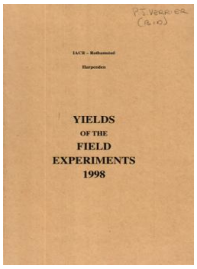
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ROTHAMSTED RESEARCH

Yields of the Field Experiments 1998

Full Table of Content



Default Title

Rothamsted Research

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(B10)

IACR – Rothamsted

Harpenden

YIELDS

OF THE

FIELD

EXPERIMENTS

1998

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YIELDS

OF THE

FIELD

EXPERIMENTS

1998

This report is produced by members of the Statistics and Crop and Disease Management Departments. It includes only experiments at Rothamsted and Woburn. Only those experiments which have the determination of crop yields as an object are included. For many of these, other determinations are of equal or greater importance.

Published 1999

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CONVENTIONS 1998

For each experiment current treatments are shown with the factor and level names which are used in the tables.

For each experiment, other than annuals, references are given to previous years. These refer to the '(Numerical)(Results) previous editions of Yields of the Field Experiments'.

For the classical and some long-term experiments reference is made to 'Details' - separate publications, giving full descriptions of treatments until 1977 & 1973, with full titles 'Details of the Classical and Long Term Experiments up to 1977' and 'Details of the Classical and Long Term Experiments up to 1973'.

The following conventions are observed unless otherwise stated.

All areas are in hectares. All plot dimensions are in metres.

All rates of application of fertilizers, sprays etc. are per hectare.

All yields are per hectare.

For any other crop, details of abbreviations are given as necessary.

'Nitro-Chalk' contains 27.5% N and 'Nitram' 34.5% N.

'34.5% N' means 34.5% N as ammonium nitrate.

'46% N' means N as urea.

'Dolomite' means magnesian limestone.

'Tiger 90' contains 90% sulphur.

'Ashlade Nu Trace' contains 5% magnesium and 1% copper.

'Manganese sulphate' contains 27% manganese and 24% sulphur.

'Phosyn Manganese' contains 150 g/l manganese.

'Profol Copper' contains 500 g/l copper.

'Vytel Manganese' contains 6.4% manganese.

Compound fertilizers indicated thus - (20:10:10) = (20% N, 10% P_2O_5, 10% K_2O), granular unless otherwise stated.

Cereal straw is removed unless otherwise stated.

In the experimental diary;
T: Refers to treatments applied to part of the experiment.
B: Refers to basal operations and applications to the whole experiment.

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Tables of means

The following abbreviations are used in variate headings:

Wheat, barley, oats, beans, lupins etc.

Grain:	Grain (at 85% dry matter)
Straw:	Straw (at 85% dry matter)

All crops

Mean D.M. %:	Mean dry matter % as harvested

Standard errors

NOTES: (1) This report gives standard errors of differences, not of means.

(2) Annotations (e.g. * min rep, max-min, max rep) to S.E.Ds are only explained the first time they occur in any experiment.

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PESTICIDES USED

The following list of pesticides is based on The UK Pesticides Guide, C.A.B. International and British Crop Protection Council. Published by University Press, Cambridge.

KEY TO ABBREVIATIONS

A	Acaricide	**AD**	Adjuvant
D	Desiccant	**F**	Fungicide
GR	Growth regulator	**H**	Herbicide
I	Insecticide	**M**	Molluscicide
N	Nematicide		

TRADE NAME	FUNCTION	ACTIVE INGREDIENT
Adder	AD	97 % refined mineral oil
Ally	H	20 % w/w metsulfuron-methyl
Alpha Briotril 24/16	H	240:160 g/l bromoxynil + ioxynil
Alpha Glyphogan	H	360 g/l glyphosate
Alto 100 SL	F	100 g/l cyproconazole
Alto 240 EC	F	240 g/l cyproconazole
Amazon	H	30:50 g/l clodinafop-propargyl + diflufenican
Amazon TP	H	240:500 g/l clodinafop-propargyl + diflufenican
Amistar	F	250 g/l azoxystrobin
Anchor	F	200:200 g/l carboxin + thiram
Aphox	I	50 % w/w pirimicarb
Asset	H	50:125:62.5 g/l benazolin + bromoxynil + ioxynil
Astix	H	600 g/l mecoprop-P
Atlas Adjuvant Oil	AD	95 % highly refined mineral oil
Atlas Dimethoate 40	A,I	400 g/l dimethoate
Atlas Fieldgard	H	500 g/l isoproturon
Atlas IPU	H	500 g/l isoproturon
Avadex BW Granular	H	10 % w/w tri-allate
Barclay Eyetak	F	450 g/l prochloraz
Barclay Gallup	H	360 g/l glyphosate
Barclay Mutiny	H	250 g/l bromoxynil
BASF Dimethoate 40	I	400 g/l dimethoate
Bavistin DF	F	50 % w/w carbendazim
Baytan Flowable	F	22.5:187.5 g/l fuberidazole + triadimenol
Benazalox	H	30:5 % w/w benazolin + clopyralid
Benlate Fungicide	F	50 % benomyl
Beret Gold	F	25 g/l fludioxonil
Bravo 500	F	500 g/l chlorothalonil
Butisan S	H	500 g/l metazachlor
Campbell's Carbendazim 50 % Flowable	F	50 % w/w carbendazim
Carbate Flowable	F	500 g/l carbendazim
Carbetamex	H	70 % w/w carbetamide
Checkmate	H	193 g/l sethoxydim

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TRADE NAME	FUNCTION	ACTIVE INGREDIENT
Cheetah Super	H	55 g/l fenoxaprop-P-ethyl
Chiltern Cropoil	AD	99 % highly refined mineral oil
Clayton Metazachlor	H	500 g/l metazachlor
Clayton Turret	F	500 g/l chlorothalonil
Compass	F	167:167 g/l iprodione + thiophanate-methyl
Corbel	F	750 g/l fenpropimorph
Cyperkill 10	I	100 g/l cypermethrin
Danadim Dimethoate 40	A,I	400 g/l dimethoate
Decis	I	25 g/l deltamethrin
Deloxil	H	190:190 g/l bromoxynil + ioxynil
Doff Metaldehyde Slug Killer Mini Pellets	M	6 % w/w metaldehyde
Dow Shield	H	200 g/l clopyralid
Draza	M,I	4 % w/w methiocarb
DUK9703	F	400 g/l flusilazole
Eagle	H	75 % w/w amidosulfron
Fastac	I	100 g/l alpha-cypermethrin
Ferrax	F	400:30:10 g/l ethirimol + flutriafol + thiabendazole
Folicur	F	250 g/l tebuconazole
Folio 575 SC	F	500:75 g/l chlorothalonil + metalaxyl
Fonofos Seed Treatment	I	433 g/l fonofos
Frigate	AD	800 g/l tallow amine ethoxylate
Gaucho	I	70 % w/w imidacloprid
Germipro	F	175:350 g/l carbendazim + iprodione
Gesaprim 500 SC	H	500 g/l atrazine
Gesatop 500 SC	H	500 g/l simizane
Gramoxone 100	H	200 g/l paraquat
Grasp	H	250 g/l tralkoxydim
Harvest	H	150 g/l glufosinate-ammonium
Hawk	H	12:383 g/l clodinafop-propargyl + trifluralin
Headland Enhance LF	AD	900 g/l alkyl phenol ethylene oxide condensate with silicone anti-foaming agent
Isoproturon 500	H	500 g/l isoproturon
Isoguard	H	500 g/l isoproturon
Javelin Gold	H	20:500 g/l diflufenican + isoproturon
Katamaran	H	350:100 g/l metazachlor + quinmerac
Landmark	F	125:125 g/l epoxiconazole + kersoxim-methyl
Laser	H	200 g/l cycloxydim
Legumex Extra	H	27:237:42.8 g/l benazolin + 2,4-DB + MCPA
Lexus Class WSB	H	33.3:66.7 % w/w carfentrazone-ethyl + flupyrsulfuron-methyl

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TRADE NAME	FUNCTION	ACTIVE INGREDIENT
LI-700	AD	350:100:350 g/l modified soya lecithin + alkylphenylhydroxypolyoxyethylene + pripionic acid
Lindex-Plus FS Seed Treatment	I,F	545:43:73 g/l gamma-HCH + fenpropimorph +thiram
Luxan Non-Ionic Wetter	AD	900 g/l alkyl phenol ethylene oxide condensate
Lo-Gran 20 WG	H	20 % w/w triasulfuron
Mesurol	M,I	methiocarb seed treatment
Methiocare	M,I	methiocarb seed treatment
Mistral	F	750 g/l fenpropimorph
MSS Optica	H	600 g/l mecoprop-P
MSS Simazine 50 FL	H	500 g/l simazine
MSS Trifluralin 48 EC	H	480 g/l trifluralin
Opogard 500 SC	H	150:350 g/l terbuthylazine + terbutryn
Opus	F	125 g/l epoxiconazole
Opus Team	F	84:250 g/l epoxiconazole + fenpropimorph
Output	AD	60 % mineral oil and 40 % surfactants
Panther	H	50:500 g/l diflufenican + isoproturon
Parable	H	100:100 g/l diquat + paraquat
PDQ	H	80:120 g/l diquat + paraquat
Plover 250 EC	F	250 g/l difenoconazole
Pointer	F	125 g/l flutriafol
Prelude 20 LF	F	200 g/l prochloraz
Punch C	F	125:250 g/l carbendazim + flusilazole
Quantum	H	50 % w/w tribenuron-methyl
Radar	F	250 g/l propiconazole
Raxil S	F	20:20 tebuconazole + triazoxide
Reglone	H,D	200 g/l diquat
Ronilan FL	F	500 g/l vinclozolin
Roundup	H	360 g/l glyphosate
Roundup Biactive	H	360 g/l glyphosate
Rovral Flo	F	255 g/l iprodine
Scythe LC	H	200 g/l paraquat
Seedox SC	I	500 g/l bendiocarb
Sibutol	F	375:23 g/l biteranol + fuberidazole
Skirmish	H	75:420 g/l isoxaben + terbuthylazine
Spannit	A,I	480 g/l chlorpyrifos
Sportak 45 HF	F	450 g/l prochloraz
Sportak Delta 460 HF	F	48:320 g/l cyproconazole + prochloraz
Sprayprover	AD	92 % highly refined mineral oil
Standon Bentazone	H	480 g/l bentazone
Standon Tebuconazole	F	250 g/l tebuconazole
Starane 2	H	200 g/l fluroxypyr

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TRADE NAME	FUNCTION	ACTIVE INGREDIENT
Stefes CCC 700	GR	700 g/l chlormequat
Stefes IPU 500	H	500 g/l isoproturon
Stomp 400 SC	H	400 g/l pendimethalin
Swipe 560 EC	H	56:56:224 g/l bromoxynil + ioxynil + mecoprop-P
Tern 750 EC	F	750 g/l fenpropidin
Terpal	GR	155:305 g/l 2-chloroethylphosphonic acid + mepiquat chloride
Titus	H	25 % w/w rimsulfuron
Topik	H	240 g/l clodinafop-propargyl
Tripart Brevis	GR	700 g/l chlormequat
Tripart Defensor FL	F	500 g/l carbendazim
Unite A	H	100 g/l diflufenican
Unite B	H	240:500 g/l clodinafop-propargyl + isoproturon
Unix	F	75 % w/w cyprodinil
Vassgro Non Ionic	AD	921 g/l alkyl phenol ethoxylate
Vindex	H	240:50 g/l bromoxynil + clopyralid
Vitavax RS	F	45:675:90 g/l carboxin + gamma-HCH + thiram
Yaltox	I,N	5 % w/w carbofuran

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98/R/BK/1

BROADBALK

Object: To study the effects of organic and inorganic manures on continuous w. wheat. From 1968 two three-year rotations were included: potatoes, beans, w. wheat and fallow, w. wheat, w. wheat. In 1979 the first rotation was changed to fallow, potatoes, w. wheat. In 1980 the second rotation reverted to continuous w. wheat. Since 1985 part of the second rotation has been added to the first to extend the rotation to fallow, potatoes, w. wheat, w. wheat, w. wheat, in 1996 the fallow was replaced by w. oats and potatoes replaced by maize in 1997.

The 155th year, w. wheat, w. oats and forage maize.

For previous years see 'Details' 1967 and 1973, Station Report for 1966, pp. 229-231, Station Report for 1978, Part 2, Station Report for 1982, Part 2, pp. 5-44 and 74-97/R/BK/1.

Areas harvested:

	Section	
Wheat:	0	0.00351
	1	0.00645
	3,4,5 and 6	0.00533
	8 and 9	0.00561
Oats:	7	0.00533
Maize:	2	0.00162

Treatments:

Whole plots

PLOT		Fertilizers and organic manures:-		
	Plot	Treatments until 1967	Treatments from 1968	Treatments from 1985
01DN4PK	01	-	D N2 P K	D N4 P K
21DN2	21	D	D N2	D N2
22D	22	D	D	D
030	03	None	None	None
05F	05	P K Na Mg	P K (Na) Mg	PK Mg
06N1F	06	N1 P K Na Mg	N1 P K (Na) Mg	N1 P K Mg
07N2F	07	N2 P K Na Mg	N2 P K (Na) Mg	N2 P K Mg
08N3F	08	N3 P K Na Mg	N3 P K (Na) Mg	N3 P K Mg
09N4F	09	N*1 P K Na Mg	N4 P K (Na) Mg	N4 P K Mg
10N2	10	N2	N2	N2
11N2P	11	N2 P	N2 P	N2 P
12N2PNA	12	N2 P Na	N2 P Na	N2 P Na
13N2PK	13	N2 P K	N2 P K	N2 P K
14N2PKMG	14	N2 P Mg	N2 P K Mg	N2 P K Mg
15N5F	15	N2 P K Na Mg	N3 P K (Na) Mg	N5 P K Mg
16N6F	16	N*2 P K Na Mg	N2 P K (Na) Mg	N6 P K Mg
17N1+3FH	17	N2(A)	N2 ½(P K (Na) Mg)	N1+3 ½(PK Mg)+
18N0+3FH	18	P K Na Mg(A)	N2 ½(P K (Na) Mg)	N0+3 ½(PK Mg)+
19(C)	19	C	C	(C) (since 1989)
20N2KMG	20	N2 K Na Mg	N2 K (Na) Mg	N2 K Mg

(A) Alternating each year

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\+ This change since 1980. Treatments shown are those to w. wheat; autumn N alternates. Maize received N3 ½(PK Mg) on both plots 17 and 18.

W. oats; Nitrogen and dung were not applied.

N1,N2,N3,N4,N5,N6: 48, 96, 144, 192, 240, 288 kg N as sulphate of ammonia until 1977, except N* which was nitrate of soda. All as 'Nitro-Chalk' in spring from 1978 to 1985, as 34.5% N since 1986.

N0+3; N1+3: None in autumn + 144 kg N in spring; 48 kg N in autumn + 144 kg N in spring

P: 35 kg P as triple superphosphate in 1974 and since 1988, single superphosphate in other years

K: 90 kg K as sulphate of potash

Na: 55 kg Na as sulphate of soda

(Na): 16 kg Na as sulphate of soda until 1973

Mg: 30 kg Mg annually to Plot 14, 35 kg Mg every third year to other plots since 1974. All as kieserite since 1974, previously as sulphate of magnesia annually

D: Farmyard manure at 35 t

(C): Castor meal to supply 96 kg N until 1988, none since

F: P K (Na) Mg H: Half rate

Strips of sub-plots: Until 1967 wheat alone was grown on the experiment, with some bare fallowing. From 1968, ten strips of sub-plots (sections) were started with the following cropping:-

SECTION	1/W32	9/W40	0/W47	8/W4	6/W21	5/W2	3/W1	7/O	4/W3	2/M
Section	1	9	0*	8+	6**	5	3	7	4	2
Year										
1968	W	W	W	W	F	W	W	P	W	BE
1969	W	W	W	W	W	F	W	BE	P	W
1970	W	W	W	W	W	W	F	W	BE	P
1971	W	W	W	W	F	W	W	P	W	BE
1972	W	W	W	W	W	F	W	BE	P	W
1973	W	W	W	W	W	W	F	W	BE	P
1974	W	W	W	W	F	W	W	P	W	BE
1975	W	W	W	W	W	F	W	BE	P	W
1976	W	W	W	W	W	W	F	W	BE	P
1977	W	W	W	W	F	W	W	P	W	BE
1978	W	W	W	W	W	F	W	BE	P	W
1979	W	W	W	W	W	W	F	W	P	F
1980	W	W	W	W	W	W	W	F	W	P
1981	W	W	W	F	W	W	W	P	F	W
1982	W	W	W	W	W	W	W	W	P	F
1983	W	W	W	W	W	W	W	F	W	P
1984	W	W	W	W	W	W	W	P	F	W
1985	W	W	W	W	W	F	W	W	P	W
1986	W	W	W	W	W	P	F	W	W	W
1987	W	W	W	W	W	W	P	W	W	F
1988	W	W	W	F	W	W	W	F	W	P

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98/R/BK/1

SECTION	1/W32	9/W40	0/W47	8/W4	6/W21	5/W2	3/W1	7/O	4/W3	2/M
Section	1	9	0*	8+	6**	5	3	7	4	2
Year										
1989	W	W	W	W	W	W	W	P	F	W
1990	W	W	W	W	W	F	W	W	P	W
1991	W	W	W	W	W	P	F	W	W	W
1992	W	W	W	W	W	W	P	W	W	F
1993	W	W	W	W	W	W	W	F	W	P
1994	W	W	W	F	W	W	W	P	F	W
1995	W	W	W	W	W	F	W	W	P	W
1996	W	W	W	W	W	P	O	W	W	W
1997	W	W	W	W	W	W	M	W	W	O
1998	W	W	W	W	W	W	W	O	W	M

W = w. wheat, O = w. oats, P = potatoes, BE = s. beans, F = fallow, M = forage maize

* Straw incorporated since autumn 1986. ** No sprays except weedkillers since 1985. + No weedkillers.

NOTES: (1) For a fuller record of treatments see 'Details' etc.
(2) From autumn 1975 to autumn 1986, chalk was applied at 2.9 t each autumn to all plots in sets of Sections on a three-year cycle. Year 1: Sections 1,2,3. Year 2: Sections 6,7,8,9. Year 3: Sections 0,4,5. From autumn 1988 until autumn 1992 a five-year cycle was used. Year 1: Sections 1,3. Year 2: Sections 2,8. Year 3: Sections 7,9. Year 4: Sections 4,6. Year 5: Sections 0,5. None applied since autumn 1991.

Experimental diary:
All sections:
13-Oct-97 : **T** : P, K, Na and Mg applied.
15-Oct-97 : B : Ploughed and furrow pressed.
19-Oct-97 : B : Rotary harrowed.
07-Jul-98 : B : Hand rogued wild oats.
Cropped sections:
W. wheat:
01-Sep-97 : **T** : Straw chopped (section 0 only), straw baled (sections 1, 3,4,5,6,8 and 9).
14-Oct-97 : **T** : Farmyard manure and autumn N treatments applied.
15-Oct-97 : **T** : Rotary harrowed, Hereward, dressed Anchor and Fonofos Seed Treatment at 380 seeds per m^2.
22-Oct-97 : **T** : Rolled.
05-Feb-98 : **T** : Amazon at 1.0 l with Chiltern Cropoil at 1.0 l in 200 l (except section 8).
24-Mar-98 : **T** : Spring N treatments applied.
08-May-98 : **T** : Ally at 20 g with Starane 2 at 0.5 l in 200 l (except section 8).
08-May-98 : **T** : Opus at 0.7 l in 200 l (except section 6).
01-Jun-98 : **T** : Opus at 0.7 l in 200 l (except section 6).
17-Jun-98 : **T** : Bavistin DF at 0.5 kg with Opus at 0.4 l in 100 l (except section 6).
16-Aug-98 : **T** : Combine harvested.

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98/R/BK/1

Experimental diary:

W. oats:
- 01-Sep-97 : **T** : Wheat straw baled.
- 21-Oct-97 : **T** : Rotary harrowed, Image dressed Anchor at 350 seeds per m^2.
- 23-Oct-97 : **T** : Rolled.
- 08-May-98 : **T** : Ally at 20 g with Starane 2 at 0.5 l in 200 l.
- 03-Jul-98 : **T** : Mistral at 1.0 l in 200 l.
- 06-Aug-98 : **T** : Combine harvested.

Forage maize:
- 20-Aug-97 : **T** : Oat straw baled.
- 14-Oct-97 : **T** : Farmyard manure applied.
- 23-Mar-98 : **T** : Gramoxone 100 at 3.0 l with Luxan Non-Ionic Wetter at 0.1 l in 260 l.
- 30-Apr-98 : **T** : Spring-tine cultivated.
- 06-May-98 : **T** : Heavy spring-tine cultivated.
- 07-May-98 : **T** : Spring N treatments applied, rotary harrowed, Hudson, dressed Mesurol at 11 seeds per m^2.
- 12-Jun-98 : **T** : Barclay Mutiny at 2.4 l in 200 l.
- 16-Sep-98 : **T** : Hand harvested.

NOTE: Samples of wheat and oat; grain and straw and forage maize were taken for chemical analysis. Unground grain, straw and maize samples from selected treatments were archived.

