

	ROWSPACE	15	30
VARIETY	CARBRATE		
EUROPE	0.0	0.68	0.59
	1.5	0.58	0.20
EUVA	0.0	0.95	0.37
	1.5	0.68	0.71
VELA	0.0	0.15	0.24
	1.5	0.13	0.14
VERTUS	0.0	0.61	0.82
	1.5	0.85	0.78

CA3 RO15	EUROPE	EUVA	VELA	VERTUS	Mean
	0.70	0.89	0.23	0.54	0.59

GRAND MEAN 0.54

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

CA3 RO15	VARIETY	CARBRATE	ROWSPACE
0.287	0.144	0.101	0.101

VARIETY CARBRATE	VARIETY ROWSPACE	CARBRATE ROWSPACE	VARIETY CARBRATE ROWSPACE
0.203	0.203	0.144	0.287

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	19	0.287	52.9

4TH CUT MEAN DM% 24.4

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/327

TOTAL OF 4 CUTS DRY MATTER TONNES/HECTARE

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

CARBRATE	0.0	1.5	Mean
VARIETY			
EUROPE	9.38	7.97	8.68
EUVA	11.81	11.11	11.46
VELA	5.65	5.70	5.68
VERTUS	14.05	14.76	14.40
Mean	10.22	9.89	10.05

ROWSPACE	15	30	Mean
VARIETY			
EUROPE	9.57	7.78	8.68
EUVA	12.26	10.65	11.46
VELA	5.80	5.55	5.68
VERTUS	15.31	13.50	14.40
Mean	10.74	9.37	10.05

ROWSPACE	15	30	Mean
CARBRATE			
0.0	10.63	9.82	10.22
1.5	10.85	8.92	9.89
Mean	10.74	9.37	10.05

ROWSPACE		15	30
VARIETY	CARBRATE		
EUROPE	0.0	9.44	9.33
	1.5	9.71	6.24
EUVA	0.0	13.04	10.57
	1.5	11.49	10.73
VELA	0.0	5.16	6.14
	1.5	6.44	4.97
VERTUS	0.0	14.86	13.24
	1.5	15.75	13.76

CA3 RO15	EUROPE	EUVA	VELA	VERTUS	Mean
	9.50	12.70	8.16	13.27	10.91

GRAND MEAN 10.22

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

CA3 RO15	VARIETY	CARBRATE	ROWSPACE
1.532	0.766	0.542	0.542

VARIETY CARBRATE	VARIETY ROWSPACE	CARBRATE ROWSPACE	VARIETY CARBRATE ROWSPACE
1.083	1.083	0.766	1.532

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90/R/CS/327

TOTAL OF 4 CUTS DRY MATTER TONNES/HECTARE

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	19	1.532	15.0

TOTAL OF 4 CUTS MEAN DM% 22.1

PLOT AREA HARVESTED 0.00045

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90/R/CS/331

TAKE-ALL INOCULATION

Object: To compare a range of methods of artificially inoculating take-all (Gaeumannomyces graminis) 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 second year, w. wheat.

For previous year see 89/R/CS/331

Design: 4 randomised blocks of 9 plots.

Whole plot dimensions: 3.0 x 22.0.

Treatments:

INOCMETH	Methods of inoculating take-all to w. wheat in the first year, none to w. wheat in 1990:
NONE(O)	None (w. oats in the first year)
NONE(W)	None (w. wheat in the first year)
I PRE PL	Infective inoculum applied to soil surface pre-ploughing
N PRE PL	Non-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
N PRE SO	Non-infective inoculum applied as above
I CD	Infective inoculum combine drilled with the seed
N CD	Non-infective inoculum combine drilled with the seed

NOTES: (1) Inoculum was prepared on autoclaved oat seed.
(2) The sequence of cultivations in the first year was identical for all treatments: Plough to 23 cm, cultivate to level, traverse with fertilizer drill to 10 cm, rotary harrow to 10 cm and sow wheat with combine drill. In the second year the cultivations, all basal, were: Ploughed on 31 Aug, 1989, rotary harrowed twice on 2 Oct and rotary harrowed and seed sown, 4 Oct.
(3) An additional treatment, required for comparisons in future years, was sown with w. oats.