W. WHEAT

GRAIN TONNES/HECTARE

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

SECTION / **PLOT**	3/W1	5/W2	4/W3	8/W4	6/W21	1/W32	9/W40	0/W47
01DN4PK	9.25	9.84	9.65	*	7.23	*	*	*
21DN2	10.01	9.31	8.26	2.74	8.16	8.84	8.31	7.05
22D	7.80	5.41	4.35	1.74	5.09	5.53	4.65	3.88
030	1.42	1.08	1.21	1.33	1.40	1.64	1.28	1.65
05F	1.61	0.81	1.08	0.73	1.10	1.50	1.19	1.19
06N1F	3.93	2.21	2.99	1.37	2.54	3.15	2.34	2.90
07N2F	6.41	3.89	4.74	2.06	3.65	4.49	3.77	4.03
08N3F	7.92	4.24	6.27	2.25	4.58	5.61	4.96	5.50
09N4F	8.96	6.36	7.39	4.08	6.73	6.95	7.19	7.27
10N2	5.50	1.22	4.32	1.09	2.96	3.24	2.81	3.22
11N2P	5.50	3.66	4.10	2.28	3.95	4.76	3.36	4.38
12N2PNA	5.35	4.01	4.01	2.07	3.47	4.56	3.31	4.62
13N2PK	5.54	2.92	3.62	2.89	3.34	4.02	4.46	4.42
14N2PKMG	5.73	3.70	4.25	2.71	3.90	5.25	4.61	4.94
15N5F	9.84	7.48	8.32	3.98	6.59	7.59	8.02	7.52
16N6F	9.35	8.60	8.86	2.75	6.91	8.57	8.39	7.98
17N1+3FH	8.09	6.75	6.84	3.76	5.98	6.78	7.32	7.00
18N0+3FH	7.53	6.47	6.45	2.89	6.06	6.21	6.93	5.94
19C	2.08	1.22	1.77	1.97	1.58	1.97	2.45	1.79
20NKMG	*	*	*	*	*	2.68	*	3.06

GRAIN MEAN DM% 85.2

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98/R/BK/1 W. WHEAT

STRAW TONNES/HECTARE

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

SECTION / PLOT	3/W1	6/W21	1/W32	9/W40
01DN4PK	8.84	*	*	*
21DN2	8.61	6.20	7.50	5.80
22D	5.54	3.77	3.70	3.19
030	0.57	0.63	1.32	0.37
05F	0.60	0.39	0.92	0.52
06N1F	2.86	1.95	2.61	1.97
07N2F	4.24	3.08	3.99	3.24
08N3F	5.16	3.44	4.40	3.87
09N4F	5.79	4.53	5.40	4.97
10N2	3.21	*	2.30	*
11N2P	2.70	*	3.02	*
12N2PNA	3.22	*	3.06	*
13N2PK	3.71	*	3.12	*
14N2PKMG	3.82	*	4.38	*
15N5F	6.25	3.89	5.37	5.60
16N6F	6.93	4.88	6.19	5.75
17N1+3FH	5.68	*	5.03	*
18N0+3FH	5.05	*	4.53	*
19C	0.64	*	1.48	*
20NKMG	*	*	2.25	*

STRAW MEAN DM% 86.7

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98/R/BK/1 W. OATS

GRAIN TONNES/HECTARE

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

PLOT	GRAIN	STRAW
01DN4PK	6.22	5.22
21DN2	5.90	4.18
22D	5.67	3.92
030	1.42	0.52
05F	1.86	0.85
06N1F	1.66	0.69
07N2F	1.79	0.60
08N3F	2.00	0.82
09N4F	2.78	1.48
10N2	2.62	1.20
11N2P	2.28	0.89
12N2PNA	2.41	1.08
13N2PK	2.12	0.83
14N2PKMG	1.66	0.71
15N5F	3.62	2.03
16N6F	5.14	4.65
17N1+3FH	2.80	1.43
18N0+3FH	2.54	1.32
19C	1.55	0.68

GRAIN MEAN DM% 86.4 STRAW MEAN DM% 67.8

NOTE: Dung and nitrogen treatments are residual from previous wheat.

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98/R/BK/1 MAIZE

WHOLE CROP (100% DM) TONNES/HECTARE

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

PLOT	WHOLE CROP
01DN4PK	15.38
21DN2	17.79
22D	14.91
030	3.08
05F	4.28
06N1F	9.52
07N2F	13.53
08N3F	11.83
09N4F	13.31
10N2	7.22
11N2P	3.86
12N2PNA	6.27
13N2PK	10.46
14N2PKMG	8.22
15N5F	11.02
16N6F	11.13
17N1+3FH	11.28
18N0+3FH	11.08
19C	2.68

CROP MEAN DM% 24.4

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98/R/HB/2

HOOS BARLEY

Object: To study the effects of organic and inorganic manures on continuous s. barley. From 1968 to 1978 a rotation of potatoes, beans and s. barley was practised. The rotation was discontinued in 1979 and continued in s. barley.

The 147th year, s. barley.

For previous years see 'Details' 1967 and 1973, Station Report for 1966 and 74-97/R/HB/2.

Treatments: All combinations of:-

Whole plots

1. **MANURE** Plot Fertilizers and organic manures:

		Form of N 1852-1966	Additional treatments 1852-1979	Changes since 1980
---	11	None	-	-
-P-	21	None	P	-
--K	31	None	K(Na)Mg	-
-PK	41	None	PK(Na)Mg	-
A--	12	A	-	-
AP-	22	A	P	-
A-K	32	A	K(Na)Mg	-
APK	42	A	PK(Na)Mg	-
N----	131	N	-	-
NP---	231	N	P	-
N-K--	331	N	K(Na)Mg	-
NPK--	431	N	PK(Na)Mg	-
N--S-	134	N	Si	Si omitted
NP-S-	234	N	P Si	"
N-KS-	334	N	K(Na)MgSi	"
NPKS-	434	N	PK(Na)MgSi	"
N---S	132	N	-	Si added
NP--S	232	N	P	"
N-K-S	332	N	K(Na)Mg	"
NPK-S	432	N	PK(Na)Mg	"
N--SS	133	N	Si	-
NP-SS	233	N	P Si	-
N-KSS	333	N	K(Na)MgSi	-
NPKSS	433	N	PK(Na)MgSi	-
C(--)	14	C	-	PKMg omitted
C(P-)	24	C	P	"
C(-K)	34	C	K(Na)Mg	"
C(PK)	44	C	PK(Na)Mg	"
D	72	None	D	-
(D)	71	None	(D)	-
(A)	62	None	(Ashes)	-
-	61	None	-	-

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98/R/HB/2

Form of N: A sulphate of ammonia: N nitrate of soda - each to supply 48 kg N: C castor meal to supply 97 kg N
P: 35 kg P as triple superphosphate in 1974 and since 1988, single superphosphate in other years
K: 90 kg K as sulphate of potash
(Na): 16 kg Na as sulphate of soda until 1973
Mg: 35 kg Mg as kieserite every third year since 1974 (sulphate of magnesia annually until 1973)
Si: Silicate of soda at 450 kg
D: Farmyard manure at 35 t. (D): until 1871 only
(Ashes): Weed ash 1852-1916, furnace ash 1917-1932, none since

Sub-plots

2. **N** Nitrogen fertilizer (kg N), as 'Nitro-Chalk', since 1968 (cumulative N applications until 1973, on a cyclic system since 1974):

0
48
96
144

Plus extra plots testing all combinations of:-

Whole plots

1 **MANURE** Fertilizers other than magnesium:

55AN2PK	Plot 55 AN2PK
56--PK	Plot 56 --PK
57NN2--	Plot 57 NN2
58NN2--	Plot 58 NN2

N2: 96 kg N as 'Nitro-Chalk' since 1968. Other symbols as above.

Sub-plots

2. **MGNESIUM** Magnesium fertilizer (kg Mg) as kieserite every third year since 1974:

0
35

NOTE: For a fuller record see 'Details' etc.

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98/R/HB/2

Experimental diary:

21-Aug-97	: B	:	Straw baled.
13-Nov-97	: B	:	Alpha Glyphogan at 1.5 l with Vassgro Non Ionic at 250 ml in 200 l.
26-Nov-97	: **T**	:	Si applied.
03-Dec-97	: **T**	:	P applied.
06-Jan-98	: **T**	:	K and Mg applied.
13-Jan-98	: **T**	:	Farmyard manure applied.
14-Jan-98	: B	:	Ploughed.
04-Feb-98	: B	:	Spring-tine cultivated.
05-Feb-98	: B	:	Rotary harrowed, Cooper, dressed Baytan Flowable, drilled at 350 seeds per m^2.
23-Mar-98	: **T**	:	N applied.
08-May-98	: B	:	Ally at 20 g with MSS Optica at 2.0 l in 200 l. Bavistin DF at 0.5 kg with Opus at 0.3 l in 200 l.
07-Jul-98	: B	:	Hand rogued wild oats.
10-Aug-98	: B	:	Combine harvested.

NOTE: Samples of grain and straw were taken for chemical analysis. Unground grain and straw samples were archived.

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98/R/HB/2 MAIN PLOTS

GRAIN TONNES/HECTARE

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

N / MANURE	0	48	96	144	Mean
---	0.43	0.54	0.39	1.30	0.67
-P-	2.53	3.21	2.72	2.75	2.80
--K	0.55	1.68	1.93	2.99	1.79
-PK	1.63	3.16	4.34	5.04	3.54
A--	1.03	1.51	1.16	1.09	1.20
AP-	2.49	2.75	2.48	2.05	2.44
A-K	0.92	1.86	2.09	2.21	1.77
APK	1.83	3.40	4.93	5.55	3.93
N---	1.49	1.55	1.50	2.80	1.83
NP--	2.84	3.45	3.28	3.75	3.33
N-K-	1.36	2.65	2.90	2.38	2.32
NPK-	2.04	3.67	5.45	6.00	4.29
N--S	1.52	2.05	3.99	3.50	2.77
NP-S	2.41	4.15	3.30	4.25	3.53
N-KS	2.03	2.98	3.58	4.49	3.27
NPKS	2.46	4.36	5.41	6.18	4.60
N---S	1.92	3.02	2.74	2.96	2.66
NP--S	2.71	3.85	4.69	4.35	3.90
N-K-S	2.05	2.48	3.78	3.91	3.05
NPK-S	2.09	3.72	5.03	5.74	4.15
N--SS	2.12	2.12	2.44	4.26	2.74
NP-SS	2.35	3.90	4.01	4.16	3.61
N-KSS	1.93	3.42	4.01	4.83	3.55
NPKSS	2.29	3.90	5.33	6.12	4.41
C(--)	1.71	2.66	2.84	3.41	2.65
C(P-)	2.21	4.29	4.34	4.50	3.84
C(-K)	1.84	2.49	3.93	4.26	3.13
C(PK)	1.99	3.82	4.77	5.81	4.10
D	6.51	6.99	6.82	6.16	6.62
(D)	1.19	2.20	5.19	3.29	2.97
(A)	1.38	3.07	2.58	2.94	2.49
-	1.00	1.75	1.79	2.41	1.74
Mean	1.96	3.02	3.55	3.92	3.11

GRAIN MEAN DM% 85.6

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98/R/HB/2 MAIN PLOTS

STRAW TONNES/HECTARE

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

N	0	48	96	144	Mean
MANURE					
---	0.08	0.27	0.45	0.62	0.35
-P-	0.81	1.58	1.35	1.58	1.33
--K	0.22	0.57	1.00	1.59	0.84
-PK	0.61	1.19	1.98	2.02	1.45
A--	0.35	0.51	0.31	0.47	0.41
AP-	1.05	1.50	1.84	1.37	1.44
A-K	0.23	0.77	1.49	1.08	0.89
APK	0.61	1.56	2.51	2.30	1.75
N----	1.15	1.90	1.73	2.26	1.76
NP---	1.58	2.32	2.38	2.78	2.27
N-K--	1.14	1.89	2.33	2.06	1.86
NPK--	1.26	2.01	3.06	3.28	2.41
N--S-	1.23	2.08	2.77	2.48	2.14
NP-S-	1.72	2.79	2.33	2.58	2.35
N-KS-	1.66	2.02	2.56	2.64	2.22
NPKS-	1.74	2.56	3.13	3.41	2.71
N---S	1.91	2.04	2.57	2.33	2.21
NP--S	2.24	2.13	2.80	3.27	2.61
N-K-S	1.44	1.88	3.16	3.53	2.50
NPK-S	1.64	3.17	2.90	2.89	2.65
N--SS	1.40	1.85	1.89	2.91	2.01
NP-SS	1.83	2.83	2.51	3.01	2.54
N-KSS	1.83	2.25	3.64	2.98	2.67
NPKSS	1.68	2.66	3.65	3.72	2.93
D	2.95	4.85	5.15	4.55	4.37
(D)	0.76	1.36	2.50	2.12	1.69
(A)	0.36	1.59	1.30	1.56	1.20
-	0.35	0.72	1.11	1.47	0.91
Mean	1.21	1.89	2.30	2.39	1.95

STRAW MEAN DM% 90.0

EXTRA PLOTS

GRAIN TONNES/HECTARE

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

MANURE	551AN2PK	561--PK	571NN2--	581NN2--	Mean
MGNESIUM					
0	4.52	0.62	2.76	1.56	2.36
35	4.28	0.68	2.41	1.61	2.24
Mean	4.40	0.65	2.58	1.58	2.30

GRAIN MEAN DM% 86.9

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98/R/WF/3

WHEAT AND FALLOW

Object: To study the effects of fallowing on unmanured w. wheat - Hoosfield.

The 143rd year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-97/R/WF/3.

Whole plot dimensions: 9.0 x 211.

Treatments:
Two plots, one sown to w. wheat, one fallow; alternating in successive years.

Experimental diary:
Wheat plot:
23-Oct-97 : **T** : Ploughed.
27-Oct-97 : **T** : Hereward, dressed Anchor and Fonofos Seed Treatment, drilled at 380 seeds per m^2.
08-May-98 : **T** : Ally at 20 g with Starane 2 at 0.5 l in 200 l.
09-May-98 : **T** : Opus at 0.7 l in 200 l.
28-May-98 : **T** : Opus at 0.7 l in 200 l
15-Jun-98 : **T** : Bavistin DF at 0.5 kg with Folicur at 0.5 l in 100 l.
16-Aug-98 : **T** : Combine harvested.
Fallow plot:
23-Oct-97 : **T** : Ploughed.
29-Apr-98 : **T** : Spring-tine cultivated.
20-May-98 : **T** : Thistle barred.
09-Jul-98 : **T** : Thistle barred.

NOTE: A sample of unground grain and straw was archived.

GRAIN AND STRAW TONNES/HECTARE

	GRAIN	STRAW
YIELD	1.48	0.57
MEAN DM%	82.4	83.3

PLOT AREA HARVESTED 0.023232

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98/R/EX/4

EXHAUSTION LAND

Object: To study the residual effects of manures applied 1876-1901, and of additional phosphate applied since 1986, on the yield of continuous s. barley up to 1991, w. wheat since - Hoosfield.

The 143rd year, w. wheat.

For previous years see 'Details' 1977, 1973 and 74-97/R/EX/4.

Treatments: All combinations of:-

Whole plots (P test)

1.	**OLD RES**	Residues of manures applied annually 1876-1901:
	O	None
	D	Farmyard manure at 35 t
	N	96 kg N as ammonium salts
	P	34 kg P as superphosphate
	NPKNAMG	N and P as above plus 137 kg K as sulphate of potash, 16 kg Na as sulphate of soda, 11 kg Mg as sulphate of magnesia
2.	**P RES**	Residues of phosphate (kg P) applied annually from 1986, as single superphosphate in 1986 and 1987, triple superphosphate from 1988 until 1992, none since:
	O	None
	P1	44
	P2	87
	P3	131

plus

Whole plots (K test, previously N test until 1991)

	OLD RES	Residues of manures applied annually 1876-1901:
	O	None
	D	Farmyard manure at 35 t
	N*	96 kg N as nitrate of soda
	PK	34 kg P as superphosphate, 137 kg K as sulphate of potash
	N*PK	N, P and K as above

Experimental diary:

P test:

15-Oct-97 : **T** : Muriate of potash at 167 kg.

K test:

15-Oct-97 : **T** : Triple superphosphate at 319 kg.

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98/R/EX/4

Experimental diary:
All plots:
23-Oct-97 : B : Ploughed.
24-Oct-97 : B : Rotary harrowed, Mercia, dressed Sibutol, drilled at 380 seeds per m^2.
05-Feb-98 : B : Amazon at 1.0 l with Chiltern Cropoil at 1.0 l in 200 l.
24-Mar-98 : B : 34.5% N at 557 kg.
09-May-98 : B : Opus at 0.7 l in 200 l.
28-May-98 : B : Opus at 0.7 l in 200 l.
15-Jun-98 : B : Bavistin DF at 0.5 kg with Folicur at 0.5 l in 100 l.
06-Aug-98 : B : Alpha Glyphogan at 3.0 l in 200 l.
18-Aug-98 : B : Combine harvested.

NOTE: Samples of grain and straw were taken for chemical analysis.

P TEST

GRAIN TONNES/HECTARE

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

P RES / OLD RES	0	P1	P2	P3	Mean
0	3.38	7.22	7.62	8.01	6.56
D	6.98	7.62	7.70	7.88	7.55
N	3.43	7.48	7.73	7.61	6.56
P	6.19	7.32	7.72	7.41	7.16
NPKNAMG	6.40	7.41	7.77	8.05	7.41
Mean	5.28	7.41	7.71	7.79	7.05

GRAIN MEAN DM% 86.0

STRAW TONNES/HECTARE

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

P RES / OLD RES	0	P1	P2	P3	Mean
0	3.18	6.13	7.13	6.88	5.83
D	5.92	7.17	7.25	8.10	7.11
N	3.46	6.25	7.73	7.53	6.24
P	6.13	7.42	8.03	7.90	7.37
NPKNAMG	5.64	6.91	7.52	7.80	6.97
Mean	4.86	6.78	7.53	7.64	6.70

STRAW MEAN DM% 90.6

PLOT AREA HARVESTED 0.00589

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98/R/EX/4

K TEST

GRAIN TONNES/HECTARE

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

OLD RES

O	6.50
D	6.79
N*	6.81
PK	7.21
N*PK	7.07
Mean	6.88

GRAIN MEAN DM% 85.8

STRAW TONNES/HECTARE

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

OLD RES

O	5.96
D	6.72
N*	6.38
PK	7.10
N*PK	7.72
Mean	6.78

STRAW MEAN DM% 91.9

PLOT AREA HARVESTED 0.00589

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98/R/PG/5

PARK GRASS

Object: To study the effects of organic and inorganic manures and lime on old grass for hay.

The 143rd year, hay.

For previous years see 'Details' 1977 and 1973 and 74-97/R/PG/5.

Treatments: Combinations of:-

Whole plots

1.	**MANURE**	Fertilizers and organic manures:	
	N1	Plot 1	N1
	K	Plot 2/1	K since 1996 (as 2/2 before)
	O(D)	Plot 2/2	None (D until 1863)
	O	Plot 3	None
	P	Plot 4/1	P
	N2P	Plot 4/2	N2 P
	N1MN	Plot 6	N1 P K Na Mg
	MN	Plot 7	P K Na Mg
	PNAMG	Plot 8	P Na Mg
	MN(N2)	Plot 9/1	P K Na Mg (N2 until 1989)
	N2MN	Plot 9/2	N2 P K Na Mg
	N2PNAMG	Plot 10	N2 P Na Mg
	N3MN	Plot 11/1	N3 P K Na Mg
	N3MNSI	Plot 11/2	N3 P K Na Mg Si
	O	Plot 12	None
	(D/F)	Plot 13/1	None (D/F until 1994)
	D/F	Plot 13/2	D/F
	MN(N2*)	Plot 14/1	P K Na Mg (N2* until 1989)
	N2*MN	Plot 14/2	N2* P K Na Mg
	MN(N2*)	Plot 15	P K Na Mg (N2* until 1875)
	N1*MN	Plot 16	N1* P K Na Mg
	N1*	Plot 17	N1*
	N2KNAMG	Plot 18	N2 K Na Mg
	D	Plot 19	D
	D/N*PK	Plot 20	D/N*P K

N1, N2, N3:	48, 96, 144 kg N as sulphate of ammonia
N1*, N2*:	48, 96 kg N as nitrate of soda (30 kg N to plot 20, only in years with no farmyard manure)
P:	35 kg P (15 kg P to plot 20, only in years with no farmyard manure) as triple superphosphate in 1974 and since 1987, single superphosphate in other years
K:	225 kg K (45 kg K to plot 20, only in years with no farmyard manure) as sulphate of potash
Na:	15 kg Na as sulphate of soda
Mg:	10 kg Mg as sulphate of magnesia
Si:	Silicate of soda at 450 kg
D:	Farmyard manure at 35 t every fourth year
F:	Fishmeal every fourth year to supply 63 kg N
MN:	P K Na Mg as above

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98/R/PG/5

Sub-plots

2. **LIME** Liming plots 1-17:

A	Ground chalk applied as necessary to achieve pH7
B	Ground chalk applied as necessary to achieve pH6
C	Ground chalk applied as necessary to achieve pH5
D	None

NOTE: Lime was applied regularly at the same rate, to all 'a' and 'b' sub-plots of plots 1 to 17 (except 12) from 1924. Differential liming started in 1975 on certain 'b' and 'c' sub-plots (except on plot 12) and in 1976 on certain 'a' sub-plots (including plot 12) and 12b. Lime last applied in 1997, the second application in a triennial scheme of soil pH analysis and remedial chalk applications.

Liming plots 18-20:

Differential rates of lime were applied to sub-plots 2 and 3 regularly 1920-1974. Since 1975 plot 18-1 has been split into two for treatments 'C' and 'D' above and plot 18-3 split into two for treatments 'A' and 'B'. Plots 19 and 20 received no further chalk after 1978; plot 18/2 no further chalk after 1972.

Experimental diary:

03-Dec-97 : **T** : (Not plot 20) P applied.
22-Jan-98 : **T** : K, Mg, Na and Si applied.
22-Jan-98 : **T** : Plot 20 only: P applied.
08-May-98 : **T** : Sulphate of ammonia applied. Nitrate of soda applied.
24-Jun-98 : **T** : Cut.
07-Dec-98 : **T** : Cut.

NOTE: Samples of herbage from selected plots were taken for chemical analysis. Unground herbage samples from all plots from both cuts were archived.

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98/R/PG/5

1ST CUT (25/6/98) DRY MATTER TONNES/HECTARE

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

LIME / MANURE		A	B	C	D	MEAN
N1	1	2.96	3.13	2.02	1.09	2.30
K	2/1	1.81	2.88	1.88	2.22	2.20
O(D)	2/2	2.29	2.90	1.60	1.47	2.06
O	3	2.36	2.31	1.71	2.12	2.12
P	4/1	2.34	3.14	3.00	2.74	2.81
N2P	4/2	3.03	2.65	3.20	2.88	2.94
N1MN	6	4.32	3.83			4.08
MN	7	4.98	4.23	5.28	2.64	4.28
PNAMG	8	2.47	3.31	3.14	2.84	2.94
MN(N2)	9/1	4.83	4.39	2.66	2.96	3.71
N2MN	9/2	4.63	5.06	4.42	4.81	4.73
N2PNAMG	10	4.09	4.10	4.39	4.24	4.20
N3MN	11/1	4.69	4.44	4.00	4.75	4.47
N3MNSI	11/2	4.93	4.99	4.36	4.75	4.76
O	12	2.04	2.22	2.05	1.88	2.05
(D/F)	13/1	2.89	3.83	4.14	3.45	3.58
D/F	13/2	2.99	4.41	4.95	3.97	4.08
MN(N2*)	14/1	4.68	4.50	4.14	4.41	4.43
N2*MN	14/2	3.73	4.11	4.68	4.93	4.36
MN(N2*)	15	4.69	4.60	3.92	3.19	4.10
N1*MN	16	4.34	3.57	3.23	3.18	3.58
N1*	17	3.00	2.96	3.12	3.02	3.03
N2KNAMG0	18/1			4.88	1.16	3.02
N2KNAMG2	18/2					3.41
N2KNAMG1	18/3	3.20	4.01			3.61
D0	19/1					5.54
D2	19/2					4.52
D1	19/3					4.59
D/N*PK0	20/1					5.38
D/N*PK2	20/2					4.37
D/N*PK1	20/3					4.89

1ST CUT MEAN DM% 25.2

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98/R/PG/5

2ND CUT (7/12/98) DRY MATTER TONNES/HECTARE

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

LIME / MANURE		A	B	C	D	MEAN
N1	1	2.22	2.61	1.61	1.29	1.93
K	2/1	0.72	1.00	0.77	1.38	0.97
O(D)	2/2	0.61	1.31	0.69	1.21	0.95
O	3	0.79	0.58	0.67	2.09	1.03
P	4/1	0.43	0.56	0.83	1.10	0.73
N2P	4/2	1.03	1.56	1.85	1.21	1.41
N1MN	6	1.77	1.52			1.65
MN	7	1.91	2.22	2.48	1.01	1.91
PNAMG	8	1.64	1.14	1.90	1.35	1.51
MN(N2)	9/1	1.25	1.63	0.78	0.73	1.10
N2MN	9/2	1.71	2.69	1.89	1.24	1.88
N2PNAMG	10	2.94	3.74	1.52	0.94	2.29
N3MN	11/1	4.08	2.00	1.26	2.89	2.56
N3MNSI	11/2	3.39	2.24	1.10	2.35	2.27
O	12	0.46	0.40	0.60	0.45	0.48
(D/F)	13/1	2.64	1.97	1.86	1.54	2.00
D/F	13/2	4.72	4.33	4.39	2.93	4.09
MN(N2*)	14/1	1.46	1.65	1.77	2.02	1.72
N2*MN	14/2	2.49	2.07	1.59	2.00	2.04
MN(N2*)	15	2.38	1.79	1.89	1.95	2.00
N1*MN	16	2.11	1.57	1.55	1.38	1.65
N1*	17	1.23	1.13	1.10	1.27	1.18
N2KNAMG0	18/1			7.35	1.18	4.27
N2KNAMG2	18/2					3.91
N2KNAMG1	18/3	3.21	4.66			3.93
D0	19/1					5.22
D2	19/2					4.25
D1	19/3					4.42
D/N*PK0	20/1					4.15
D/N*PK2	20/2					5.66
D/N*PK1	20/3					4.16

2ND CUT MEAN DM% 27.7

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98/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME / MANURE		A	B	C	D	MEAN
N1	1	5.18	5.74	3.63	2.38	4.23
K	2/1	2.53	3.88	2.66	3.60	3.17
O(D)	2/2	2.89	4.21	2.28	2.68	3.02
O	3	3.15	2.89	2.38	4.21	3.16
P	4/1	2.76	3.70	3.83	3.84	3.53
N2P	4/2	4.06	4.21	5.05	4.09	4.35
N1MN	6	6.10	5.36			5.73
MN	7	6.89	6.45	7.77	3.65	6.19
PNAMG	8	4.11	4.44	5.04	4.20	4.45
MN(N2)	9/1	6.08	6.02	3.44	3.69	4.81
N2MN	9/2	6.34	7.75	6.31	6.05	6.61
N2PNAMG	10	7.03	7.84	5.91	5.18	6.49
N3MN	11/1	8.77	6.43	5.26	7.64	7.03
N3MNSI	11/2	8.32	7.24	5.46	7.10	7.03
O	12	2.50	2.62	2.64	2.34	2.53
(D/F)	13/1	5.53	5.81	5.99	4.99	5.58
D/F	13/2	7.72	8.74	9.35	6.90	8.18
MN(N2*)	14/1	6.13	6.15	5.91	6.43	6.15
N2*MN	14/2	6.23	6.19	6.28	6.94	6.41
MN(N2*)	15	7.06	6.39	5.81	5.15	6.10
N1*MN	16	6.45	5.14	4.78	4.57	5.23
N1*	17	4.23	4.09	4.22	4.28	4.21
N2KNAMG0	18/1			12.23	2.35	7.29
N2KNAMG2	18/2					7.33
N2KNAMG1	18/3	6.41	8.67			7.54
D0	19/1					10.77
D2	19/2					8.77
D1	19/3					9.01
D/N*PK0	20/1					9.54
D/N*PK2	20/2					10.03
D/N*PK1	20/3					9.05

TOTAL OF 2 CUTS MEAN DM% 26.5

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98/R/BN/7

BARNFIELD

Object: The experiment was designed to study the effects of organic and inorganic manures on continuous root crops. It was progressively modified to study effects on other crops.

Sections 1 and 2, 4th year of clover. Sections 3-6, 4th year of grass/clover.

For previous years see 'Details' 1967 and 1973 and 74-97/R/BN/7.

Plot dimensions: 10.7 x 55.9.

Treatments to grass/clover, Sections 3-6: All combinations of:-

Whole plots

1. **MANURE**	Fertilizers and organic manures:
(D)	(D)
(D)PK	(D) P K
PKMG	P K (Na) Mg
P	P
PK	P K
PMG	P (Na) Mg
0	0

P: 35 kg P as triple superphosphate in 1974 and since 1987, single superphosphate in other years
K: 225 kg K as sulphate of potash
(Na): 90 kg Na as sodium chloride until 1973, none since
Mg: 90 kg Mg as kieserite every fourth year since 1974 (sulphate of magnesia until 1973)
(D): Farmyard manure at 35 t until 1975, none since

Sub-plots

2. **N PERCUT**	Nitrogen fertilizer in 1998 (kg N per cut) as 34.5% N, cumulative to previous dressings and residues of forms of N previously each supplying 96 kg N per annum:
75	75, previously nitrate of soda, section 3
100	100, previously sulphate of ammonia, section 4
125	125, previously sulphate of ammonia + castor meal, section 5
150	150, previously castor meal, section 6

No nitrogen fertilizer applied in 1995. Castor meal last applied 1971, nitrate of soda and sulphate of ammonia until 1959.

Plus one plot **MANURE** KMG 100

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Treatments to clover, sections 1 and 2 (not given nitrogen fertilizer):

MANURE Fertilizers and organic manures as for grass/clover above, excluding KMG.

NOTES: (1) P, K and D treatments were applied to Sections 1 and 2 until 1980. None were applied subsequently until the resumption of P and K treatments only, from 1985.
(2) Yields were not taken from section 2.

Experimental diary:

04-Dec-97 : **T** : P applied.
21-Jan-98 : **T** : K and Mg applied.
26-Feb-98 : **T** : N applied.
18-Mar-98 : B : Rolled.
17-Jun-98 : B : Cut, herbage removed.
10-Jul-98 : **T** : Sections 1 & 2 only: Checkmate at 1.75 l in 400 l.
05-Sep-98 : **T** : Sections 1 & 2 only: Topped.
08-Dec-98 : **T** : Cut, herbage removed.

NOTE: Herbage samples were taken for chemical analysis.

GRASS/CLOVER

1ST CUT (17/6/98) DRY MATTER TONNES/HECTARE

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

N PERCUT / **MANURE**	75	100	125	150	Mean
(D)	5.63	5.43	4.14	5.62	5.21
(D)PK	6.74	7.76	7.11	5.79	6.85
PKMG	6.89	5.83	5.66	6.25	6.16
P	4.16	3.24	2.49	3.98	3.47
PK	6.06	5.92	6.08	6.36	6.10
PMG	4.49	3.84	3.28	3.94	3.89
0	4.95	3.90	3.34	4.33	4.13
Mean	5.56	5.13	4.59	5.18	5.12

MANURE KMG 100 5.29

Grand mean 5.12

1ST CUT MEAN DM% 18.9

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98/R/BN/7

GRASS/CLOVER

2ND CUT (8/12/98) DRY MATTER TONNES/HECTARE

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

N PERCUT MANURE	75	100	125	150	Mean
(D)	1.95	3.29	3.39	4.70	3.33
(D)PK	3.11	3.72	3.49	3.70	3.51
PKMG	2.74	3.50	3.30	3.06	3.15
P	0.70	1.95	1.83	1.44	1.48
PK	2.84	3.02	3.12	2.86	2.96
PMG	1.54	2.26	1.52	1.67	1.75
0	1.21	1.72	1.51	2.73	1.79
Mean	2.01	2.78	2.59	2.88	2.57

MANURE KMG 100 2.82

Grand mean 2.58

2ND CUT MEAN DM% 15.9

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

N PERCUT MANURE	75	100	125	150	Mean
(D)	7.58	8.72	7.54	10.32	8.54
(D)PK	9.85	11.48	10.60	9.50	10.36
PKMG	9.63	9.34	8.95	9.30	9.30
P	4.86	5.19	4.31	5.42	4.95
PK	8.90	8.94	9.20	9.22	9.06
PMG	6.03	6.10	4.80	5.61	5.63
0	6.16	5.62	4.85	7.06	5.92
Mean	7.57	7.91	7.18	8.06	7.68

MANURE KMG 100 8.11

Grand mean 7.70

TOTAL OF 2 CUTS MEAN DM% 17.4

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98/R/BN/7

CLOVER

1ST CUT (17/6/98) DRY MATTER TONNES/HECTARE

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

MANURE	(D)	(D)PK	PKMG	P	PK	PMG	0	Mean
	3.33	4.39	4.16	3.93	4.04	3.83	2.26	3.71

1ST CUT MEAN DM% 15.1

2ND CUT (8/12/98) DRY MATTER TONNES/HECTARE

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

MANURE	(D)	(D)PK	PKMG	P	PK	PMG	0	Mean
	0.38	0.62	0.20	0.14	0.21	0.24	0.16	0.28

2ND CUT MEAN DM% 15.2

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

MANURE	(D)	(D)PK	PKMG	P	PK	PMG	0	Mean
	3.71	5.02	4.36	4.07	4.25	4.07	2.42	3.99

TOTAL OF 2 CUTS MEAN DM% 15.2

PLOT AREA HARVESTED 0.00155

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98/R/GC/8

GARDEN CLOVER

Object: To study yields and pathogens of red clover grown continuously - Manor Garden.

The 145th year, red clover.

For previous years see 'Details' 1967 and 1973, and 74-97/R/GC/8.

Design: 2 blocks of 2 plots.

Whole plot dimensions: 1.00 x 1.40.

Treatments:

FUNG RES	Residual effects of fungicide to control *Sclerotinia trifoliorum*:
NONE	None
BENOMYL	Benomyl sprays during previous winters, last applied November 1989.

Experimental diary:

29-May-98 : B : First cut, hand weeded.
05-Aug-98 : B : Second cut, hand weeded.
29-Sep-98 : B : Third cut.

NOTE: Clover samples were taken for chemical analysis.

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98/R/GC/8

1ST CUT (29/5/98) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	6.93	7.08	7.01

1ST CUT MEAN DM% 16.1

2ND CUT (5/8/98) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	6.26	5.30	5.78

2ND CUT MEAN DM% 23.5

3RD CUT (29/9/98) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	2.03	2.28	2.15

3RD CUT MEAN DM% 17.8

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	15.22	14.65	14.94

TOTAL OF 3 CUTS MEAN DM% 19.1

PLOT AREA HARVESTED 0.00010

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98/W/RN/3

LEY/ARABLE

Object: To compare the effects on soil fertility of rotations with or without leys - Woburn, Stackyard D.

Sponsor: P.R. Poulton.

The 61st year, leys, w. beans, w. wheat, w. rye, s. barley.

For previous years see 'Details' 1967 & 1973 and 74-97/W/RN/3.

Design: 5 series of 8 plots, split for treatments other than rotations.

Whole plot dimensions: 8.53 x 40.7.

Treatments: All phases of four five-course rotations were originally present:

ROTATION

LEY	Clover/grass ley:	L, L, L, P, W
CLO	All legume ley:	SA, SA, SA, P, W until 1971 then CL, CL, CL, P, W
A	Arable with roots:	P, R, C, P, W until 1971 then P, B, B, P, W
A H	Arable with hay:	P, R, H, P, W until 1971 then P, B, H, P, W

P = potatoes, R = w. rye, C = carrots, W = w. wheat, B = s. barley, H = hay, L = clover/grass ley, SA = sainfoin ley, CL = red clover ley

Rotations themselves followed different cycles:

On four plots in each block the rotations were repeated

On four plots in each block arable rotations alternated each five years with ley rotations

From 1976 all the rotations were changed on all phases except for the first and second test crops in 1976:

LN 3	(Previous LEY) LN1, LN2, LN3, W, R
LC 3	(Previous CLO) LC1, LC2, LC3, W, R
AF	(Previous A) F, F, BE, W, R
AB	(Previous A H) B, B, BE, W, R

From 1998 rotations AF and AB are replaced by AM and ABe respectively. Phased in at the beginning of each treatment crop sequence.

ABe	R, M, BE, W, R
AM	R, BE, M, W, R

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98/W/RN/3

LN1 to LN3 = three year grass ley with N, 1st year to 3rd year,
LC = clover/grass ley, no N, BE = beans (s. oats until 1980), F = fallow,
M = maize

Plots hitherto in alternating rotations were changed to test eight-year leys:

LLN	LLN1, LLN2, LLN3, LLN4, LLN5, LLN6, LLN7, LLN8, W, R
LLC	LLC1, LLC2, LLC3, LLC4, LLC5, LLC6, LLC7, LLC8, W, R

LLN1 to LLN8 = eight year grass ley with nitrogen, first year to eighth year, similarly for LLC - clover/grass ley, no nitrogen

The new scheme started by sowing these new leys in spring 1976 on four phases and in spring 1977 on the fifth phase (2nd test crop in 1976).

In 1992 w. rye (R) replaced s. barley (B) as the second test crop.

Yields are taken only from the leys and the test crops.

Treatments to first test crop w. wheat, all combinations of:

Whole plots

1. **ROTATION** Rotations before wheat:

   LLN 8
   LN 3
   LLC 8
   LC 3
   AF
   AB

½ plots

2. **FYMRES62** Farmyard manure residues, last applied 1962:

   NONE
   FYM 38 t on each occasion

1/8 plots

3. **N** Nitrogen fertilizer in spring 1998 (kg N) as 27.5% N:

   0
   70
   140
   210

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98/W/RN/3

Treatments to second test crop w. rye, all combinations of:

Whole plots

1. **ROTATION** Rotations before first test crop:

   LLN 8
   LN 3
   LLC 8
   LC 3
   AF
   AB

½ plots

2. **FYMRES66** Farmyard manure residues, last applied 1966:

   NONE
   FYM 38 t on each occasion

1/8 plots

3. **N** Nitrogen fertilizer in spring 1998 (kg N) as 27.5% N:

   0
   40
   80
   120

Treatments to leys:

FYM RES Farmyard manure residues:

NONE
FYM 38 t on each occasion, last applied 1965 to 1st and 6th year leys, 1964 to 2nd and 7th year leys, 1963 to 3rd and 8th year leys, 1962 to 4th year leys, 1966 to 5th year leys

NOTE: Corrective K dressings (kg K_2O) as muriate of potash, applied to first test crop w. wheat and long-term leys in the wheat block, applied 12-Sep-97:

Continuous rotations before wheat	No FYM half plots	FYM half plots
AF	240	270
AB	240	230

None to other plots.

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98/W/RN/3

Experimental diary:

Grass ley and clover/grass ley, 1st year (**ROTATION** LN1, LC1, LLN1 and LLC1):

17-Sep-97 : **T** : Ploughed, rolled.
18-Sep-97 : **T** : Rotary harrowed.
: **T** : LC1 and LLC1 only: 27.5% N at 182 kg. 45% Stella meadow fescue, 45% Erecta RVP Timothy and 10% Huia white clover mixture drilled at 30 kg.
: **T** : LN1 and LLN1 only: 27.5% N at 273 kg. 50% Stella meadow fescue and 50% Erecta RVP Timothy drilled at 30 kg.
22-Sep-97 : **T** : Rolled.
12-Mar-98 : **T** : PK as (0:20:32) at 469 kg.
: **T** : LC1 and LLC1 only: Muriate of potash at 80 kg.
: **T** : LN1 and LLN1 only: NK as (24:0:16) at 312 kg.
09-May-98 : **T** : Legumex Extra at 7.0 l in 200 l.
29-Jun-98 : **T** : First cut.
07-Jul-98 : **T** : LC1 and LLC1 only: Muriate of potash at 80 kg.
: **T** : LN1 and LLN1 only : NK as (24:0:16) at 312 kg.
04-Dec-98 : **T** : Second cut.

Grass leys, 2nd to 8th year (**ROTATION** LN2-3 and LLN2-8):

24-Feb-98 : **T** : Chain harrowed.
12-Mar-98 : **T** : PK as (0:20:32) at 469 kg. NK as (24:0:16) at 312 kg.
09-May-98 : **T** : Legumex Extra at 7.0 l in 200 l.
29-Jun-98 : **T** : First cut.
07-Jul-98 : **T** : NK as (24:0:16) at 312 kg.
02-Aug-98 : **T** : LN3 and LLN8 only: Roundup Biactive at 4.0 l in 200 l.
04-Dec-98 : **T** : LN2 and LLN2-7 only: Second cut.

Clover/grass leys, 2nd to 8th year (**ROTATION** LC2-3 and LLC2-8):

24-Feb-98 : **T** : Chain harrowed.
12-Mar-98 : **T** : PK as (0:20:32) at 469 kg. Muriate of potash at 80 kg.
09-May-98 : **T** : Legumex Extra at 7.0 l in 200 l.
29-Jun-98 : **T** : First cut.
07-Jul-98 : **T** : Muriate of potash at 80 kg.
02-Aug-98 : **T** : LC3 and LLC8 only: Roundup Biactive at 4.0 l in 200 l.
04-Dec-98 : **T** : LC2 and LLC2-7 only: Second cut.

S. barley, 2nd treatment crop (**ROTATION** AB):

04-Feb-98 : **T** : Heavy spring-tine cultivated.
05-Feb-98 : **T** : Rotary harrowed, Cooper, dressed Raxil S, drilled at 375 seeds per m^2.
17-Mar-98 : **T** : Deloxil at 2.0 l in 200 l.
02-Apr-98 : **T** : NPK as (20:10:10) at 400 kg.
20-May-98 : **T** : Asset at 2.0 l with Astix at 1.0 l in 200 l.
31-May-98 : **T** : Opus at 0.8 l in 200 l.
19-Aug-98 : **T** : Combine harvested.

W. beans, 3rd treatment crop (**ROTATION** AF and AB):

29-Sep-97 : **T** : PK as (0:24:24) at 168 kg.
24-Oct-97 : **T** : Barclay Gallup at 6.0 l in 300 l.
27-Oct-97 : **T** : Punch broadcast at 21 seeds per m^2. Ploughed.
25-Nov-97 : **T** : Gesatop 500 SC at 2.0 l in 200 l.
28-Apr-98 : **T** : Bavistin DF at 0.5 kg with Clayton Turret at 2.0 l in 200 l.
19-Aug-98 : **T** : Combine harvested.

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Experimental diary:

Fallow, 2nd treatment year (**ROTATION** AF):

17-Sep-97 : **T** : Ploughed.
27-Feb-98 : **T** : Heavy spring-tine cultivated.
29-Apr-98 : **T** : Spring-tine cultivated.
08-May-98 : **T** : Spiked rotary cultivated.