Basal applications: Manure: 'Nitram' at 580 kg. Weedkillers: Isoproturon at 1.7 kg in 200 l (wheat only). Fluroxypyr at 0.15 kg with bromoxynil at 0.24 kg, clopyralid at 0.05 kg applied with the prochloraz in 200 l. Fungicides: Prochloraz at 0.40 kg. Propiconazole at 0.12 kg with carbendazim at 0.25 kg and maneb at 1.6 kg in 200 l. Insecticide: Deltamethrin at 6.2 g in 200 l.

Seed: W. wheat: Mercia, sown at 180 kg.
W. oats: Image, sown at 190 kg.

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90/R/CS/311

Cultivations, etc.:- Isoproturon (wheat only) applied: 20 Nov, 1989. Deltamethrin applied: 22 Feb, 1990. N applied: 12 Apr. Remaining weedkillers with prochloraz applied: 25 Apr. Remaining fungicides applied: 14 June. Combine harvested: 11 Aug.

NOTE: Plants were sampled on six occasions between mid-March and mid-July to assess take-all. Quality assessments were made on the grain. Soil cores were taken after harvest to assess take-all infectivity.

W.WHEAT

GRAIN TONNES/HECTARE

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

INOCMETH	
NONE(O)	8.02
NONE(W)	7.48
I PRE PL	6.98
N PRE PL	7.50
I PRE SO	6.85
N PRE SO	7.87
I CD	7.59
N CD	7.39
Mean	7.46

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

INOCMETH
0.413

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	21	0.583	7.8

GRAIN MEAN DM% 88.9

PLOT AREA HARVESTED 0.00500

W.OATS

GRAIN TONNES/HECTARE 7.37

MEAN DM% 88.0

PLOT AREA HARVESTED 0.00506

https://doi.org/10.23637/ERADOC-1-42

90/W/CS/336

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.

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 second year, w. wheat.

For first year see 89/W/CS/336.

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

Whole plot dimensions: 10.0 x 24.0.

Treatments: All combinations of:-

Whole plots

1.	**LAND TRT**	Land treatment in 1989, after s. wheat 1988 (all treatments ploughed in autumn 1989 before w. wheat):
	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**	Nitrogen fertilizer (kg N) as 'Nitro-Chalk':
	0	
	37	
	56	
	73	
	92	
	110	
	128	

NOTES: (1) An additional fallow sub plot was present, systematically arranged on one side of each whole plot.
(2) Rates of N shown were those used in error for the intended N scale of 0, 80, 120, 160, 200, 240, 280.

https://doi.org/10.23637/ERADOC-1-42

90/W/CS/336

Standard applications: W. wheat: Weedkillers: Isoproturon at 2.1 kg with isoxaben at 75 g in 220 l. Isoproturon at 2.1 kg with fluroxypyr at 0.15 kg in 220 l. Fungicides: Propiconazole at 0.12 kg with chlorothalonil at 0.50 kg in 300 l. Insecticide: Deltamethrin at 6.2 g in 220 l.

Seed: W. wheat: Mercia, sown at 170 kg.

Cultivations, etc.:- Straw chopped on CA WW plots: 21 Aug, 1989. Ploughed: 31 Aug. Rolled: 1 Sept. Rotary cultivated with crumbler attached: 28 Sept. Seed sown: 29 Sept. Isoproturon and isoxaben applied: 11 Dec. Insecticide applied: 23 Feb, 1990. N applied: 27 Mar. Isoproturon and fluroxypyr applied: 24 Apr. Fungicides applied: 22 May. Fallow rotary cultivated: 12 June. Wheat combine harvested: 8 Aug.

NOTE: Amounts of soil and plant dry matter were measured in autumn, spring and summer. Assessments of plant cover were made in autumn and spring.

GRAIN TONNES/HECTARE

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

NITROGEN	0	37	56	73	92	110	128	Mean
LAND TRT								
CA WW	3.34	4.72	5.50	5.11	5.94	6.21	6.26	5.30
CA RA	3.13	5.24	5.80	5.06	5.54	6.13	6.56	5.35
SA CA FA	4.51	5.90	6.59	6.20	6.70	6.24	6.30	6.06
CA CS	5.65	6.91	7.10	7.58	7.93	8.09	8.51	7.40
SA CS	5.27	6.84	7.05	7.47	7.77	7.33	7.87	7.08
WT	3.67	5.93	6.63	6.84	6.98	7.09	7.15	6.33
WT CS TS	5.04	5.64	5.70	5.93	6.39	6.32	6.51	5.93
Mean	4.37	5.88	6.34	6.31	6.75	6.77	7.02	6.21

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

	LAND TRT	**NITROGEN**	**LAND TRT NITROGEN**
	0.671	0.171	0.791
Except when comparing means with the same level(s) of **LAND TRT**			0.452

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.822	13.2
BLOCK.WP.SP	84	0.553	8.9

GRAIN MEAN DM% 89.6

SUB PLOT AREA HARVESTED 0.00199

https://doi.org/10.23637/ERADOC-1-42

90/R/CS/337

PREVIOUS CROPS AND N

Object: To study the effects of a range of crops on the nitrogen requirements, quality and yield of a subsequent w. barley crop - Webbs.