W. wheat, 1st test crop (W):

10-Sep-97 : **T** : Barclay Gallup at 6.0 l in 200 l.
17-Sep-97 : **T** : Ploughed.
29-Sep-97 : **T** : PK as (0:24:24) at 260 kg.
02-Oct-97 : **T** : Rotary harrowed, Hereward, dressed Sibutol, drilled at 385 seeds per m^2. Yaltox at 150 kg.
13-Nov-97 : **T** : Stomp 400 SC with Isoproturon 500 at 1.0 l and Cyperkill 10 at 0.25 l in 200 l.
19-Mar-98 : **T** : Mn and Cu as Phosyn Manganese at 2.0 l with Profol Copper at 0.25 l in 200 l.
02-Apr-98 : **T** : **N** 70, 140, 210: N applied as 27.5% N.
28-Apr-98 : **T** : Folicur at 0.5 l in 200 l.
29-May-98 : **T** : Ally at 15 g in 200 l.
31-May-98 : **T** : Opus at 0.8 l in 200 l.
12-Jun-98 : **T** : Folicur at 0.3 l with Bavistin DF at 0.3 kg in 200 l.
02-Aug-98 : **T** : Roundup Biactive at 3.0 l in 200 l.
12-Aug-98 : **T** : Combine harvested.

W. rye, 2nd test crop (R) and 1st treatment crop (**ROTATION** ABe, AM):

23-Sep-97 : **T** : Ploughed.
29-Sep-97 : **T** : PK as (0:24:24) at 260 kg.
02-Oct-97 : **T** : Rotary harrowed, Yaltox at 150 kg.
: **T** : **ROTATION** ABe, AM: 27.5% N at 73 kg.
21-Oct-97 : **T** : Espirit, dressed Baytan Flowable, drilled at 375 seeds per m^2, harrowed.
17-Mar-98 : **T** : Deloxil at 2.0 l in 200 l.
02-Apr-98 : **T** : **N** 40, 80, 120: N applied as 27.5% N.
03-Apr-98 : **T** : **ROTATION** ABe, AM: NK as (20:10:10) at 400 kg.
28-Apr-98 : **T** : Folicur at 0.5 l in 200 l. Quantum at 30 g in 200 l.
14-Aug-98 : **T** : Combine harvested.

NOTE: Samples of grass, grass and clover, wheat and rye grain were taken for chemical analysis.

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LEYS

1ST CUT (29/6/98) DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	0.50	1.22	0.86
LC2	5.94	6.34	6.14
LC3	5.43	6.43	5.93
LN1	3.37	3.40	3.38
LN2	8.17	7.79	7.98
LN3	7.67	7.64	7.65
LLC1	1.21	0.77	0.99
LLC2	5.58	5.44	5.51
LLC3	4.27	3.64	3.95
LLC4	5.47	5.97	5.72
LLC5	5.58	4.43	5.01
LLC6	5.65	5.17	5.41
LLC7	2.72	2.77	2.74
LLC8	3.87	2.99	3.43
LLN1	5.08	3.73	4.41
LLN2	7.92	9.01	8.47
LLN3	7.76	8.17	7.97
LLN4	6.70	7.07	6.89
LLN5	7.17	6.76	6.96
LLN6	6.52	4.94	5.73
LLN7	5.69	4.95	5.32
LLN8	7.73	6.70	7.22
Mean	5.45	5.24	5.35

1ST CUT MEAN DM% 31.5

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LEYS

2ND CUT (04/12/98) DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	0.18	0.28	0.23
LC2	0.16	0.19	0.17
LN1	1.32	1.19	1.25
LN2	0.92	0.59	0.76
LLC1	0.60	0.63	0.61
LLC2	0.30	0.14	0.22
LLC3	0.22	0.14	0.18
LLC4	0.63	0.63	0.63
LLC5	0.79	0.58	0.68
LLC6	0.65	2.56	1.61
LLC7	0.13	0.22	0.18
LLN1	1.22	1.84	1.53
LLN2	1.25	1.43	1.34
LLN3	1.35	1.19	1.27
LLN4	2.07	2.35	2.21
LLN5	1.00	1.48	1.24
LLN6	1.06	0.59	0.83
LLN7	1.13	0.64	0.89
Mean	0.83	0.93	0.88

2ND CUT MEAN DM% 18.9

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LEYS

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	0.69	1.50	1.10
LC2	6.10	6.53	6.32
LN1	4.69	4.59	4.64
LN2	9.09	8.39	8.74
LLC1	1.81	1.39	1.60
LLC2	5.87	5.57	5.72
LLC3	4.49	3.79	4.14
LLC4	6.10	6.60	6.35
LLC5	6.37	5.01	5.69
LLC6	6.30	7.74	7.02
LLC7	2.84	3.00	2.92
LLN1	6.30	5.57	5.93
LLN2	9.17	10.44	9.81
LLN3	9.11	9.36	9.24
LLN4	8.77	9.42	9.10
LLN5	8.17	8.24	8.20
LLN6	7.58	5.53	6.55
LLN7	6.83	5.59	6.21
Mean	6.13	6.01	6.07

TOTAL OF 2 CUTS MEAN DM% 50.5

PLOT AREA HARVESTED 0.00200

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W. WHEAT

GRAIN TONNES/HECTARE

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

FYMRES62	NONE	FYM	Mean
ROTATION			
LLN 8	7.46	8.13	7.79
LN 3	7.44	7.16	7.30
LLC 8	7.66	7.17	7.41
LC 3	7.12	7.63	7.38
AF	6.85	6.85	6.85
AB	7.47	7.29	7.38
Mean	7.33	7.37	7.35

N	0	70	140	210	Mean
ROTATION					
LLN 8	4.97	7.77	9.21	9.24	7.79
LN 3	3.77	7.13	8.67	9.62	7.30
LLC 8	4.11	7.55	9.01	8.98	7.41
LC 3	4.78	7.48	8.50	8.75	7.38
AF	2.52	6.35	8.80	9.72	6.85
AB	3.21	6.70	9.35	10.26	7.38
Mean	3.89	7.16	8.92	9.43	7.35

N	0	70	140	210	Mean
FYMRES62					
NONE	4.04	7.02	8.94	9.34	7.33
FYM	3.75	7.31	8.91	9.52	7.37
Mean	3.89	7.16	8.92	9.43	7.35

N	FYMRES62	0	70	140	210
ROTATION					
LLN 8	NONE	4.85	7.31	9.02	8.65
	FYM	5.08	8.23	9.40	9.82
LN 3	NONE	4.08	7.06	8.97	9.64
	FYM	3.46	7.20	8.37	9.60
LLC 8	NONE	4.55	7.62	9.31	9.15
	FYM	3.67	7.49	8.71	8.81
LC 3	NONE	4.84	7.04	8.04	8.56
	FYM	4.71	7.91	8.96	8.93
AF	NONE	2.50	6.31	8.83	9.75
	FYM	2.55	6.39	8.77	9.70
AB	NONE	3.38	6.77	9.46	10.28
	FYM	3.04	6.64	9.24	10.25

GRAIN MEAN DM% 88.5

PLOT AREA HARVESTED 0.00183

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W. RYE

GRAIN TONNES/HECTARE

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

FYMRES66	NONE	FYM	Mean
ROTATION			
LLN 8	7.60	8.16	7.88
LN 3	7.40	7.95	7.68
LLC 8	7.67	6.92	7.29
LC 3	6.23	6.59	6.41
AF	5.58	5.69	5.64
AB	6.18	6.96	6.57
Mean	6.78	7.04	6.91

N	0	40	80	120	Mean
ROTATION					
LLN 8	7.86	8.52	7.62	7.53	7.88
LN 3	6.92	8.41	8.35	7.03	7.68
LLC 8	7.02	7.32	7.87	6.97	7.29
LC 3	6.72	6.55	6.98	5.39	6.41
AF	3.64	5.55	6.75	6.59	5.64
AB	4.71	7.08	7.77	6.71	6.57
Mean	6.14	7.24	7.56	6.70	6.91

N	0	40	80	120	Mean
FYMRES66					
NONE	6.09	7.18	7.18	6.66	6.78
FYM	6.20	7.30	7.94	6.75	7.04
Mean	6.14	7.24	7.56	6.70	6.91

N	0	40	80	120
ROTATION	**FYMRES66**				
LLN 8	NONE	7.32	8.84	7.21	7.04
	FYM	8.39	8.21	8.03	8.02
LN 3	NONE	6.97	8.00	7.96	6.69
	FYM	6.87	8.82	8.74	7.37
LLC 8	NONE	7.62	7.95	7.57	7.55
	FYM	6.42	6.69	8.17	6.39
LC 3	NONE	7.32	6.48	6.20	4.94
	FYM	6.12	6.63	7.77	5.83
AF	NONE	3.16	5.55	6.70	6.91
	FYM	4.13	5.56	6.81	6.28
AB	NONE	4.18	6.28	7.44	6.84
	FYM	5.25	7.88	8.10	6.59

GRAIN MEAN DM% 88.1

PLOT AREA HARVESTED 0.00183

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98/W/RN/12

ORGANIC MANURING

Object: To study, from crop yields and soil analyses, the effects of a range of types of organic matter - Woburn, Stackyard B.

Sponsor: P.R. Poulton.

The 34th year, w. wheat.

For previous years see 'Details' 1973 and 74-97/W/RN/12.

Design: 4 blocks of 8 plots.

Whole plot dimensions: 8.0 x 30.5.

Treatments: From 1966 to 1971 the experiment had a preliminary period designed to build up organic matter from different sources. An arable rotation was started on two blocks in 1972 and the remaining two blocks in 1973. After a period of testing the residues built up, a further period of accumulation was started; on two blocks (which included ley sown in 1979) in 1981 and on the other two (which included ley sown in 1980) in 1982. A second test phase began when leys on the first pair of blocks were ploughed for the 1st test crop in 1987 and on the second pair for the 1st test crop in 1988. From 1988 two blocks, and 1989 the other two, to 1994, plots were split into 6 sub-plots to test five levels of nitrogen and nil. From 1995 to 1997 residual effects of that nitrogen were measured. In 1998 yields were taken from whole plots only.

Whole blocks

1. **CROPSEQ** Crop sequence:

WHEAT A	W. wheat, after w. wheat 1988, potatoes 1989, w. wheat 1990, w. beans 1991, w. wheat 1992-6, w. rye 1997
WHEAT B	W. wheat, after w. wheat 1987, potatoes 1988, w. wheat 1989, w. beans 1990, w. wheat 1991-6, w. rye 1997

Whole plots

2. **TREATMNT** Previous treatments:

LC 8 GM	Eight-year clover/grass ley until 1987 (WHEAT A) or 1986 (WHEAT B), green manure in the preliminary period
LC 8 PT	As above, peat in the preliminary period
LC 6 LC	Six-year clover/grass ley until 1987 (WHEAT A) or 1986 (WHEAT B), clover/grass ley in the preliminary period
LC 6 LN	As above, grass ley with N in the preliminary period
FYM	Farmyard manure annually 1981 to 1986 (WHEAT A) or 1985 (WHEAT B) and in the preliminary period
STRAW	Straw in both periods
FERT-FYM	Fertilizers only in both periods, rates of P, K & Mg equivalent to amounts in FYM
FERT-STR	Fertilizers only in both periods, rates of P, K & Mg equivalent to amounts in straw (+P)

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98/W/RN/12

Experimental diary:

```
17-Sep-97 : B : Ploughed.  Rolled.
29-Sep-97 : B : PK as (0:20:32) at 500 kg.
30-Sep-97 : B : Rotary harrowed, Hereward, dressed Sibutol, drilled at
                385 seeds per m².
13-Nov-97 : B : Stomp 400 SC at 2.0 l with Isoproturon 500 at 1.0 l and
                Cyperkill 10 at 0.25 l in 200 l.
19-Mar-98 : B : Mn and Cu as Phosyn Manganese at 2.0 l with Profol
                Copper at 0.25 l in 200 l.
31-Mar-98 : B : 34.5% N at 278 kg.
04-May-98 : B : Alto 100 SL at 0.6 l in 200 l.
29-May-98 : B : Ally at 15 g in 200 l.
31-May-98 : B : Opus at 0.8 l in 200 l.
12-Jun-98 : B : Folicur at 0.3 l with Bavistin DF at 0.3 kg in 200 l.
02-Aug-98 : B : Roundup Biactive at 3.0 l in 200 l.
12-Aug-98 : B : Combine harvested.
```

NOTE: Samples of grain were taken for chemical analysis.

GRAIN TONNES/HECTARE

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

CROPSEQ / TREATMNT	WHEAT A	WHEAT B	Mean
LC 8 GM	4.24	5.92	5.08
LC 8 PT	4.66	5.46	5.06
LC 6 LC	3.82	5.40	4.61
LC 6 LN	4.57	6.03	5.30
FYM	6.31	5.65	5.98
STRAW	5.85	5.66	5.75
FERT-FYM	4.79	5.11	4.95
FERT-STR	5.25	5.01	5.13
Mean	4.94	5.53	5.23

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

CROPSEQ	TREATMNT	CROPSEQ TREATMNT
0.537	0.438	0.790

Except when comparing means with the same level(s) of
CROPSEQ 0.620

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	14	0.620	11.8

GRAIN MEAN DM% 88.0 PLOT AREA HARVESTED 0.01219

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98/R/RN/22

CROP ROTATIONS

Object: To test combinable break crops and their effect on following wheat crops. New crop species and winter sown varients of established species will be tested to determine optimal break crop selection for rotations that maximise first wheat yields and minimise inputs - Great Field I/II.

Sponsor: I.F. Shield, M.V. Hewitt, R.W. Payne.

The first year, w.oats.

Design: 2 blocks of 42 plots split into 4 sub-plots.

Whole plot dimensions: 4.5 x 10.0.

Treatments:

None (preparatory year)

Experimental diary:

15-Sep-97 : B : Deep tine cultivated with vibrating tines 60 cm apart and 45 cm deep.
18-Sep-97 : B : Chalk at 4.0 t.
19-Sep-97 : B : Ploughed.
13-Oct-97 : B : Rotary harrowed, Image, dressed Anchor, drilled at 350 seeds per m^2.
13-Feb-98 : B : 34.5% N at 116 kg.
01-Apr-98 : B : Mistral at 0.75 l in 200 l.
27-Apr-98 : B : 34.5% N at 155 kg.
27-Apr-98 : B : Rovral Flo at 3.0 l in 200 l.
12-May-98 : B : Tripart Brevis at 2.25 l with Headland Enhance LF at 40 ml in 200 l.
25-Jun-98 : B : Corbel at 1.0 l in 200 l.
06-Aug-98 : **T** : Combine harvested.

NOTE: The whole site was sown to oats in the preparatory year. Yields were taken for each sub-plot and a yield map produced. Lodging occured in many plots.

GRAIN TONNES/HECTARE

Grand mean 6.30

SUB-PLOT AREA HARVESTED 0.00230

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98/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 yield of continuous s. barley - Long Hoos V 3.

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

The 25th year, s. barley.

For previous years see 74-97/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 since.

All combinations of:-

1. **WEEDKLLR** Weedkiller in autumn:

(NONE)	None
(GLYPHOS)	Glyphosate to barley stubble

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-Dec-97 : B : Ploughed.
05-Feb-98 : B : Spring-tine cultivated.
11-Feb-98 : B : Spring-tine cultivated. Rotary harrowed, Alexis, undressed, drilled at 350 seeds per m^2.
19-Mar-98 : B : 34.5% N at 435 kg.
28-Apr-98 : B : Ally at 20 g with MSS Optica at 1.5 l in 200 l.

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Experimental diary:
13-Jul-98 : B : Hand rogued wild oats.
08-Aug-98 : B : Combine harvested.

GRAIN TONNES/HECTARE

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

FUNGCIDE[1]	(NONE)	(TRIADIM)	Mean
WEEDKLLR			
(NONE)	2.77	3.17	2.97
(GLYPHOS)	3.68	3.65	3.66
Mean	3.22	3.41	3.32

FUNGCIDE[2]	(NONE)	(BENOMYL)	Mean
WEEDKLLR			
(NONE)	2.83	3.11	2.97
(GLYPHOS)	3.76	3.56	3.66
Mean	3.30	3.34	3.32

FUNGCIDE[2]	(NONE)	(BENOMYL)	Mean
FUNGCIDE[1]			
(NONE)	3.21	3.23	3.22
(TRIADIM)	3.38	3.44	3.41
Mean	3.30	3.34	3.32

INSCTCDE	(NONE)	(CHLORFEN)	Mean
WEEDKLLR			
(NONE)	3.06	2.88	2.97
(GLYPHOS)	3.67	3.66	3.66
Mean	3.36	3.27	3.32

INSCTCDE	(NONE)	(CHLORFEN)	Mean
FUNGCIDE[1]			
(NONE)	3.32	3.12	3.22
(TRIADIM)	3.40	3.42	3.41
Mean	3.36	3.27	3.32

INSCTCDE	(NONE)	(CHLORFEN)	Mean
FUNGCIDE[2]			
(NONE)	3.38	3.22	3.30
(BENOMYL)	3.35	3.32	3.34
Mean	3.36	3.27	3.32

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98/R/CS/140

GRAIN TONNES/HECTARE

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

NEMACIDE / WEEDKLLR	(NONE)	(ALDICARB)	Mean
(NONE)	3.03	2.91	2.97
(GLYPHOS)	3.80	3.53	3.66
Mean	3.42	3.22	3.32

NEMACIDE / FUNGCIDE[1]	(NONE)	(ALDICARB)	Mean
(NONE)	3.29	3.16	3.22
(TRIADIM)	3.55	3.27	3.41
Mean	3.42	3.22	3.32

NEMACIDE / FUNGCIDE[2]	(NONE)	(ALDICARB)	Mean
(NONE)	3.28	3.31	3.30
(BENOMYL)	3.55	3.12	3.34
Mean	3.42	3.22	3.32

NEMACIDE / INSCTCDE	(NONE)	(ALDICARB)	Mean
(NONE)	3.43	3.30	3.36
(CHLORFEN)	3.41	3.13	3.27
Mean	3.42	3.22	3.32

	FUNGCIDE[1]	(NONE)		(TRIADIM)	
WEEDKLLR	FUNGCIDE[2]	(NONE)	(BENOMYL)	(NONE)	(BENOMYL)
(NONE)		2.52	3.02	3.15	3.19
(GLYPHOS)		3.91	3.45	3.62	3.68

	FUNGCIDE[1]	(NONE)		(TRIADIM)	
WEEDKLLR	INSCTCDE	(NONE)	(CHLORFEN)	(NONE)	(CHLORFEN)
(NONE)		3.02	2.52	3.10	3.24
(GLYPHOS)		3.63	3.73	3.71	3.59

	FUNGCIDE[2]	(NONE)		(BENOMYL)	
WEEDKLLR	INSCTCDE	(NONE)	(CHLORFEN)	(NONE)	(CHLORFEN)
(NONE)		2.90	2.77	3.23	2.99
(GLYPHOS)		3.86	3.67	3.48	3.65

	FUNGCIDE[2]	(NONE)		(BENOMYL)	
FUNGCIDE[1]	INSCTCDE	(NONE)	(CHLORFEN)	(NONE)	(CHLORFEN)
(NONE)		3.33	3.10	3.32	3.15
(TRIADIM)		3.43	3.34	3.38	3.49

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98/R/CS/140

GRAIN TONNES/HECTARE

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

FUNGCIDE[1]		(NONE)		(TRIADIM)	
WEEDKLLR	NEMACIDE	(NONE)	(ALDICARB)	(NONE)	(ALDICARB)
(NONE)		2.69	2.84	3.37	2.97
(GLYPHOS)		3.88	3.48	3.72	3.58

FUNGCIDE[2]		(NONE)		(BENOMYL)	
WEEDKLLR	NEMACIDE	(NONE)	(ALDICARB)	(NONE)	(ALDICARB)
(NONE)		2.69	2.97	3.37	2.84
(GLYPHOS)		3.87	3.66	3.73	3.40

FUNGCIDE[2]		(NONE)		(BENOMYL)	
FUNGCIDE[1]	NEMACIDE	(NONE)	(ALDICARB)	(NONE)	(ALDICARB)
(NONE)		3.27	3.15	3.30	3.17
(TRIADIM)		3.29	3.48	3.80	3.07

INSCTCDE		(NONE)		(CHLORFEN)	
WEEDKLLR	NEMACIDE	(NONE)	(ALDICARB)	(NONE)	(ALDICARB)
(NONE)		3.15	2.97	2.91	2.84
(GLYPHOS)		3.70	3.63	3.90	3.42

INSCTCDE		(NONE)		(CHLORFEN)	
FUNGCIDE[1]	NEMACIDE	(NONE)	(ALDICARB)	(NONE)	(ALDICARB)
(NONE)		3.40	3.24	3.17	3.08
(TRIADIM)		3.45	3.36	3.64	3.19

INSCTCDE		(NONE)		(CHLORFEN)	
FUNGCIDE[2]	NEMACIDE	(NONE)	(ALDICARB)	(NONE)	(ALDICARB)
(NONE)		3.42	3.33	3.14	3.30
(BENOMYL)		3.43	3.28	3.67	2.97

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

Margins of two factor tables	0.264
Two factor tables	0.373
Three factor tables	0.527

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

Stratum	d.f.	s.e.	cv%
WP	6	0.745	22.5

GRAIN MEAN DM% 90.7

PLOT AREA HARVESTED 0.00105

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98/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 14th year, w. wheat.

For previous years see 85-93,95-97/R/CS/302

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

Whole plot dimensions: 12.0 X 24.0.
Sub-plot dimensions: 4.5 x 6.0.