Sponsors: D.G. Christian, N.L. Carreck.

The second year, w. barley.

For first year see 89/R/CS/337.

Design: 3 randomised blocks of 5 plots split into 6 sub plots.

Whole plot dimensions: 21.0 x 20.0.

Treatments: All combinations of:-

Whole plots

1. **PREVCROP** Crops in 1989, all w. barley in 1990:

W BARLEY	W. barley
W BEANS	W. beans
W OATS	W. oats
RAPE	W. oilseed rape, resown to s. oilseed rape
POTATOES	Potatoes

Sub plots

2. **N** Nitrogen fertilizer (kg N) as 'Nitro-Chalk' (27% N):

0
50
75
100
125
150

Basal applications: Weedkillers: Glyphosate at 0.27 kg in 200 l. Isoproturon at 1.7 kg in 200 l. Mecoprop at 2.0 kg in 200 l. Bromoxynil at 0.28 kg, ioxynil at 0.28 kg and mecoprop at 2.2 kg with the prochloraz in 200 l. Fungicides: Prochloraz at 0.60 kg. Propiconazole at 0.12 kg in 200 l.

Seed: Halcyon, sown at 160 kg.

Cultivations, etc.:- Glyphosate applied: 14 Sept, 1989. Ploughed: 16 Sept. Rotary harrowed: 20 Sept. Rotary harrowed, seed sown: 21 Sept. Isoproturon applied: 29 Nov. Mecoprop applied: 4 Jan, 1990. Bromoxynil, ioxynil and mecoprop with prochloraz applied: 9 Apr. Propiconazole applied: 3 May. Combine harvested: 24 July.

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90/R/CS/337

NOTES: (1) Soil samples taken in November and March were analysed for nitrate and ammonium contents.
(2) Plant samples taken from November to May were analysed for nitrate-N contents.
(3) Crop samples were taken from March to maturity to measure plant and shoot numbers, dry weights and nitrogen uptakes.
(4) Components of yield were measured at maturity.

GRAIN TONNES/HECTARE

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

N	0	50	75	100	125	150	Mean
PREVCROP							
W BARLEY	3.03	4.59	4.97	5.61	5.80	6.22	5.04
W BEANS	3.77	5.43	6.18	6.70	7.02	7.54	6.11
W OATS	3.43	5.28	5.96	6.52	7.05	7.32	5.93
RAPE	3.61	5.26	5.57	6.66	6.81	7.25	5.86
POTATOES	4.40	6.46	6.55	7.67	7.73	7.71	6.75
Mean	3.65	5.40	5.85	6.63	6.88	7.21	5.94

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

	PREVCROP	**N**	**PREVCROP N**
	0.278	0.116	0.366
Except when comparing means with the same level(s) of **PREVCROP**			0.260

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	8	0.341	5.7
BLOCK.WP.SP	50	0.318	5.4

GRAIN MEAN DM% 89.3

SUB PLOT AREA HARVESTED 0.00204

https://doi.org/10.23637/ERADOC-1-42

90/W/CS/339

SULPHUR AND NITROGEN

Object: To study the effects of differing amounts of sulphur on rates of sulphur uptake and on the yield of w. oilseed rape and the extent to which responses are affected by amounts of nitrogen fertilizer - Woburn, Butt Close II.

Sponsor: S.P. McGrath.

The second year, w. oilseed rape.

For first year see 89/W/CS/339.

Design: 3 randomised blocks of 12 plots.

Whole plot dimensions: 4.0 x 10.0.

Treatments: All combinations of:-

1. **S** Rates of sulphur (kg S) as calcium sulphate cumulative to 1989 applications:

   0
   10
   20
   40

2. **N** Rates of nitrogen (kg N) as 'Nitro-Chalk' (27% N) cumulative to 1989 applications:

   0
   180
   230

Basal applications: Weedkillers: Benazolin at 0.38 kg with clopyralid at 0.062 kg in 220 l. Insecticides: Deltamethrin at 6.2 g in 220 l. Triazophos at 0.42 kg applied with the fungicide. Fungicide: Iprodione at 0.50 kg in 300 l. Irrigation: 25 mm divided equally between two occasions.

Seed: Libravo, sown at 6.0 kg.

Cultivations, etc.:- Wheat straw removed: 24 Aug, 1989. Subsoiled, ploughed and rolled: 1 Sept. Rotary harrowed with crumbler attached, seed sown: 8 Sept. Rolled: 9 Sept. Irrigated: 28 Sept and 4 Oct. Weedkillers applied: 23 Feb, 1990. N and S applied: 9 March. Deltamethrin applied: 5 Apr. Iprodione and triazophos applied: 24 May. Combine harvested: 27 July.

https://doi.org/10.23637/ERADOC-1-42

90/W/CS/339

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

N S	0	180	230	Mean
0	0.16	0.35	0.29	0.27
10	0.19	0.37	0.76	0.44
20	0.14	0.19	0.39	0.24
40	0.17	0.29	0.43	0.30
Mean	0.16	0.30	0.47	0.31

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

S	N	S N
0.083	0.072	0.143

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	22	0.175	56.2

GRAIN MEAN DM% 78.1

STRAW (AT 90% DRY MATTER) TONNES/HECTARE

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

N S	0	180	230	Mean
0	0.55	1.54	1.05	1.04
10	0.50	1.51	2.31	1.44
20	0.56	1.01	1.33	0.97
40	0.33	1.67	1.28	1.09
Mean	0.49	1.43	1.49	1.14

STRAW MEAN DM% 80.4

PLOT AREA HARVESTED 0.00120

https://doi.org/10.23637/ERADOC-1-42

90/W/CS/342

CATCH CROPS

Object: To compare a range of catch crops for their ability to take up N during the autumn, to measure rates of mineralization of N after incorporating them in spring and to measure their effects on the yield of a subsequent spring barley crop - Woburn, Road Piece.

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

The first year, clover, forage rape, Phacelia, ryegrass, rye, mustard, w. wheat, s. barley.

Design: 3 randomised blocks of 11 plots split into 2 sub plots criss cross.

Whole plot dimensions: 8.0 x 10.0.

Treatments: All combinations of:-

Whole plots

1. **CROPS** Catch crops and subsequent crops:

Sown 11 Aug, 1989, ploughed in on 6 Mar, 1990, s. barley sown 8 Mar:

AL CL SB	Alsike clover
FA CU SB	Fallow, cultivated to keep soil bare
FA UC SB	Fallow, uncultivated, weeds and volunteers allowed to grow
FO RA SB	Forage rape
PH TA SB	Phacelia tanacetifolia
RY GR SB	Ryegrass
RYE SB	Rye
WH MU SB	White mustard
WM+RY SB	White mustard + rye

Sown 5 Oct, 1989, ploughed in on 6 Mar, 1990, s. barley sown 8 Mar:

WW SB	Winter wheat

Sown 5 Oct, 1989, taken to normal maturity:

W WHEAT	Winter wheat

Sub plots

2. **N** Nitrogen fertilizer on 8 Mar, 1990 (kg N) as 'Nitro-Chalk' (27% N):

0
50

Standard applications: Manure, to w. wheat taken to maturity: 150 kg N as 'Nitro-Chalk'. Weedkillers to all w. wheat: Glyphosate at 0.36 kg in 200 l. Isoproturon at 1.5 kg with isoxaben at 75 g in 220 l.

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Basal applications: Weedkillers: Bromoxynil at 0.24 kg and clopyralid at 0.05 kg with mecoprop at 1.8 kg in 220 l. Fungicide: Fenpropimorph at 0.75 kg in 220 l.