Treatments: All combinations of:-

Whole plots

1. **FUNGCIDE** — Fungicide applied cumulatively 1985-93 and 1995-98:

NONE	None
CARB	Carbendazim at 0.25 kg
PRO	Prochloraz at 0.40 kg (0.50 kg in 1993, 1995-1998)
CARB+PRO	Carbendazim and prochloraz as above

Sub-plots

2. **EYE INOC** — Eyespot inoculum, applied in first year only:

NATURAL	Natural background population (duplicated)
W 19R 1S	Inoculated with wheat strains in proportion 19 resistant to one sensitive
W 1R 19S	As above but one resistant to 19 sensitive
R 19R 1S	Inoculated with rye strains, 19 resistant to one sensitive
R 1R 19S	As above but one resistant to 19 sensitive

NOTE: The inoculum was colonized on oat seed and broadcast in October, 1984.

Experimental diary:

04-Oct-97 : B : Ploughed.
08-Oct-97 : B : Harrowed, rotary harrowed, Hereward, dressed Anchor, drilled at 380 seeds per m^2.
05-Dec-97 : B : Part: Unite A at 0.125 l with Unite B at 1.0 l and Adder at 1.0 l in 200 l.
13-Jan-98 : B : Completed: Unite A at 0.125 l with Unite B at 1.0 l and LI-700 at 1.0 l in 200 l.
16-Feb-98 : B : 34.5% N at 120 kg.

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99/R/CS/302

Experimental diary:

```
   16-Mar-98 : T : FUNGCIDE CARB+PRO: Barclay Eyetak at 1.1 l with Tripart
                   Defensor FL at 0.5 l in 200 l.
             : T : FUNGCIDE PRO: Barclay Eyetak at 1.1 l in 200 l.
             : T : FUNGCIDE CARB: Tripart Defensor FL at 0.5 l in 200 l.
   14-Apr-98 : B : 34.5% N at 460 kg.
   27-Apr-98 : T : FUNGCIDE PRO: Barclay Eyetak at 1.1 l in 200 l.
             : T : FUNGCIDE CARB: Campbell's Carbendazim 50 % Flowable at 0.5 l
                   in 200 l.
             : T : FUNGCIDE CARB+PRO: Barclay Eyetak at 1.1 l with Tripart
                   Defensor FL at 0.5 l in 200 l.
   28-Apr-98 : B : Ally at 20 g with Cheetah Super at 0.75 l, Starane 2 at 0.7 l
                   and Chiltern Cropoil at 1.0 l in 200 l.
   03-Jul-98 : B : Folicur at 0.3 l in 100 l.
   05-Aug-98 : B : Alpha Glyphogan at 3.0 l in 200 l.
   11-Aug-98 : B : Combine harvested.
```

GRAIN TONNES/HECTARE

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

EYE INOC / FUNGCIDE	NATURAL	W 19R 1S	W 1R 19S	R 19R 1S	R 1R 19S	Mean
NONE	7.49	7.79	6.67	6.44	7.41	7.22
CARB	6.55	6.57	6.57	6.45	7.03	6.62
PRO	7.99	7.76	8.06	8.42	7.77	8.00
CARB+PRO	7.88	7.98	7.76	7.43	8.11	7.84
Mean	7.48	7.52	7.27	7.19	7.58	7.42

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

EYE INOC	FUNGCIDE* EYE INOC	
0.269	0.538	min.rep
0.233	0.446	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	0.538	7.3

GRAIN MEAN DM% 90.6 SUB-PLOT AREA HARVESTED 0.00138

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98/R/CS/309 and 98/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, pests, diseases, weeds and yield of w. wheat - Rothamsted (R) Great Knott III and Woburn (W) Far Field I.

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

The 14th year, w. wheat.

For previous years see 85-97/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 BTTTTT
   BT1T2 CTTTTT
   BP2 BPPPPP
   BT1P2 CPPPPP
   CT1 CTTTTT
   CT1 CPTTPT
   CT1T2 CTPTTP
   CT1T2 CTTPTT
   CP2 CPPPPP
   CP2 CPTTPT
   CT1P2 CTPTTP
   CT1P2 CTTPTT

Sub-plots

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

   E Early
   L Late

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97/R/CS/309 and 97/W/CS/309

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 to 20 cm
P2 Ploughed to 20 cm depth
(2) From 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. BTTTTT, CTTTTT, BPPPPP, CPPPPP, etc.

Experimental diary:

Great Knott III (R):

19-Aug-97 : B : Straw chopped.
02-Sep-97 : **T** : **STRAWCUL** BTTTTT, BPPPPP: Straw burnt, ash incorporated with discs.
09-Sep-97 : B : PK as (0:20:32) at 1250 kg.
11-Sep-97 : B : Scythe LC at 4.0 l in 300 l.
07-Oct-97 : **T** : **STRAWCUL** BTTTTT, CTTTTT, CPTTPT, CTTPTT: Heavy spring-tine cultivated twice.
: **T** : **STRAWCUL** BPPPPP, CPPPPP, CTPTTP: Ploughed.
21-Oct-97 : B : Heavy spring-tine cultivated.
22-Oct-97 : **T** : **SOW DATE** E: Rotary harrowed, Hereward, dressed Anchor, drilled at 380 seeds per m^2.
12-Nov-97 : **T** : **SOW DATE** L: Rotary harrowed, Hereward, dressed Anchor, drilled at 380 seeds per m^2.
13-Jan-98 : B : Hawk at 2.5 l with Sprayprover at 1.0 l in 200 l.
13-Feb-98 : B : 34.5% N at 116 kg.
17-Mar-98 : B : Ally at 20 g with Alpha Briotril 24/16 at 0.5 l in 200 l.
27-Apr-98 : B : 34.5% N at 460 kg.
09-May-98 : B : Standon Tebuconazole at 0.7 l with Starane 2 at 0.5 l in 200 l.
28-May-98 : B : Opus at 0.7 l in 200 l.
04-Jun-98 : **T** : **SOW DATE** E **STRAWCUL** CTTTTT, CPTTPT and **SOW DATE** L **STRAWCUL** CTTTTT: Roundup at 3.0 l in 200 l.
12-Jun-98 : B : Bavistin DF at 0.5 kg with Folicur at 0.5 l in 100 l.
17-Aug-98 : **T** : Combine harvested.

Far Field I (W):

15-Aug-97 : **T** : **STRAWCUL** BTTTTT, CTTTTT, CPTTPT, CTTPTT: Straw chopped.
01-Sep-97 : **T** : **STRAWCUL** BTTTTT, BPPPPP: Straw burnt, ash incorporated with spring-tines.
05-Sep-97 : **T** : **STRAWCUL** BTTTTT, CTTTTT, CPTTPT, CTTPTT: Heavy spring-tine cultivated.
19-Sep-97 : **T** : **STRAWCUL** BPPPPP, CPPPPP, CTPTTP: Ploughed.
30-Sep-97 : B : Harvest at 3.0 l in 200 l.
01-Oct-97 : B : Rolled, rotary harrowed.
01-Oct-97 : **T** : **SOW DATE** E: Hereward, dressed Sibutol, drilled at 325 seeds per m^2.
21-Oct-97 : **T** : **SOW DATE** L: Hereward, dressed Sibutol, drilled at 350 seeds per m^2. Harrowed.
22-Oct-97 : B : Avadex BW Granular at 22.5 kg.
29-Jan-98 : B : Panther at 1.0 l with Atlas IPU at 1.0 l in 200 l.

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98/R/CS/309 and 98/W/CS/309

Experimental diary:

Far Field I (W):

11-Feb-98 : B : 34.5% N at 145 kg.
19-Mar-98 : B : Mn and Cu as Phosyn Manganese at 2.0 l with Profol Copper at 0.25 l in 200 l.
30-Mar-98 : B : 34.5% N at 377 kg.
04-May-98 : B : Alto 100 SL at 0.6 l with Tripart Brevis at 2.0 l in 200 l.
21-May-98 : B : Ally at 20 g in 200 l.
31-May-98 : B : Opus at 0.8 l in 200 l.
12-Jun-98 : B : Folicur at 0.3 l with Bavistin DF at 0.3 kg in 200 l.
12-Aug-98 : B : Combine harvested.

NOTES: (1) At Rothamsted 24 plots were destroyed with herbicide because of brome infestation. All plots with **STRAWCUL** BT1T2 CTTTTT and CT1 CTTTTT were lost and were omitted from the analysis. All **SOW DATE** E for **STRAWCUL** CT1 CPTTPT and CP2 CPTTPT were lost. Estimated values were used in the analysis.

(2) Plant samples were taken in July to assess root and stem base diseases.

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

GRAIN TONNES/HECTARE

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

SOW DATE / **STRAWCUL**	E	L	Mean
BT1 BTTTTT	7.87	8.55	8.21
BP2 BPPPPP	8.08	8.51	8.29
BT1P2 CPPPPP	9.15	8.75	8.95
CT1 CPTTPT	7.63*	7.81	7.72
CT1T2 CTPTTP	9.04	8.65	8.84
CT1T2 CTTPTT	6.69	5.97	6.33
CP2 CPPPPP	8.70	8.70	8.70
CP2 CPTTPT	7.95*	8.12	8.04
CT1P2 CTPTTP	9.09	8.90	9.00
CT1P2 CTTPTT	4.38	6.41	5.40
Mean	7.86	8.04	7.95

* These means have been estimated since all values were lost. Treat these values with caution.

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

STRAWCUL	**SOW DATE**	**STRAWCUL SOW DATE**
0.464	0.169	0.598

Except when comparing means with the same level(s) of **STRAWCUL** 0.534

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

GRAIN TONNES/HECTARE

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	27	0.656	8.3
BLOCK.WP.SP	24	0.755	9.5

GRAIN MEAN DM% 87.1

SUB-PLOT AREA HARVESTED 0.00644

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

GRAIN TONNES/HECTARE

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

SOW DATE / **STRAWCUL**	E	L	Mean
BT1 BTTTTT	5.82	5.93	5.88
BT1T2 CTTTTT	3.11	5.66	4.39
BP2 BPPPPP	6.13	6.48	6.30
BT1P2 CPPPPP	5.52	5.57	5.55
CT1 CTTTTT	3.60	5.90	4.75
CT1 CPTTPT	4.42	6.45	5.44
CT1T2 CTPTTP	6.45	6.35	6.40
CT1T2 CTTPTT	5.81	6.96	6.38
CP2 CPPPPP	5.72	5.86	5.79
CP2 CPTTPT	5.76	6.73	6.25
CT1P2 CTPTTP	5.77	6.35	6.06
CT1P2 CTTPTT	4.80	6.00	5.40
Mean	5.24	6.19	5.72

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

STRAWCUL	**SOW DATE**	**STRAWCUL SOW DATE**
0.544	0.130	0.630

Except when comparing means with the same level(s) of **STRAWCUL** 0.450

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	11	0.544	9.5
BLOCK.WP.SP	12	0.450	7.9

GRAIN MEAN DM% 89.0 SUB-PLOT AREA HARVESTED 0.00690

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98/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, W. Powell, A.D. Todd.

The 14th year, w. wheat.

For previous years see 85-97/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 and incorporated (duplicated)

Criss-cross with

2.	**CULTIVTN**	Autumn cultivations since 1993, previously all shallow cultivated:
	S P94	Shallow tine cultivated to 10 cm, (ploughed to 20 cm in autumn 1993)
	S P95	Shallow tine cultivated to 10 cm, (ploughed to 20 cm in autumn 1994)
	S P96	Shallow tine cultivated to 10 cm, (ploughed to 20 cm in autumn 1995)
	S P97	Shallow tine cultivated to 10 cm, (ploughed to 20 cm in autumn 1996)

Experimental diary:

11-Aug-97	**T**	**STRAW** BALED: Straw baled and removed.
	T	**STRAW** BURNT: Straw burnt and ash incorporated.
	T	**STRAW** CHOPPED: Straw chopped with trailed chopper.
12-Aug-97	B	Disced.
05-Sep-97	B	Scythe LC at 1.5 l with Vassgro Non Ionic at 1.0 l in 200 l.
11-Oct-97	B	Scythe LC at 3.0 l in 200 l.
14-Oct-97	B	Heavy spring-tine cultivated to 10 cm.
14-Oct-97	B	Rotary harrowed, Soissons, dressed Anchor, drilled at 400 seeds per m^2.
16-Oct-97	B	Draza at 5.5 kg.

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98/R/CS/311

Experimental diary:

13-Jan-98 : B : Hawk at 2.5 l with Sprayprover at 1.0 l in 200 l.
17-Feb-98 : B : 34.5% N at 120 kg.
16-Mar-98 : B : Ally at 20 g with MSS Optica at 1.0 l in 200 l.
28-Apr-98 : B : 34.5% N at 580 kg. Tripart Brevis at 1.5 l in 200 l.
29-May-98 : B : Folicur at 0.7 l in 200 l.
04-Jun-98 : **T** : **CULTIVTN** S P95: Roundup at 3.0 l in 200 l.
12-Jun-98 : B : Bavistin DF at 0.5 kg with Folicur at 0.5 l in 100 l.
08-Aug-98 : B : Combine harvested.

NOTES: (1) Plant samples were taken in July to assess root and stem base diseases.
(3) All **CULTIVTN** S P95 plots were destroyed with herbicide to reduce brome infestation in readiness for modifications to the experiment, these are omitted from the table of results.

GRAIN TONNES/HECTARE

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

CULTIVTN / **STRAW**	S P94	S P96	S P97	Mean
BURNT	8.66	8.19	8.50	8.45
BALED	6.04	6.05	7.59	6.56
CHOPPED	5.57	6.83	7.81	6.74
Mean	6.76	7.02	7.97	7.25

GRAIN MEAN DM% 87.8

SUB-PLOT AREA HARVESTED 0.00276

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98/R/CS/323

CEREAL SEQUENCES AND TAKE-ALL

Object: To study the level of take-all (*Gaeumannomyces graminis*) in w. wheat grown after various cereal sequences and one year of set-aside - West Barnfield II.

Sponsors: R.G. Gutteridge, J.F. Jenkyn.

The eleventh year, w. wheat.

For previous years see 88-96/R/CS/323.

Design: 3 randomised blocks of 26 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

CROPSEQ Crop sequences 1988 to 1995, all in wheat in 1996 and set-aside in 1997

TTTTTTTT
OTTTOTTT
TOTTTOTT
TTOTTTOT
TTTOTTTO
WWWWWWWW
OWWWOWWW
WOWWWOWW
WWOWWWOW
WWWOWWWO
BBBBBBBB
OBBBOBBB
BOBBBOBB
BBOBBBOB
BBBOBBBO
WTWTWTWT
WBWBWBWB
TBTBTBTB
SBSBSBSB
WWTTTWWW
WWBBBWWW
TTBBBTTT
TTWWWTTT
BBWWWBBB
BBTTTBBB
WWSSSWWW

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

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Experimental diary:

28-Jul-97 : B : Disced.
10-Sep-97 : B : Scythe LC at 3.0 l in 300 l.
23-Sep-97 : B : Topped.
26-Sep-97 : B : Ploughed and furrow pressed.
01-Oct-97 : B : Rotary harrowed, Abbot, dressed Beret Gold, drilled at 380 seeds per m^2.
02-Oct-97 : B : Rolled.
12-Nov-97 : B : Stefes IPU 500 at 4.0 l with MSS Trifluralin 48 EC at 2.0 l and Cyperkill 10 at 250 ml in 200 l.
17-Feb-98 : B : 34.5% N at 120 kg.
27-Apr-98 : B : Opus at 0.6 l with Tripart Brevis at 2.25 l in 200 l.
28-Apr-98 : B : 34.5% N at 460 kg.
28-May-98 : B : Opus at 0.7 l in 200 l.
12-Jun-98 : B : Bavistin DF at 0.5 kg with Folicur at 0.5 l in 100 l.
17-Aug-98 : B : Combine harvested.

NOTE: Plant samples were taken in July to assess root and stem base diseases.

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99/R/CS/323

GRAIN TONNES/HECTARE

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

CROPSEQ	
TTTTTTTT	11.23
OTTTOTTT	11.31
TOTTTOTT	11.40
TTOTTTOT	11.09
TTTOTTTO	11.17
WWWWWWWW	11.15
OWWWOWWW	11.38
WOWWWOWW	11.29
WWOWWWOW	11.28
WWWOWWWO	11.27
BBBBBBBB	11.07
OBBBOBBB	11.41
BOBBBOBB	11.19
BBOBBBOB	10.94
BBBOBBBO	11.43
WTWTWTWT	11.40
WBWBWBWB	11.30
TBTBTBTB	11.29
SBSBSBSB	10.98
WWTTTWWW	11.20
WWBBBWWW	11.58
TTBBBTTT	11.32
TTWWWTTT	11.26
BBWWWBBB	11.32
BBTTTBBB	11.14
WWSSSWWW	11.09
Mean	11.25

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

CROPSEQ
0.199

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	50	0.243	2.2

GRAIN MEAN DM% 87.6

PLOT AREA HARVESTED 0.00229

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98/R/CS/326 and 98/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: M.J. Glendining, J.F. Jenkyn.

The 12th year, w. wheat.

For previous years see 87-97/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	5.2	4.4
2 NORMAL	Twice normal	10.4	8.8
4 NORMAL	Four times normal	20.8	17.6

Experimental diary:
Great Knott III (R):

02-Sep-97 : **T** : **STRAW** NORMAL, 2 NORMAL, 4 NORMAL: Straw applied and chopped.
: **T** : **STRAW** NONE: Straw removed.
09-Sep-97 : B : PK as (0:20:32) at 1250 kg.
11-Sep-97 : B : Scythe LC at 3.0 l in 300 l.
08-Oct-97 : B : Ploughed.
22-Oct-97 : B : Rotary harrowed, Hereward, dressed Anchor, drilled at 380 seeds per m^2.
13-Jan-98 : B : Hawk at 2.5 l with Sprayprover at 1.0 l in 200 l.
13-Feb-98 : B : 34.5% N at 116 kg.
17-Mar-98 : B : Ally at 20 g with Alpha Briotril 24/16 at 0.5 l in 200 l.
27-Apr-98 : B : 34.5% N at 460 kg.
09-May-98 : B : Standon Tebuconazole at 0.7 l with Starane 2 at 0.5 l in 200 l.
28-May-98 : B : Opus at 0.7 l in 200 l.
12-Jun-98 : B : Bavistin DF at 0.5 kg with Folicur at 0.5 l in 100 l.
17-Aug-98 : B : Combine harvested.

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98/R/CS/326 and 98/W/CS/326

Far Field I (W):

02-Sep-97	**T**	**STRAW** NORMAL, 2 NORMAL, 4 NORMAL: Straw applied.
	T	**STRAW** NONE: Straw removed.
19-Sep-97	B	Ploughed.
01-Oct-97	B	Rolled, rotary harrowed, Hereward, dressed Sibutol, drilled, at 325 seeds per m^2.
22-Oct-97	B	Avadex BW Granular at 22.5 kg.
29-Jan-98	B	Panther at 1.0 l with Atlas IPU at 1.0 l in 200 l.
11-Feb-98	B	34.5% N at 145 kg.
19-Mar-98	B	Mn and Cu as Phosyn Manganese at 2.0 l with Profol Copper at 0.25 l in 200 l.
30-Mar-98	B	34.5% N at 377 kg.
04-May-98	B	Alto 100 SL at 0.6 l with Tripart Brevis at 2.0 l in 200 l.
21-May-98	B	Ally at 20 g in 200 l.
31-May-98	B	Opus at 0.8 l in 200 l.
12-Jun-98	B	Folicur at 0.3 l with Bavistin DF at 0.3 kg in 200 l.
12-Aug-98	B	Combine harvested.

NOTE: Samples of grain were analysed for thousand grain weight, hectolitre weight, Hagberg falling numbers and nitrogen content. Straw was sampled for nitrogen content.

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

GRAIN TONNES/HECTARE

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

STRAW	
NONE	8.61
NORMAL	8.71
2 NORMAL	8.75
4 NORMAL	9.13
Mean	8.80

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

STRAW
0.191

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	9	0.271	3.1

GRAIN MEAN DM% 86.6

STRAW TONNES/HECTARE

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

STRAW	
NONE	5.81
NORMAL	6.01
2 NORMAL	6.12
4 NORMAL	6.68
Mean	6.15

STRAW MEAN DM% 89.4

PLOT AREA HARVESTED 0.00310

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

GRAIN TONNES/HECTARE

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

	STRAW
NONE	7.70
NORMAL	7.65
2 NORMAL	7.88
4 NORMAL	7.73
Mean	7.74

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

STRAW
0.403

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	6	0.494	6.4

GRAIN MEAN DM% 89.0

STRAW TONNES/HECTARE

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

	STRAW
NONE	5.61
NORMAL	5.11
2 NORMAL	6.13
4 NORMAL	5.28
Mean	5.53

STRAW MEAN DM% 90.5

PLOT AREA HARVESTED 0.00333

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98/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 eighth year, w. wheat.

For previous years see 91-97/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 cumulative to previous dressings:
0	
50	
100	
150	
200	
250	
300	

Experimental diary:

17-Aug-97 : B : PK as (0:20:32) at 1250 kg.
08-Oct-97 : B : Ploughed and furrow pressed.
19-Oct-97 : B : Rotary harrowed.
24-Oct-97 : B : Rotary harrowed, Mercia, dressed Sibutol, drilled at 380 seeds per m^2.
03-Nov-97 : B : Draza at 5.5 kg.
23-Jan-98 : B : Hawk at 2.5 l with Chiltern Cropoil at 1.0 l in 200 l.
17-Mar-98 : B : Ally at 20 g with Alpha Briotril 24/16 at 0.5 l in 200 l.
24-Mar-98 : **T** : **N** 50, 100, 150, 200, 250, 300: 34.5% N at 145, 290, 435, 580, 725 and 870 kg respectively.
08-May-98 : B : Standon Tebuconazole at 0.7 l with Starane 2 at 0.5 l in 200 l.
28-May-98 : B : Opus at 0.7 l in 200 l.
12-Jun-98 : B : Bavistin DF at 0.5 kg with Folicur at 0.5 l in 100 l.
19-Aug-98 : B : Combine harvested.