Seed: Alsike clover: Sown at 10 kg.
Forage rape: Giant, sown at 30 kg.
Phacelia tanacetifolia: Sown at 12 kg.
Ryegrass: Contessa, sown at 25 kg.
Rye: Halo, sown at 180 kg.
White mustard: Sown at 30 kg.
White mustard + rye: Sown at 30 and 180 kg respectively.
W. wheat: Mercia, sown at 180 kg.
S. barley: Blenheim, seed dressed triadimenol and fuberidazole, sown at 160 kg

Cultivations, etc.:-
All crops except w. wheat: Rotary cultivated twice, except on uncultivated fallow, seeds sown: 11 Aug, 1989. Deep-tine cultivated fallow only: 21 Sept. Ploughed: 6 Mar, 1990. Treatment N applied, rotary harrowed with crumbler attached, s. barley sown: 8 Mar. Weedkillers applied: 23 May. Fungicide applied: 24 May. Combine harvested: 9 Aug.
W. wheat: Rotary cultivated twice: 26 Sept, 1989. Glyphosate applied: 4 Oct. Seed sown and rolled: 5 Oct. Isoproturon and isoxaben applied: 11 Dec. Wheat not taken to maturity ploughed: 6 Mar, 1990. Remaining wheat, test N applied: 8 Mar, standard N applied: 6 Apr, bromoxynil, clopyralid and mecoprop applied: 23 May, fungicide applied: 24 May, combine harvested: 7 Aug.

https://doi.org/10.23637/ERADOC-1-42

90/W/CS/342

GRAIN TONNES/HECTARE

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

N	0	50	Mean
CROP			
AL CL SB	2.38	3.04	2.71
FA CU SB	2.78	3.65	3.21
FA UC SB	2.87	4.01	3.44
FO RA SB	3.19	3.47	3.33
PH TA SB	3.45	1.96	2.71
RY GR SB	2.33	2.61	2.47
RYE SB	2.87	2.64	2.76
WH MU SB	2.42	3.23	2.82
WM+RY SB	2.49	3.94	3.21
WW SB	2.72	3.77	3.25
W WHEAT	5.34	5.38	5.36
Mean	2.99	3.43	3.21

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

CROP	CROP* N
0.531	0.75

* Within the same level of N only

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

Stratum	d.f.	s.e.	cv%
BLOCKN.BLOCK.WP	40	0.919	28.7

GRAIN MEAN DM% *

SUB PLOT AREA HARVESTED 0.00003

https://doi.org/10.23637/ERADOC-1-42

90/W/CS/346

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, White Horse.

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, M.D. Helps.

The first year, w. wheat, forage rape, ryegrass, trefoil.

Design: 3 randomised blocks of 7 plots.

Whole plot dimensions: 10.0 x 24.0.

Treatments:

1.	**LAND TRT**	Land treatment, after w. wheat 1989:
	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

NOTE: Yields were taken only from CA WW.

Standard applications, seed and cultivations, etc.:-

CA WW: W. wheat straw baled and carted: 22 Aug, 1989. Ploughed: 29 Aug. Rolled: 1 Sept. Rotary harrowed with crumbler attached, Mercia wheat seed sown at 150 kg: 2 Oct. Weedkillers: Isoxaben at 75 g with isoproturon at 1.5 kg in 200 l applied: 11 Dec. Bromoxynil at 0.34 kg, clopyralid at 0.07 kg with fluroxypyr at 0.15 kg in 220 l applied: 28 Apr, 1990. Manures: N applied at 40 kg: 8 Mar and at 160 kg: 17 Apr as 'Nitram'. Fungicides: Propiconazole at 0.12 kg with chlorothalonil at 0.50 kg in 300 l applied: 22 May. Combine harvested: 7 Aug.

CA RA: W. wheat straw baled and carted: 22 Aug, 1989. Ploughed: 29 Aug. Rolled: 1 Sept. Rotary cultivated with crumbler attached, Italian ryegrass seed sown at 25 kg and rolled: 7 Sept. Topped: 18 May, 1990, 5 July and 11 Sept.

SA CA FA: W. wheat straw chopped: 22 Aug, 1989. Ploughed: 29 Aug. Rolled: 1 Sept. Rotary cultivated with crumbler attached, Giant forage rape seed sown at 10 kg and rolled: 7 Sept. Topped: 18 May, 1990, 5 July and 11 Sept.

CA CS: W. wheat straw baled and carted: 22 Aug, 1989. Ploughed: 29 Aug. Weedkillers: Paraquat at 0.80 kg ion in 250 l applied: 12 Jan, 1990 and 15 Mar. Cultivated with 'thistle bar': 25 May and 17 July.

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Standard applications, seed and cultivations, etc.:-

SA CS: W. wheat straw chopped: 22 Aug, 1989. Shallow-tine cultivated: 30 Apr, 1990 and 11 June.

WT: W. wheat straw baled and carted: 22 Aug, 1989. Topped: 18 May, 1990, 5 July and 11 Sept.

WT CS TS: W. wheat straw baled and carted: 22 Aug, 1989. Topped, ploughed, rotary harrowed, Virgo Pajayere trefoil seed, inoculated with Rhizobium, sown at 10 kg: 15 May, 1990. Topped: 11 Sept.

Previous crops: Potatoes 1988, w. wheat 1989.

NOTE: Soil nitrogen, dry matter and plant cover were assessed in autumn, spring and summer.

GRAIN TONNES/HECTARE (CA WW PLOT ONLY) 4.91

MEAN DM% 89.4

PLOT AREA HARVESTED 0.00528

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90/W/CS/347

GREEN CROPS FOR SET-ASIDE

Object: To obtain information on the establishment and maintenance of sown crops and unsown vegetation in a long term, up to five-year, set-aside area given no chemical inputs. 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: 6 blocks of 6 plots.

Whole plot dimensions: 6.5 x 26.0.

The first year, w. wheat, ryegrass, clover.

Treatments in first year:

CROPS	Crops:
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
W WHEAT	Winter wheat

NOTE: Yields were taken from the w. wheat and from the ley plots from which cuttings were removed.

Standard applications:

All crops except w. wheat and tumbledown: Manure: N at 100 kg as 'Nitram' to RY+N RE plots only.

W. wheat: Manures: N at 40 kg and at 160 kg as 'Nitram'. Weedkillers: Isoproturon at 1.5 kg with isoxaben at 75 g in 200 l. Bromoxynil at 0.34 kg and clopyralid at 0.07 kg with fluroxypyr at 0.15 kg in 220 l. Flamprop-M-isopropyl at 0.60 kg in 300 l. Fungicides: Propiconazole at 0.12 kg with chlorothalonil at 0.50 kg in 300 l.

Seed: Perennial ryegrass: Melle, sown at 15 kg and resown at same rate.
Perennial ryegrass and white clover: Melle, sown at 15 kg and Huia at 4 kg, resown at same rate.
W. wheat: Mercia, sown at 150 kg.

Cultivations, etc.:-

All crops except w. wheat and tumbledown: Ploughed: 30 Aug, 1989. Rolled: 1 Sept. Rotary harrowed with crumbler attached, twice, seed sown, rolled: 6 Sept. Spike harrowed and seed resown: 15 Mar, 1990. N applied: 21 Mar. Cut: 17 May, 5 July and 24 Oct. Cuttings removed from RY+CL RE and RY+N RE plots: 14 June, 12 July and 7 Nov.

Tumbledown plots: Topped: 17 May, 5 July and 7 Nov, 1990.

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Cultivations, etc.:-

W. wheat: Ploughed: 30 Aug, 1989. Rolled: 1 Sept. Rotary harrowed with crumbler attached: 25 Sept. Seed sown: 26 Sept. Isoproturon and isoxaben applied: 11 Dec. N applied: 21 Mar, 1990 and 17 Apr. Bromoxynil, clopyralid and fluroxypyr applied: 28 Apr. Flamprop-M -isopropyl applied: 17 May. Fungicides applied: 23 May. Combine harvested: 7 Aug.

Previous crops: S. barley 1988, w. oats 1989.

NOTE: Assessments were made of numbers and species of seeds in the soil in autumn, of soil nitrogen in autumn and spring and of plant numbers and plant cover in spring and autumn.

GRASS

1ST CUT (17/5/90) DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	2.87	4.17	3.52

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

CROPS
0.391

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	5	0.677	19.2

1ST CUT MEAN DM% 21.9

2ND CUT (5/7/90) DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	1.02	1.20	1.11

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

CROPS
0.138

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	5	0.239	21.6

2ND CUT MEAN DM% 28.4

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GRASS

3RD CUT (24/10/90) DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	0.64	0.84	0.74

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

CROPS
0.115

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	5	0.200	27.0

3RD CUT MEAN DM% 28.4

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	4.53	6.21	5.37

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

CROPS
0.299

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	5	0.518	9.6

TOTAL OF 3 CUTS MEAN DM% 26.2

PLOT AREA HARVESTED 0.00264

WHEAT

GRAIN TONNES/HECTARE 7.60

GRAIN MEAN DM% 89.4

PLOT AREA HARVESTED 0.00572

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