NOTE: Samples of grain and straw were taken for chemical analysis.

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98/R/CS/355

GRAIN TONNES/HECTARE

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

N	
0	2.84
50	4.01
100	5.22
150	6.32
200	6.89
250	7.12
300	7.03
Mean	5.63

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

N
0.496

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.607	10.8

GRAIN MEAN DM% 86.7

PLOT AREA HARVESTED 0.00483

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98/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 sixth year, grass.

For previous years see 94-97/R/CS/408.

Design: 3 randomised blocks of 3 plots.

Whole plot dimensions: 10.0 x 10.0.

Treatments:

N	Nitrogen fertilizer cumulative to previous dressings, kg N:
-	None
N1	60
N2	120

Experimental diary:

08-May-98 : B : Dow Shield at 0.5 l in 220 l, spot treated thistles.
04-Jun-98 : **T** : **N** N1, N2: 34.5% N at 174 and 348 kg respectively.
16-Jun-98 : B : Muriate of potash at 286 kg.
01-Feb-99 : B : Hand harvested.

NOTE: Plants were measured regularly for stem height and density. Samples were taken regularly to measure dry matter and for chemical analysis.

DRY MATTER TONNES/HECTARE

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

N	-	N1	N2	Mean
	15.46	15.02	15.37	15.28

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

N
0.322

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	4	0.394	2.6

MEAN DM% 44.9 AVERAGE PLOT AREA HARVESTED 0.00444

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98/R/CS/411

PANICUM STUDY

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

Sponsor: D.G. Christian.

The sixth year, grass.

For previous year see 94-97/R/CS/411

Design: 3 randomised blocks of 7 x 2 plots.

Whole plot dimensions: 5.0 x 2.0.

Treatments: All combinations of:-

1. **VARIETY**

CAVIN R	Cave in Rock
KANLOW	Kanlow
PATHFIND	Pathfinder
SUNBURST	Sunburst
FORESTB	Forestburg
NEBR 28	Nebraska 28
DACOTAH	Dacotah

2. **N** Nitrogen fertilizer, kg N cumulative to previous dressings:

-	None
N1	60

Experimental diary:

19-Feb-98 : B : Barclay Gallup at 4.0 l in 220 l.
08-May-98 : **T** : Dow Shield at 0.5 l in 220 l, spot treated thistles.
04-Jun-98 : B : Dow Shield at 1.0 l in 220 l.
05-Jun-98 : **T** : **N** N1: 34.5% N at 174 kg.
16-Jun-98 : B : Muriate of potash at 190 kg. Triple superphosphate at 230 kg.
25-Jan-99 : B : Hand harvested.

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98/R/CS/411

DRY MATTER TONNES/HECTARE

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

N	-	N1	Mean
VARIETY			
CAVIN R	13.61	11.33	12.47
KANLOW	12.27	12.78	12.53
PATHFIND	10.37	9.69	10.03
SUNBURST	10.35	9.54	9.95
FORESTB	10.36	8.77	9.57
NEBR 28	10.74	12.13	11.44
DACOTAH	8.01	9.36	8.69
Mean	10.82	10.52	10.67

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

VARIETY	N	VARIETY N
1.168	0.624	1.651

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	26	2.023	19.0

MEAN DM% 48.8

PLOT AREA HARVESTED 0.00047

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98/W/CS/427

CONTAMINATED SLUDGE CAKE

Object: To test the effect of zinc, copper or cadmium enriched sewage sludges on soil microbial activity and agricultural productivity - Woburn, Butt Close West.

Sponsors: S.P. McGrath, A. Chaudri.

The fourth year, grass.

Design: 3 randomised blocks of 23 plots.

Whole plot dimensions: 6.0 x 8.0.

Treatments:

SLUDGE

T1	None (duplicated)
T2	Uncontaminated, digested low rate (quadruplicated)
T3	Uncontaminated, undigested low rate (duplicated)
T4	Zinc 150
T5	Zinc 250
T6	Zinc 350
T7	Zinc 450
T8	Copper 50
T9	Copper 100
T10	Copper 150
T11	Copper 200
T12	Cadmium 1
T13	Cadmium 2
T14	Cadmium 3
T15	Cadmium 4
T16	Uncontaminated, digested low rate + nitrogen (duplicated)
T17	Uncontaminated, undigested low rate + nitrogen (duplicated)
T18	Zinc 15 kg per annum
T19	Copper 7.5 kg per annum
T20	Cadmium 0.15 kg per annum

Experimental diary:

26-Jun-97 : **T** : Sludges applied as treatment.
29-Jul-97 : B : Mechanical spade cultivated.
03-Sep-97 : B : Rolled.
10-Sep-97 : B : Gallup at 6.0 l in 200 l.
18-Sep-97 : B : Rotary harrowed, Atalja Italian Ryegrass, drilled at 40 kg.
22-Sep-97 : B : Rolled.
31-Mar-98 : B : Muriate of potash at 120 kg. 34.5% N at 261 kg.
07-Apr-98 : **T** : **SLUDGE** T1, T19, T20: Triple superphosphate at 64 kg.
07-Apr-98 : **T** : **SLUDGE** T1, T16, T17, T18, T19, T20: 27% N at 222 kg.
09-May-98 : B : Legumex Extra at 7.0 l in 200 l.
02-Jul-98 : B : Cut.
09-Sep-98 : B : Cut, no yields

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98/W/CS/427

NOTE: Soils were sampled in spring and the grass in summer for chemical analysis.

1ST CUT (2/7/98) DRY MATTER TONNES/HECTARE

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

SLUDGE	
T1	4.90
T2	6.13
T3	6.22
T4	6.14
T5	6.41
T6	6.80
T7	6.69
T8	6.71
T9	5.95
T10	6.68
T11	6.18
T12	6.17
T13	7.00
T14	6.37
T15	6.03
T16	5.64
T17	5.78
T18	5.56
T19	5.24
T20	5.73
Mean	6.04

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

SLUDGE
0.596 min.rep
0.516 max-min
0.421 max.rep

	SLUDGE
max.rep	T1 v T2 or T16
max-min	T1 or T2 or T16 v any of the remainder
min.rep	Any of the remainder

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	47	0.730	12.1

1ST CUT MEAN DM% 20.2

PLOT AREA HARVESTED 0.00081

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98/W/CS/428

METAL-AMENDED LIQUID SLUDGE

Object: To study the effects of zinc, copper and cadmium on soil microbial activity with low organic matter inputs - Woburn, Butt Close West.

Sponsor: S.P. McGrath, A. Chaudri.

The fourth year, grass.

Design: 3 randomised blocks of 13 plots.

Whole plot dimensions: 1.2 x 3.5.

Treatments:

SLUDGE

T21	None (duplicated)
T22	Uncontaminated (duplicated)
T23	Zinc, rate 1
T24	Zinc, rate 2
T25	Zinc, rate 3
T26	Copper, rate 1
T27	Copper, rate 2
T28	Copper, rate 3
T29	Cadmium, rate 1
T30	Cadmium, rate 2
T31	Cadmium, rate 3

Experimental diary:

10-Sep-97 : B : Gallup at 6.0 l in 200 l.
31-Oct-97 : **T** : Sludges applied as treatment.
31-Mar-98 : B : Muriate of potash at 120 kg. 34.5% N at 145 kg.
03-Apr-98 : **T** : **SLUDGE** T21: Triple superphosphate at 64 kg.
27% N at 370 kg.
08-May-98 : B : PDQ at 4.0 l in 200 l.
12-May-98 : B : Raked. Mixed ryegrass broadcast at 40 kg. Raked.
05-Oct-98 : B : Cut.

NOTE: Soils were sampled in spring and the grass in summer for chemical analysis.

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98/W/CS/428

1ST AND ONLY CUT (5/10/1998) DRY MATTER TONNES/HECTARE

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

SLUDGE	
T21	1.12
T22	2.63
T23	1.97
T24	2.61
T25	2.65
T26	2.47
T27	3.03
T28	3.00
T29	2.40
T30	2.10
T31	2.84
Mean	2.35

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

SLUDGE
0.470 min.rep
0.407 max-min
0.333 max.rep

	SLUDGE
max-min	T21 or T22 v any of the remainder
min.rep	Any of the remainder
max.rep	T21 v T22 only

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	26	0.576	24.5

1ST CUT MEAN DM% 14.0

PLOT AREA HARVESTED BETWEEN 0.00020 and 0.00024

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98/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.

The fifth year, w. rye.

For previous years see 94-97/R/CS/429.

Design: 3 randomised blocks of 5 plots.

Plot dimensions: 3.0 x 15.0.

Treatments:

N	Nitrogen fertilizer (kg N), cumulative to previous dressings:
-	None
N1	30
N2	60
N3	90
N4	120

Experimental diary:

15-Aug-97 : B : Straw baled.
26-Aug-97 : B : Ploughed and rolled.
27-Aug-97 : B : PK as (0:20:32) at 1500 kg.
29-Aug-97 : B : Heavy spring-tine cultivated. Rotary harrowed. Amando, undressed, drilled at 350 seeds per m^2. Rolled.
29-Sep-97 : B : Swipe 560 EC at 3.5 l in 200 l.
17-Mar-98 : B : Alto 100 SL at 0.6 l in 200 l.
14-Apr-98 : **T** : **N** N1, N2, N3, N4: 34.5% N at 87, 174, 261, and 348 kg respectively.
08-May-98 : B : Folicur at 0.75 l in 200 l.
05-Aug-98 : B : Combine harvested.

NOTE: Straw yields were also taken. Samples of grain and straw were taken for chemical analysis.

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98/R/CS/429

GRAIN TONNES/HECTARE

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

N	
-	6.02
N1	6.01
N2	6.91
N3	6.41
N4	6.34
Mean	6.34

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

N
0.308

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	8	0.378	6.0

GRAIN MEAN DM% 81.9

STRAW TONNES/HECTARE

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

N	
-	5.81
N1	7.28
N2	6.48
N3	6.18
N4	6.79
Mean	6.51

STRAW MEAN DM% 92.5

PLOT AREA HARVESTED 0.00300

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98/W/CS/435

RYEGRASS, WHEAT VOLUNTEERS AND DISEASE

Object: To study how different populations of cereal volunteers and ryegrass sown as a cover crop affect the survival of cereal diseases - Woburn, School Field.

Sponsors: J.F. Jenkyn, R.J. Gutteridge.

The fourth year, w. wheat.

For previous years see 95-97/W/CS/435

Design: 4 randomised blocks of 10 x 2 plots.

Whole plot dimensions: 6.0 x 10.0.

Treatments:

1.	**COV CROP**	Crop, seed rate and soil inoculation in 1995:
	(R)	Ryegrass at 30 kg
	(RW)	Ryegrass at 30 kg + wheat at 50 seeds per m^2
	(RI)	Ryegrass at 30 kg + soil inoculated with *Phialophora graminicola*
	(RWI)	Ryegrass at 30 kg + wheat at 50 seeds per m^2 + soil inoculated with *P. graminicola*
	(M)	Mustard at 300 seeds per m^2
	(MW1)	Mustard at 100 seeds per m^2 + wheat at 4 seeds per m^2
	(MW2)	Mustard at 100 seeds per m^2 + wheat at 9 seeds per m^2
	(MW3)	Mustard at 100 seeds per m^2 + wheat at 50 seeds per m^2
	(MW4)	Mustard at 100 seeds per m^2 + wheat at 200 seeds per m^2
	(MW5)	Mustard at 30 seeds per m^2 + wheat at 400 seeds per m^2
2.	**PLOUGH**	Time of ploughing in 1995:
	(PE)	Early (12 May)
	(PL)	Late (17 Aug)

Experimental diary:

```
11-Sep-97 : B : Ploughed.  Rolled.
25-Sep-97 : B : Rotary harrowed.
26-Sep-97 : B : Rialto, dressed Sibutol, drilled at 350 seeds per m².
28-Sep-97 : B : Rolled.
25-Nov-97 : B : Stomp 400 SC at 2.0 l with Javelin Gold at 2.0 l and
                    Cyperkill 10 at 0.25 l in 200 l.
06-Feb-98 : B : Ashlade Nu Trace at 2.5 l in 200 l.
12-Feb-98 : B : 34.5% N at 145 kg.
25-Feb-98 : B : Vytel Manganese at 2.0 l in 200 l.
31-Mar-98 : B : 34.5% N at 377 kg
01-Apr-98 : B : Phosyn Manganese at 2.5 l with Profol Copper at 0.25 l
                    in 200 l.
27-Apr-98 : B : Alto 100 SL at 0.6 l with Tripart Brevis at 2.0 l,
                    Phosyn Manganese at 2.0 l and Profol Copper at 0.25 l.
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98/W/CS/435

Experimental diary:

21-May-98 : B : Ally at 15 g with Cheetah Super at 0.5 l, Starane 2 at 0.5 l and Chiltern Cropoil at 1.0 l in 200 l.
31-May-98 : B : Opus at 0.8 l in 200 l.
12-Jun-98 : B : Folicur at 0.3 l with Bavistin DF at 0.3 kg in 200 l.
02-Aug-98 : B : Roundup Biactive at 4.0 l in 200 l.
14-Aug-98 : B : Combine harvested.

NOTE: Plant samples were taken in June to assess root and stem base diseases.

GRAIN TONNES/HECTARE

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

PLOUGH / COV CROP	(PE)	(PL)	Mean
(R)	8.01	8.30	8.15
(RW)	7.13	6.90	7.02
(RI)	7.57	7.30	7.44
(RWI)	7.16	7.39	7.28
(M)	6.90	7.24	7.07
(MW1)	7.29	7.33	7.31
(MW2)	7.00	7.30	7.15
(MW3)	6.59	7.37	6.98
(MW4)	6.70	7.68	7.19
(MW5)	7.86	7.12	7.49
Mean	7.22	7.39	7.31

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

COV CROP	PLOUGH	COV CROP PLOUGH
0.346	0.155	0.490

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	57	0.693	9.5

GRAIN MEAN DM% 88.1

PLOT AREA HARVESTED 0.00460

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98/W/CS/439

METAL SALTS

Object: To study the effects of zinc, copper and cadmium as metal salts on soil microbial activity - Woburn, Butt Close West.

Sponsors: S.P. McGrath, A. Chaudri.

Design: 3 randomised blocks of 11 plots.

Whole plot dimensions: 1.2 x 3.5.

Treatments:

SALTS

A	None (duplicated)
ZN1	Zinc at rate 1
ZN2	Zinc at rate 2
ZN3	Zinc at rate 3
CU1	Copper at rate 1
CU2	Copper at rate 2
CU3	Copper at rate 3
CD1	Cadmium at rate 1
CD2	Cadmium at rate 2
CD3	Cadmium at rate 3

Experimental diary:

10-Sep-97 : B : Barclay Gallup at 6.0 l in 200 l.
31-Mar-98 : B : Muriate of potash at 120 kg. 34.5% N at 145 kg.
03-Apr-98 : B : Triple superphosphate at 64 kg. 27% N at 370 kg.
08-May-98 : B : PDQ at 4.0 l in 200 l.
12-May-98 : B : Raked. Mixed ryegrass broadcast at 40 kg. Raked.
05-Oct-98 : B : Cut.

NOTE: Soils were sampled in spring and the grass in summer for chemical analysis.

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98/W/CS/439

1ST AND ONLY CUT (5/10/98) DRY MATTER TONNES/HECTARE

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

SALTS	
A	1.12
ZN1	1.10
ZN2	1.35
ZN3	1.29
CU1	1.06
CU2	0.84
CU3	0.79
CD1	0.84
CD2	1.10
CD3	0.92
Mean	1.04

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

SALTS	
0.239	min.rep
0.207	max-min

	SALTS
max-min	A v any of the remainder
min.rep	Any of the remainder

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	21	0.293	28.0

1ST CUT MEAN DM% 15.6

PLOT AREA HARVESTED (MEAN) 0.00022

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98/R/CS/442

PHALARIS LINES

Object: To assess the growth and yield of *Phalaris* lines for biofuel - Road Piece West.

Sponsor: D.G. Christian.

The fourth year.

For previous years see 96-97/R/CS/442.

Design: 6 randomised blocks of 15 plots.

Whole plot dimensions: 1.5 x 2.5.

Treatments:

LINES	*Phalaris* lines:
1	A
2	B
3	C
4	D
5	E
6	F
7	G
8	H
9	I
10	J
11	K
12	L
13	M
14	N
15	O

Experimental diary:

27-Apr-98 : B : MSS Optica at 2.0 l in 220 l.
08-May-98 : B : Spannit at 1.5 l in 220 l.
18-May-98 : B : 34.5% N at 291 kg.
22-May-98 : B : Starane 2 at 1.0 l in 220 l.
15-Jun-98 : B : Triple superphosphate at 140 kg.
16-Jun-98 : B : Muriate of potash at 190 kg.
27-Jul-98 : B : BASF Dimethoate 40 at 1.7 l in 200 l.
21-Dec-98 : **T** : Hand harvested three replicates.
03-Feb-99 : **T** : Hand harvested remaining three replicates.

NOTES: (1) Ground cover, stem height, date and duration of flowering were recorded. Incidence of pests and diseases were also recorded.
(2) **LINES** 3 and 4 failed to grow and have been omitted from the analysis.
(3) Yields presented come from the hand harvest on 03-Feb-99.

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98/R/CS/442

DRY MATTER TONNES/HECTARE

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

LINES	
1	7.45
2	7.43
5	7.30
6	5.37
7	8.80
8	8.56
9	6.27
10	6.58
11	6.17
12	5.54
13	6.96
14	8.19
15	6.55
Mean	7.01

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

LINES
1.249

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	24	1.529	21.8

MEAN DM% 73.1

PLOT AREA HARVESTED 0.00023

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98/W/CS/446

RYEGRASS, WHEAT VOLUNTEERS AND DISEASES

Object: To study how different populations of cereal volunteers and ryegrass sown as a cover crop affect the survival of cereal diseases - Woburn, White Horse.

Sponsors: J.F. Jenkyn, R.J. Gutteridge.

For previous year see 96-97/W/CS/446.

The third year, w. wheat.

Design: 4 randomised blocks of 10 x 2 plots.

Whole plot dimensions: 6.0 x 10.0.

Treatments:

Whole plots

1. **COV CROP** — Crop, seed rate and soil inoculation in 1996:

(R)	Ryegrass at 30 kg
(RW)	Ryegrass at 30 kg + wheat at 50 seeds per m^2
(RI)	Ryegrass at 30 kg + soil inoculated with *Phialophora graminicola*
(RWI)	Ryegrass at 30 kg + wheat at 50 seeds per m^2 + soil inoculated with *P. graminicola*
(M)	Mustard at 300 seeds per m^2
(MW1)	Mustard at 100 seeds per m^2 + wheat at 4 seeds per m^2
(MW2)	Mustard at 100 seeds per m^2 + wheat at 9 seeds per m^2
(MW3)	Mustard at 100 seeds per m^2 + wheat at 50 seeds per m^2
(MW4)	Mustard at 100 seeds per m^2 + wheat at 200 seeds per m^2
(MW5)	Mustard at 30 seeds per m^2 + wheat at 400 seeds per m^2

2. **PLOUGH** — Time of ploughing in 1996:

(PE)	Early (17 May)
(PL)	Late (14 Aug)

Experimental diary:

12-Sep-97 : B : Ploughed.
16-Sep-97 : B : Rolled.
25-Sep-97 : B : Rotary harrowed, Hereward, dressed Sibutol, drilled at 350 seeds per m^2.
28-Sep-97 : B : Rolled.
25-Nov-97 : B : Stomp 400 SC at 2.0 l with Javelin Gold at 2.0 l and Cyperkill 10 at 0.25 l in 200 l.
06-Feb-98 : B : Ashlade Nu Trace at 2.5 l in 200 l.
12-Feb-98 : B : 34.5% N at 145 kg.
25-Feb-98 : B : Vytel Manganese at 2.0 l in 200 l.
31-Mar-98 : B : 34.5% N at 377 kg.

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98/W/CS/446

Experimental diary:

01-Apr-98 : B : Phosyn Manganese at 2.5 l with Profol Copper at 0.25 l in 200 l.
27-Apr-98 : B : Alto 100 SL at 0.6 l with Tripart Brevis at 2.0 l, Phosyn Manganese at 2.0 l and Profol Copper at 0.25 l in 200 l.
21-May-98 : B : Ally at 15 g with Cheetah Super at 0.5 l, Starane 2 at 0.5 l and Chiltern Cropoil at 1.0 l in 200 l.
31-May-98 : B : Opus at 0.8 l in 200 l.
12-Jun-98 : B : Folicur at 0.3 l with Bavistin DF at 0.3 kg in 200 l.
02-Aug-98 : B : Roundup Biactive at 4.0 l in 200 l.
13-Aug-98 : B : Combine harvested.

NOTE: Plant samples were taken in April and June to assess root and stem base diseases.

GRAIN TONNES/HECTARE

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

CULT	(PE)	(PL)	Mean
CROP			
(R)	5.18	4.12	4.65
(RW)	3.77	4.85	4.31
(RI)	5.91	5.58	5.75
(RWI)	5.06	6.88	5.97
(M)	4.94	4.42	4.68
(MW1)	4.76	4.79	4.78
(MW2)	4.71	3.52	4.12
(MW3)	4.22	3.32	3.77
(MW4)	3.45	2.61	3.03
(MW5)	2.99	3.14	3.07
Mean	4.50	4.32	4.41

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

CROP	**CULT**	**CROP CULT**
0.690	0.308	0.975

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	57	1.379	31.3

GRAIN MEAN DM% 88.5

PLOT AREA HARVESTED 0.00460

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98/R/CS/457

SET-ASIDE, CULTIVATIONS AND CROPS

Object: To measure the establishment, growth and yield of w. wheat and w. rape following a range of cultivations and herbicide applications after natural regeneration set-aside. To assess soil nitrogen and weeds in the two crops and diseases in the wheat - Scout.

Sponsors: J.F. Jenkyn, R.G. Gutteridge.

The third year, w. wheat.

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

Whole plot dimensions: 12.0 x 26.0.
Sub-plot dimensions: 10.0 x 12.0.

Treatments: All combinations of:-

1.	**SETDESTR**	Method and time of destruction of set-aside in 1996:
	(PG)	Ploughed in May, glyphosate pre-drilling
	(PC)	Ploughed in May, cultivated in June and July
	(MP)	Minimally cultivated in May, ploughed in August
	(HP)	Herbicide in May, ploughed in August
	(-P)	Ploughed in August
2.	**CROP**	Crop in 1997
	(R)	Winter rape
	(W)	Winter wheat

Sub-plots

3.	**NITROGEN**	Fertilizer nitrogen in 1997 (kg N):
	(-)	None
	(N)	160

Experimental diary:

22-Sep-97 : B : Ploughed.
25-Sep-97 : B : Rotary harrowed, Genesis, dressed Sibutol, drilled at 380 seeds per m^2.
26-Sep-97 : B : Rolled.
12-Nov-97 : B : Stefes IPU 500 at 2.0 l with Stomp 400 SC at 2.0 l and Cyperkill 10 at 250 ml in 200 l.
17-Feb-98 : B : 34.5% N at 120 kg.
17-Apr-98 : B : 34.5% N at 460 kg.
08-May-98 : B : Ally at 20 g with Pointer at 0.5 l in 200 l.
28-May-98 : B : Opus at 0.7 l in 200 l.
20-Aug-98 : B : Combine harvested.

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98/R/CS/457

NOTE: Plant samples were taken in July to assess root and stem base diseases.

GRAIN TONNES/HECTARE

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

CROP	(R)	(W)	Mean
SETDESTR			
(PG)	9.62	5.19	7.40
(PC)	9.59	5.75	7.67
(MP)	7.74	5.52	6.63
(HP)	9.32	5.36	7.34
(-P)	8.95	4.94	6.95
Mean	9.04	5.35	7.20

N	(-)	(N)	Mean
SETDESTR			
(PG)	7.18	7.63	7.40
(PC)	8.08	7.25	7.67
(MP)	6.66	6.59	6.63
(HP)	7.64	7.04	7.34
(-P)	6.81	7.08	6.95
Mean	7.27	7.12	7.20

N	(-)	(N)	Mean
CROP			
(R)	8.95	9.13	9.04
(W)	5.60	5.10	5.35
Mean	7.27	7.12	7.20

CROP	(R)		(W)	
SETDESTR **N**	(-)	(N)	(-)	(N)
(PG)	9.54	9.69	4.81	5.56
(PC)	9.64	9.54	6.53	4.97
(MP)	7.24	8.24	6.09	4.95
(HP)	9.57	9.06	5.70	5.02
(-P)	8.77	9.14	4.86	5.01

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98/R/CS/457

GRAIN TONNES/HECTARE

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

	SETDESTR	CROP	N	SETDESTR CROP
	0.542	0.343	0.186	0.766

	SETDESTR N	CROP N	SETDESTR CROP N
	0.616	0.390	0.872

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

SETDESTR	0.415
CROP	0.263
SETDESTR.CROP	0.587

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	18	0.939	13.0
BLOCK.WP.SP	20	0.719	10.0

GRAIN MEAN DM% 86.8

SUB-PLOT AREA HARVESTED 0.00230

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98/R/CS/472

CEREALS AND SEED TREATMENTS

Object: To test seed treatment fungicides on root and stem base diseases of winter wheat and barley - Highfield IV/Road Piece East.

Sponsors: W.A.J.M. Dawson, G.L. Bateman, J.F. Jenkyn.

The second year, w. wheat and w. barley.

Design: 4 randomised blocks of 8 x 2.

Plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. **FUNGCIDE** Seed dressing:

	1997	1998
(-)-	None	None
(E)-	CR21528	None
(-)E	None	CR21529
(E)E	CR21528	CR21528
(B)-	CR21529	None
(-)B	None	CR21529
(B)B	CR21529	CR21529

2. **CROP**

WW	Winter wheat
BW	Winter barley

NOTE: Fungicides CR21528 and CR21529 are under commercial development, composition disclosed in confidence.

Experimental diary:

17-Sep-97 : B : Scythe LC at 3.0 l with Vassgro Non Ionic at 100 ml in 200 l.
18-Sep-97 : B : Topped.
24-Sep-97 : B : Ploughed and furrow pressed.
26-Sep-97 : **T** : **CROP** BW: Rotary harrowed, Pipkin, dressed as treatment, drilled at 350 seeds per m^2.
: **T** : **CROP** WW: Rotary harrowed, Brigadier, dressed as treatment, drilled at 380 seeds per m^2.
06-Jan-98 : B : Atlas Fieldgard at 2.6 l with Stomp 400 SC at 3.3 l in 200 l.
13-Feb-98 : B : 34.5% N at 116 kg. Grasp at 1.4 l with Isoguard at 2.0 l and Output at 0.75 l in 200 l.
25-Feb-98 : B : Manganese sulphate at 3.0 kg with Tern 750 EC at 0.75 l in 200 l.
31-Mar-98 : **T** : **CROP** BW: Campbell's Carbendazim 50% Flowable at 0.5 l in 220 l.
28-Apr-98 : B : 34.5% N at 400 kg.
08-May-98 : B : Ally at 20 g with Starane 2 at 0.5 l in 200 l.
14-May-98 : B : Carbate Flowable at 0.5 l with Opus at 1.0 l in 200 l.

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98/R/CS/472

Experimental diary:
05-Jun-98 : B : Corbel at 1.0 l in 200 l.
20-Jul-98 : B : **CROP** BW: Combine harvested.
11-Aug-98 : B : **CROP** WW: Combine harvested.

NOTE: Plant samples were taken in January, March and June to assess root and stem base diseases.

GRAIN TONNES/HECTARE

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

CROP / **FUNGCIDE**	WW	BW	Mean
(-)-	7.59	7.40	7.50
(E)-	7.99	7.51	7.75
(-)E	9.14	7.33	8.23
(E)E	8.47	7.85	8.16
(B)-	8.00	7.90	7.95
(-)B	9.32	7.26	8.29
(B)B	8.74	7.43	8.08
Mean	8.36	7.51	7.93

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

FUNGCIDE	**CROP**	**FUNGCIDE** **CROP**	
0.296		0.419	min.rep
0.257	0.148	0.363	max-min
		0.296	max.rep

FUNGCIDE
max.rep - only
max-min - v any of the remainder
min.rep Any of the remainder

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	47	0.593	7.5

GRAIN MEAN DM% 88.5

PLOT AREA HARVESTED 0.00228

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98/W/CS/474

EFFICIENCY OF S FERTILIZERS

Object: To measure the effect of different forms of sulphur on the yield of winter wheat and the following oilseed rape crop - Woburn, Lansome III.

Sponsors: F.J. Zhao, S.P. McGrath.

The second year, w. rape.

Design: 4 randomised blocks of (4 x 2 + 1) split into 2 sub-plots.

Plot dimensions: 8.0 x 12.0.

Treatments: All combinations of:-

Whole plots

1. **FORM** — Form of sulphur to provide 30 kg S:

T+A	50% Stefes Tiger 90 and 50% ammonium sulphate
AS	Ammonium sulphate
T90	Stefes Tiger 90
NAS	Sodium thiosulphnate

2. **TIMING**

SB	To seedbed, pre-sowing
MAR	In March

EXTRA

-	None

Sub-plots

YEAR

97+98	Above treatments applied in 1997 and 1998
97	Above treatments applied in 1997 only

NOTE: The nitrogen was balanced on all plots to match that supplied by the ammonium sulphate treatment, this was 26.5 kg N to the seedbed and a spring dressing to provide a total of 180 kg N.

Experimental diary:

08-Sep-97 : B : Ploughed. Rotary harrowed.
09-Sep-97 : **T** : **FORM** T+A, AS, T90, NAS **TIMING** SB **YEAR** 97+98: Seedbed sulphur and balancing nitrogen applied.
: B : Apex, dressed Vitavax RS, drilled at 120 seeds per m^2.
24-Oct-97 : B : Butisan S at 1.5 l with Benazalox at 0.75 kg in 300 l.
17-Feb-98 : B : Folicur at 0.5 l in 200 l.

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98/W/CS/474

Experimental diary:

16-Mar-98 : **T** : **FORM** T+A, AS, T90, NAS **TIMING** MAR **YEAR** 97+98:
Sulphur treatments applied and balancing nitrogen applied.
09-May-98 : B : Ronilan FL at 0.8 l with Fastac at 200 ml in 200 l.
16-Jul-98 : B : Alpha Glyphogan at 4.0 l in 200 l.
28-Jul-98 : B : Combine harvested.

NOTE: Soil was sampled in May and plants at harvest for chemical analysis.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

TIMING	SB	MAR	Mean
FORM			
T+A	1.94	2.39	2.16
AS	1.96	2.45	2.20
T90	3.16	1.94	2.55
NAS	2.20	2.68	2.44
Mean	2.31	2.36	2.34

YEAR	97+98	97	Mean
FORM			
T+A	2.31	2.01	2.16
AS	2.24	2.17	2.20
T90	2.56	2.54	2.55
NAS	2.69	2.19	2.44
Mean	2.45	2.23	2.34

YEAR	97+98	97	Mean
TIMING			
SB	2.38	2.25	2.31
MAR	2.52	2.21	2.36
Mean	2.45	2.23	2.34

TIMING	SB		MAR	
YEAR	97+98	97	97+98	97
FORM				
T+A	2.02	1.85	2.60	2.17
AS	1.87	2.05	2.61	2.28
T90	3.13	3.19	1.99	1.89
NAS	2.51	1.89	2.87	2.49

EXTRA	2.06

Grand mean 2.31

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98/W/CS/474

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

FORM	TIMING	YEAR	FORM TIMING
0.613	0.434	0.079	0.867

FORM YEAR	TIMING YEAR	FORM TIMING YEAR
0.623	0.441	0.881

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

FORM	0.157
TIMING	0.111
FORM.TIMING	0.222

SED for comparing **EXTRA** with any item in **FORM.TIMING.YEAR** table is 0.874

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	24	1.226	53.2
BLOCK.WP.SP	28	0.314	13.6

GRAIN MEAN DM% 85.5

SUB-PLOT AREA HARVESTED 0.00230

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98/R/CS/476

FUNGICIDE SEQUENCES AND TAKE-ALL

Object: To determine the effects of a fungicidal seed treatment on take-all (*Gaeumannomyces graminis*) development in w. wheat - Long Hoos IV 4.

Sponsors: G.L. Bateman, J.F. Jenkyn.

The second year, w. wheat.

For previous year see 97/R/CS/476.

Design: 4 randomised blocks of 2 x 2 x 2.

Plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. **FUNG97** Fungicidal seed dressing to the 1997 crop:

   (F97) Seed dressed
   (-97) None

2. **FUNG98** Fungicidal seed dressing to the 1998 crop:

   F98 Seed dressed
   -98 None

3. **FUNG99** Fungicidal seed dressing to the 1999 crop:

   F99 Seed dressed
   -99 None

NOTE: The seed dressing is under commercial development, composition disclosed in confidence.

Experimental diary:

20-Aug-97 : B : Straw baled.
30-Sep-97 : B : Ploughed, rolled. Spring-tine cultivated.
01-Oct-97 : B : Rotary harrowed, Hereward, dressed as treatment, drilled at 400 seeds per m^2.
13-Jan-98 : B : Atlas Fieldgard at 3.0 l with Stomp 400 SC at 2.5 l in 200 l.
19-Feb-98 : B : 34.5% N at 120 kg.
29-Apr-98 : B : 34.5% N at 460 kg.
13-Jul-98 : B : Hand rogued wild oats.
19-Aug-98 : B : Combine harvested.

NOTE: Plant samples were taken in December for leaf and root assessments, in March and June for root and stem base diseases. Soil samples were taken after harvest and used in bioassays to measure take-all infectivity.

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98/R/CS/476

GRAIN TONNES/HECTARE

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

FUNG98 / **FUNG97**	F98	-98	Mean
(F97)	8.48	8.06	8.27
(-97)	7.99	7.50	7.74
Mean	8.24	7.78	8.01

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

FUNG97	**FUNG98**	**FUNG97** **FUNG98**
0.292	0.292	0.413

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	25	0.826	10.3

GRAIN MEAN DM% 84.9

PLOT AREA HARVESTED 0.00228

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98/R/CS/477

CONTINUOUS MAIZE

Object: To monitor the fate of organic carbon in the soil organic matter - Hoosfield.

Sponsors: P.R. Poulton, J.L. Gaunt.

The second year, maize and s. barley.

Design: 3 randomised blocks of 6 plots.

Plot dimensions: 12.0 x 25.0.

Treatments:-

CROP	Crop and straw treatments:
BM	Spring barley, straw removed then maize after three years
BTM	Continuous spring barley, straw removed plus 10 t maize tops incorporated
B	Continuous spring barley, straw removed
M	Continuous maize, stubble incorporated
MB	Maize, stubble incorporated then s. barley after five years
MTB	Maize, stubble plus 10 t maize tops incorporated, then s. barley after five years

Experimental diary:

19-Sep-97 : **T** : **CROP** BTM, MTB: Chopped maize tops at 10 t.
15-Oct-97 : B : Muriate of potash at 180 kg and triple superphosphate at 170 kg.
16-Oct-97 : B : Ploughed.
18-Mar-98 : B : Roundup at 3.0 l in 200 l.
01-Apr-98 : B : Spring-tine cultivated.
: **T** : **CROP** BM, BTM, B: Rotary harrowed, Cooper, dressed Raxil S, drilled at 350 seeds per m^2.
29-Apr-98 : B : 34.5% N at 275 kg.
07-May-98 : **T** : **CROP** M, MB, MTB: Rotary harrowed, Hudson, dressed Mesurol, drilled at 11 seeds per m^2.
04-Jun-98 : **T** : **CROP** BM, BTM, B: MSS Optica at 2.0 l with Corbel at 0.3 l and Opus at 0.3 l in 200 l.
28-Jun-98 : **T** : Gesaprim 500 SC at 3.0 l with Chiltern Cropoil at 5.0 l in 200 l.
28-Aug-98 : **T** : **CROP** BM, BTM, B: Combine harvested.
16-Sep-98 : **T** : **CROP** M, MB, MTB: Hand harvested.

NOTE: Samples of whole crop maize and barley grain and straw were taken for chemical analysis.

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98/R/CS/477 MAIZE

WHOLE CROP YIELD TONNES/HECTARE

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

CROP	
M	10.39
MB	10.71
MTB	10.16
Mean	10.42

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

CROP
0.568

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	4	0.695	6.7

CROP MEAN DM% 23.4

PLOT AREA HARVESTED 0.00108

S. BARLEY

GRAIN TONNES/HECTARE

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

CROP	
BM	5.17
BTM	4.90
B	4.80
Mean	4.95

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

CROP
0.188

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	4	0.230	4.6

GRAIN MEAN DM% 86.1

PLOT AREA HARVESTED 0.00575

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98/W/CS/478

CONTINUOUS MAIZE

Object: To monitor the fate of organic carbon in the soil organic matter - Woburn, Stackyard A I.

Sponsors: P.R. Poulton, J. Gaunt.

The second year, maize and s. barley.

Design: 3 randomised blocks of 6 plots.

Plot dimensions: 9.0 x 25.0.

Treatments:

CROP	Crop and straw treatments:
BM	Spring barley, straw removed then maize after three years
BTM	Continuous spring barley plus 10 t maize tops incorporated.
B	Continuous spring barley, straw removed
M	Continuous maize, stubble incorporated
MB	Maize, stubble incorporated then s. barley after five years
MTB	Maize, stubble plus 10 t maize tops incorporated, then s. barley after five years

Experimental diary:

29-Sep-97 : **T** : **CROP** MTB, BTM: Chopped maize tops at 10 t.
: B : PK as (0:20:32) at 235 kg and (0:24:24) at 138 kg.
20-Oct-97 : B : Ploughed.
24-Mar-98 : B : Rotary harrowed.
24-Mar-98 : **T** : **CROP** BM, BTM, B: Copper, dressed Raxil S, drilled at 375 seeds per m^2.
13-May-98 : B : 34.5% N at 278 kg.
14-May-98 : **T** : **CROP** M, MB, MTB: Rotary harrowed, Hudson, dressed Thiram and Methiocare, drilled at 10.9 seeds per m^2.
20-May-98 : **T** : **CROP** BM, BTM, B: Asset at 2.0 l with Astix at 1.0 l in 200 l. Opus at 0.2 l in 200 l.
14-Aug-98 : **T** : **CROP** BM, BTM, B: Combine harvested.
15-Sep-98 : **T** : **CROP** M, MB, MTB: Hand harvested.

NOTE: Samples of whole crop maize and barley grain and straw were taken for chemical analysis.

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98/W/CS/478 MAIZE

WHOLE CROP YIELD TONNES/HECTARE

***** TABLES OF MEANS *****

CROP	
M	9.49
MB	10.49
MTB	10.95
Mean	10.31

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

CROP
0.470

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	4	0.576	5.6

CROP MEAN DM% 29.7

PLOT AREA HARVESTED 0.00108

BARLEY

GRAIN TONNES/HECTARE

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

CROP	
BM	1.51
BTM	2.18
B	1.65
Mean	1.78

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

CROP
0.455

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	4	0.557	31.4

GRAIN MEAN DM% 86.7 PLOT AREA HARVESTED 0.00575

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98/R/CS/480

MISCANTHUS GENOTYPES

Object: To compare growth, yield, winter survival and quality for combustion and fibre uses of a range of miscanthus genotypes - Long Hoos III 4.

Sponsors: D.G. Christian.

The second year, grasses.

Design: 3 randomised blocks of 15 plots.

Plot dimensions: 5.0 x 5.0.

Treatments:-

GENOTYPE

1	Giganteus/M1 Lasei 1
2	Giganteus/M53 LLP53
3	Giganteus/M56 Haga 56
4	Giganteus/M63 Greif 63
5	Sacchariflorus/M11 Materec 11
6	Sinensis H/M7 Gofal 7
7	Sinensis H/M42 Berbo 42
8	Sinensis H/M43 RH43
9	Sinensis H/M78 Jesel 78
10	Sinensis H/M81 RH81
11	Sinensis /88-110
12	Sinensis /88-111
13	Sinensis /90-5
14	Sinensis /90-6
15	Sinensis /SW 217

Experimental diary:

16-May-97 : B : 34.5% N at 174 kg. Triple superphosphate at 213 kg. Muriate of potash at 292 kg. Heavy spring-tine cultivated.
19-May-97 : B : Rotary cultivated. Transplanted genotypes.
20-May-97 : B : Irrigated 20 mm.
28-May-97 : B : Irrigated 20 mm.
03-Jun-97 : B : Irrigated 20 mm.
20-Aug-97 : B : Irrigated 12.5 mm.
17-Feb-98 : B : Hand harvested.
18-Feb-98 : **T** : Replanted missing plants by hand.
18-Mar-98 : B : Gramoxone 100 at 2.0 l with Luxon Non-ionic Wetter at 100 ml in 200 l.
08-May-98 : B : Dow Shield at 0.5 l in 220 l, spot treat thistles.
15-Jun-98 : B : Triple superphosphate at 213 kg. 34.5% N at 174 kg.
16-Jun-98 : B : Muriate of potash at 190 kg.
17-Jul-98 : B : Hand weeded.
16-Feb-99 : B : Hand harvested.

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NOTE: Winter survival was assessed. Regular measurements of plant height and shoot numbers were made. The onset of senescence was recorded. Plant samples were taken at harvest to assess above and below ground biomass and for chemical analysis.

DRY MATTER TONNES/HECTARE

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

GENOTYPE	
1	1.78
2	3.35
3	3.53
4	2.74
5	1.23
6	3.62
7	4.13
8	0.95
9	4.83
10	3.91
11	1.19
12	0.90
13	1.61
14	0.50
15	1.22
Mean	2.36

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

GENOTYPE
0.421

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	28	0.515	21.8

MEAN DM% 64.0

PLOT AREA HARVESTED 0.00105

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98/W/CS/482

DIAGNOSIS OF S DEFICIENCY

Object: To develop reliable diagnostic methods for the prediction of sulphur deficiency - Woburn, Butt Close I.

Sponsors: F.J. Zhao, M.M.A. Blake-Kalff, S.P. McGrath.

The first year, w. wheat.

Design: 4 randomised blocks of 6 plots.

Plot dimensions: 3.0 x 12.0.

Treatments:-

SULPHUR	Kg of sulphur:
S0	None
S1	5
S2	10
S3	20
S4	40
S5	80

Experimental diary:

16-Sep-97 : B : Ploughed. Rolled.
14-Oct-97 : **T** : **SULPHUR** S1, S2, S3, S4, S5: Gypsum applied at 29, 57, 114, 229 and 457 kg respectively.
: B : Rotary harrowed. Riband, dressed Sibutol, drilled at 385 seeds m^2.
29-Jan-98 : B : Panther at 1.0 l with Atlas IPU at 1.0 l in 200 l.
12-Feb-98 : B : 34.5% N at 145 kg.
31-Mar-98 : B : 34.5% N at 377 kg.
04-May-98 : B : Alto 100 SL at 0.6 l in 200 l.
31-May-98 : B : Opus at 0.8 l in 200 l.
12-Jun-98 : B : Folicur at 0.3 l with Bavistin DF at 0.3 kg in 200 l.
02-Aug-98 : B : Roundup Biactive at 3.0 l in 200 l.
13-Aug-98 : B : Combine harvested.

NOTES: (1) Plant samples were taken in April, May and June and analysed for glutathione and sulphur content. At harvest grain and straw were analysed for sulphur content.
(2) Because of rabbit damage the yield of one plot with **SULPHUR** S2 was lost. An estimated value was used in the analysis.

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98/W/CS/482

GRAIN TONNES/HECTARE

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

SULPHUR

S0	5.32
S1	6.75
S2	6.13
S3	5.47
S4	6.13
S5	6.32
Mean	6.02

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

SULPHUR
0.541

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	14	0.766	12.7

GRAIN MEAN DM% 87.8

PLOT AREA HARVESTED 0.00276

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98/R/CS/483

SEVERE TAKE-ALL IN WHEAT

Object: To create severe take-all (*Gaeumannomyces graminis*) in winter wheat by applying inoculum artificially to spring wheat and then test seed dressings on w. wheat - Summerdells I.

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

The second year, w. wheat.

For previous year see 97/R/CS/483

Design: 4 randomised blocks of 2 x 7 plots.

Plot dimensions: 3.0 x 10.0.

Treatments:-

All combinations of:

1. **INOCULTN** Inoculum applied in 1997:

-	None
TA	Take-all inoculum

2. **SEED TRT** Seed dressing in 1998:

-	None
R1	CR 21529 at 200 ml per 100 kg
R2	CR 21529 at 300 ml per 100 kg
R3	CR 21529 at 450 ml per 100 kg
NR1	CR 21529 (Non-P) at 200 ml per 100 kg
NR3	CR 21529 (Non-P) at 450 ml per 100 kg
B	Baytan Flowable at 200 ml per 100 kg

NOTE: Treatments CR 21529 and CR 21529 (Non-P) are under commercial development, composition disclosed in confidence.

Experimental diary:

10-Sep-97 : B : PK as (0:20:32) at 1250 kg.
01-Oct-97 : B : Heavy spring-tine cultivated twice.
01-Oct-97 : **T** : Rotary harrowed, Hereward, dressed as treatment, drilled at 400 seeds per m^2.
03-Oct-97 : B : Rolled.
16-Oct-97 : B : Draza at 5.5 kg.
13-Jan-98 : B : Unite A at 0.125 l with Unite B at 1.0 l and LI-700 at 1.0 l in 200 l.
17-Feb-98 : B : 34.5% N at 120 kg.
29-Apr-98 : B : 34.5% N at 460 kg.
18-Aug-98 : B : Combine harvested.

NOTE: Plant populations, growth and take-all were assessed in March. Take-all and stem base diseases were assessed in June.

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98/R/CS/483

GRAIN TONNES/HECTARE

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

INOCULTN SEED TRT	-	TA	Mean
-	5.78	5.82	5.80
R1	6.03	6.25	6.14
R2	6.14	6.58	6.36
R3	5.59	6.67	6.13
NR1	6.75	5.68	6.21
NR3	6.22	6.70	6.46
B	5.68	6.29	5.99
Mean	6.03	6.28	6.16

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

INOCULTN	SEED TRT	INOCULTN SEED TRT
0.227	0.425	0.601

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	39	0.850	13.8

GRAIN MEAN DM% 88.0

PLOT AREA HARVESTED 0.00228

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98/R/CS/484

STEM BASE DISEASES AND FUNGICIDES

Object: To evaluate sampling methods and molecular diagnostics for assessing risk of stem-base diseases and the effects of fungicides - Great Harpenden I.

Sponsors: G.L. Bateman, L.W. Morgan.

The first year, w. wheat.

Design: 4 randomised blocks of 4 x 5 plots.

Plot dimensions: 3.0 x 10.0.

Treatments:-

1. **CULTIVAR**

L	Lynx
B	Brigadier
M	Mercia
S	Soissons

2. **FUNGCIDE**

-	None
P	Prochloraz
C	Cyprodinil
A	Azoxystrobin
F	Flusilazole

Experimental diary:

02-Sep-97 : B : Alpha Glyphogan at 5.0 l in 200 l.
27-Sep-97 : B : Ploughed and furrow pressed.
10-Oct-97 : **T** : **CULTIVAR** B: Rotary harrowed, Brigadier, undressed, drilled at 380 seeds per m^2.
: **T** : **CULTIVAR** L: Rotary harrowed, Lynx, undressed, drilled at 380 seeds per m^2.
: **T** : **CULTIVAR** M: Rotary harrowed, Mercia, undressed, drilled at 380 seeds per m^2.
: **T** : **CULTIVAR** S: Rotary harrowed, Soissons, undressed drilled at 400 seeds per m^2.
28-Jan-98 : B : Isoguard at 2.0 l with Panther at 0.25 l and Stomp 400 SC at 2.5 l in 200 l.
17-Feb-98 : B : 34.5% N at 120 kg.
23-Mar-98 : B : Eagle at 40 g in 200 l.
07-Apr-98 : **T** : **FUNGCIDE** A: Amistar at 1.0 l in 220 l.
: **T** : **FUNGCIDE** C: Unix at 1.0 kg in 220 l.
: **T** : **FUNGCIDE** F: DUK9703 at 1.5 l in 220 l.
: **T** : **FUNGCIDE** P: Sportak 45 HF at 0.89 l in 220 l.
27-Apr-98 : B : 34.5% N at 460 kg.
12-May-98 : B : Opus at 1.0 l in 200 l.
05-Jun-98 : B : Corbel at 1.0 l in 200 l.
10-Aug-98 : B : Combine harvested.

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NOTES: (1) Plant samples were taken in February, April, May and July to assess and identify stem base diseases.
(2) Two plots of **CULTIVAR** B and one of **CULTIVAR** M were sown to Hereward due to a shortage of seed. These have been treated as missing values in the analysis.

GRAIN TONNES/HECTARE

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

FUNGCIDE	-	P	C	A	F	Mean
CULTIVAR						
L	9.13	9.73	9.44	10.69	8.84	9.56
B	9.61	9.83	9.52	9.81	9.80	9.72
M	8.68	8.97	8.07	9.43	8.86	8.80
S	8.44	8.78	9.32	10.16	9.34	9.21
Mean	8.96	9.33	9.09	10.02	9.21	9.32

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

CULTIVAR	**FUNGCIDE**	**CULTIVAR FUNGCIDE**
0.247	0.276	0.552

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	54	0.780	8.4

GRAIN MEAN DM% 89.7

PLOT AREA HARVESTED 0.00230

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98/W/CS/491

EFFICIENCY OF S FERTILIZERS

Object: To measure the effect of different forms of sulphur on yields of wheat and a subsequent rape crop - Woburn, Stackyard III.

Sponsors: F.J. Zhao, S.P. McGrath.

The first year, w. wheat.

Design: 4 randomised blocks of 4 x 2 + 1.

Plot dimensions: 4.0 x 12.0.

Treatments:-

1. **S FORM** Form of sulphur:

T+A	Tiger 90 and ammonium sulphate
AS	Ammonium sulphate
T90	Tiger 90
NAS	Sodium thiosulphate

2. **APP TIME** Time of application:

SB	To the seedbed
MAR	17-Mar-98

EXTRA

-	None

NOTE: Nitrogen fertilizer was applied to balance the nitrogen supplied by ammonium sulphate, this was 26 kg to the seedbed and to give a total of 180 kg N in March.

Experimental diary:

```
29-Sep-97 : B : Ploughed.
01-Oct-97 : B : Rolled.
02-Oct-97 : B : Rotary harrowed.
03-Oct-97 : T : APP TIME SB: Sulphur treatments applied to give 30 kg S.
          : T : Balancing nitrogen applied as 27% N.
03-Oct-97 : B : Riband, dressed Sibutol, drilled at 385 seeds per m².
13-Nov-97 : B : Stomp 400 SC at 2.0 l with Isoproturon 500 at 1.0 l and
                Cyperkill 10 at 0.25 in 200 l.
17-Mar-98 : T : APP TIME MAR: Sulphur treatments applied to give 30 kg S.
          : T : Balancing nitrogen applied as 27% N.
04-May-98 : B : Alto 100 SL at 0.6 l in 200 l.  Tripart Brevis at 1.5 l
                in 200 l.
31-May-98 : B : Opus at 0.8 l in 200 l.
12-Jun-98 : B : Folicur at 0.3 l with Bavistin DF at 0.3 kg in 200 l.
13-Aug-98 : B : Combine harvested.
```

Previous crops: W. rye 1996, potatoes 1997.

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98/W/CS/491

NOTE: Soils were sampled in October and August and analysed for sulphur.
Plants were sampled in April, July and August for sulphur and nitrogen.

GRAIN TONNES/HECTARE

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

APP TIME / S FORM	SB	MAR	Mean
T+A	9.41	8.98	9.19
AS	9.37	9.38	9.37
T90	9.11	9.15	9.13
NAS	9.19	9.30	9.24
Mean	9.27	9.20	9.24
EXTRA	9.37		

GRAND MEAN 9.25

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

S FORM	APP TIME	S FORM APP TIME & EXTRA
0.177	0.125	0.250

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	24	0.353	3.8

GRAIN MEAN DM% 87.9

PLOT AREA HARVESTED 0.00230

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98/R/CS/494

TAKE-ALL, PHIALOPHORA AND SEED TREATMENTS

Object: To test the effects in the field of a fungal antagonist of take-all (*Gaeumannomyces graminis*) and determine its interaction with a take-all-selective fungicide - Stackyard.

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

The first year, s. wheat.

Design: 4 randomised blocks of 18 plots.

Plot dimensions: 3.0 x 10.0.

Treatments: Combinations of:-

1. **TRT1998** Treatment to 1998 crop:

-8	None
P8	*Phialophora* inoculum to seedbed
T8	Take-all inoculum to seedbed

2. **TRT1999** Treatment to 1999 crop:

-9	None
P9	*Phialophora* inoculum to seedbed
T9	Take-all inoculum to seedbed

3. **TRT2000** Treatment to 2000 crop:

-0	None
P0	*Phialophora* inoculum to seedbed
S0	Seed treatment fungicide
PS0	*Phialophora* and seed treatment

Experimental diary:

31-Oct-97 : B : Ploughed.
30-Jan-98 : B : Barclay Gallup at 2.0 l with Chiltern Cropoil at 1.0 l in 200 l.
12-Feb-98 : B : Parable at 2.0 l with Scythe LC at 0.5 l and Luxon Non-Ionic Wetter at 0.1 l in 200 l.
16-Mar-98 : B : Heavy spring-tine cultivated.
17-Mar-98 : B : Spring-tine cultivated.
18-Mar-98 : **T** : **TRT1998** P8: Inoculum applied at 20 g per m^2. Rotary harrowed.
: **T** : **TRT1998** T8: Inoculum applied at 20 g per m^2. Rotary harrowed.
: B : Rotary harrowed, Axona, undressed, drilled at 400 seeds per m^2.
29-Apr-98 : B : 34.5% N at 380 kg.
05-May-98 : B : Ally at 30 g with MSS Optica at 2.0 l in 200 l.
04-Jun-98 : B : Corbel at 0.3 l with Opus at 0.3 l in 200 l.
12-Jun-98 : B : Topik at 125 ml with Chiltern Cropoil at 1.0 l in 200 l.

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Experimental diary:
28-Jun-98 : B : Bavistin DF at 0.3 kg with Radar at 0.25 l in 200 l.
02-Sep-98 : B : Combine harvested.

NOTE: Plant samples were taken in July to assess take-all and root colonisation by *Phialophora*.

GRAIN TONNES/HECTARE

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

TRT1998	
-8	7.02
P8	6.83
T8	5.81
Mean	6.63

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

TRT1998	
0.099	min.rep
0.089	max-min

	TRT1998
min.rep	P8 v T8
max-min	-8 v P8 or T8

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	66	0.313	4.7

GRAIN MEAN DM% 82.0

PLOT AREA HARVESTED 0.00229

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98/W/WW/1

WINTER WHEAT

FUNGICIDES AND TIMINGS

Object: To test some new fungicides on w. wheat - Woburn, Far Field II.

Sponsors: C. Peters.

Design: 3 randomised blocks of 3 x 4 + 1 plots

Plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1.	**FUNG 1**	Fungicides in April, growth stage (GS) 32:
	AF	Azoxystrobin at 150 g and epoxiconazole at 38 g
	KF	Kresoxim-methyl with epoxiconazole each at 94 g
	AKH	Azoxystrobin at 75 g with kresoxim-methyl at 50 g and epoxiconazole at 94 g
2.	**FUNG 2**	Fungicides in May/June, GS 39 and/or 55 and/or 61:
	AP39	Azoxystrobin at 200 g with flutriafol at 50 g at GS 39
	AP55	Azoxystrobin at 200 g with flutriafol at 50 g at GS 55
		Azoxystrobin at 200 g with flutriafol at 50 g at GS 39 and azoxystrobin at 100 g at GS 61
	0	Epoxiconazole at 125 g at GS 39

Plus Extra

EXTRA	
-	Epoxiconazole at 94 g at GS 32 and difenoconazole at 50 g at GS 61

Experimental diary:

19-Sep-97 : B : Ploughed.
01-Oct-97 : B : Rolled. Rotary harrowed. Hereward, dressed Sibutol, drilled at 325 seeds per m^2.
13-Nov-97 : B : Isoproturon 500 at 1.0 l with Stomp 400 SC at 2.0 l and Cyperkill 10 at 0.25 l in 200 l.
11-Feb-98 : B : 34.5% N at 145 kg.
19-Mar-98 : B : Phosyn Manganese at 2.0 l with Profol Copper at 0.25 l in 200 l.
30-Mar-98 : B : 34.5% N at 377 kg.
23-Apr-98 : **T** : **FUNG 1** AF: Amistar at 0.60 l with Opus at 0.30 l in 220 l.
: **T** : **FUNG 1** KF: Landmark at 0.75 l in 220 l.
: **T** : **FUNG 1** AKH: Amistar at 0.30 l with Landmark at 0.40 l and Opus at 0.35 l in 200 l.
: **T** : **EXTRA** -: Opus at 0.75 l in 200 l.
04-May-98 : B : Tripart Brevis at 2.0 l in 200 l.

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98/W/WW/1

Experimental diary:

```
   21-May-98 : B : Ally at 20 g in 200 l.
             : T : EXTRA -: Opus at 0.70 l in 220 l.
             : T : FUNG 2 AP39, APA: Amistar at 0.80 l with Pointer at
                   0.40 l in 220 l.
             : T : FUNG 2 0: Opus at 1.0 l in 220 l.
   01-Jun-98 : T : FUNG 2 AP55: Amistar at 0.80 l with Pointer at 0.40 l in
                   200 l.
   12-Jun-98 : T : FUNG 2 APA: Amistar at 0.40 l in 220 l.
             : T : EXTRA -: Plover 250 EC at 0.20 l in 220 l
   12-Aug-98 : B : Combine harvested.
```

Previous crops: W. wheat 1996, potatoes 1997.

GRAIN TONNES/HECTARE

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

FUNG 2 / FUNG 1	AP39	AP55	APA	0	Mean
AF	9.26	9.47	10.17	9.34	9.56
KF	9.55	9.75	9.74	8.97	9.50
AKH	9.55	9.86	10.50	9.11	9.76
Mean	9.45	9.69	10.14	9.14	9.61
EXTRA	8.82				

Grand mean 9.54

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

FUNG 1	FUNG 2	FUNG 1 FUNG 2 & EXTRA
0.114	0.132	0.228

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	24	0.279	2.9

GRAIN MEAN DM% 88.7

PLOT AREA HARVESTED 0.00230

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98/R/WW/2

WINTER WHEAT

WEED GROWTH AND DEVELOPMENT

Object: To study the growth and seed production of weeds in the presence and absence of a wheat crop - Pastures.

Sponsors: J.W. Cussans, P.J.W. Lutman.

Design: 4 randomised blocks of 7 plots.

Whole plot dimensions: 6.0 x 10.0.

Treatments:

CRP WEED	Crop and/or weed species:
WW	W. wheat
WCH	W. wheat and chickweed (*Stellaria media*)
WBG	W. wheat and black-grass (*Alopecurus myosuroides*)
WCL	W. wheat and cleavers (*Galium aparine*)
CH	Chickweed
BG	Black-grass
CL	Cleavers

Experimental diary:

11-Sep-97 : B : Harvest at 3.0 l in 300 l.
26-Sep-97 : B : Ploughed. Rolled.
06-Oct-97 : B : Rotary harrowed.
: **T** : **CRP WEED** WBG, BG: Black-grass broadcast.
: **T** : **CRP WEED** WCH, CH: Chickweed broadcast.
: **T** : **CRP WEED** WCL, CL: Cleavers broadcast.
: **T** : **CRP WEED** WW, WCH, WBG, WCL: Rotary harrowed, Consort, dressed Sibutol, drilled at 380 seeds per m^2.
24-Oct-97 : B : Tiger 90 at 15 kg.
21-Jan-98 : **T** : **CRP WEED** WW, WCH, WCL, CH, CL: Cheetah Super at 1.0 l in 220 l.
05-Feb-98 : **T** : **CRP WEED** BG, BGW, WW: Starane 2 at 1.0 l in 220 l.
13-Mar-98 : B : 34.5% N at 120 kg.
27-Apr-98 : B : Opus at 0.6 l with Tripart Brevis at 2.25 l in 200 l.
28-Apr-98 : B : 34.5% N at 460 kg.
15-May-98 : B : Bravo 500 at 1.0 l with Opus at 0.5 l in 200 l.
15-Jun-98 : B : Bavistin DF at 0.5 kg with Folicur at 0.5 l in 100 l.
06-Aug-98 : **T** : **CRP WEED** BG: Cut and stationary combined.
20-Aug-98 : **T** : **CRP WEED** WW, WCH, WBG, WCL: Combine harvested.
28-Aug-98 : **T** : **CRP WEED** CL: Combine harvested.

Previous crops: W. wheat 1996, s. beans 1997.

NOTE: Plant samples were taken regularly through the winter and spring to measure leaf and tiller numbers, green area and dry weight. Soil cores were taken in June to assess root distribution.

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98/R/WW/2

GRAIN TONNES/HECTARE

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

CRP	WEED
WW	11.77
WCH	9.02
WBG	6.19
WCL	11.45
Mean	9.61

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

CRP	WEED
	0.406

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	9	0.574	6.0

GRAIN MEAN DM% 86.4

PLOT AREA HARVESTED 0.00230

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98/R/WW/3

WINTER WHEAT

PLANT N INDICATORS

Object: To relate chlorophyll concentrations in individual leaves of w. wheat to nitrogen supply and crop yield - Pastures.

Sponsors: P.B. Barraclough.

Design: 3 randomised blocks of 18 plots.

Whole plot dimensions: 3.0 x 25.0.

Treatments:

NITROGEN Kg N and timing:

	Early March (GS 24)	Mid April (GS 31)	Mid May (GS 37)	Late May (GS 51)	Total
-	0	0	0	0	0
A	40	40	0	0	80
B	40	40	40	0	120
C	40	40	80	0	160
D	40	80	0	0	120
E	40	80	40	0	160
F	40	80	80	0	200
G	40	120	0	0	160
H	40	120	40	0	200
I	40	120	80	0	240
J	40	160	0	0	200
K	40	0	0	0	40
L	40	0	40	0	80
M	40	0	80	0	120
N	40	0	0	80	120
O	40	40	0	80	160
P	40	80	0	80	200
Q	40	120	0	80	240

Experimental diary:

11-Sep-97 : B : Harvest at 3.0 l in 300 l.
26-Sep-97 : B : Ploughed. Rolled.
06-Oct-97 : B : Rotary harrowed, Hereward, dressed Anchor, drilled at 380 seeds per m^2.
24-Oct-97 : B : Tiger 90 at 15 kg.
26-Nov-97 : B : Atlas Fieldgard at 5.0 l with MSS Optica at 0.7 l in 100 l.
13-Mar-98 : **T** : **NITROGEN** applied as 34.5% N (GS 24).
08-Apr-98 : **T** : **NITROGEN** applied as 34.5% N (GS 31).
27-Apr-98 : B : Opus at 0.6 l with Tripart Brevis at 2.25 l in 200 l.
05-May-98 : B : Ally at 20 g with Starane 2 at 0.7 l in 200 l.

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98/R/WW/3

Experimental diary:

15-May-98 : **T** : **NITROGEN** applied as 34.5% N (GS 37).
: B : Bravo 500 at 1.0 l with Opus at 0.5 l in 200 l.
19-May-98 : B : Irrigated 15 mm.
28-May-98 : **T** : **NITROGEN** applied as 34.5% N (GS 51).
15-Jun-98 : B : Bavistin DF at 0.5 kg with Folicur at 0.5 l in 100 l.
19-Aug-98 : B : Combine harvested.

Previous crops: W. wheat 1996, s. beans 1997

NOTE:

GRAIN TONNES/HECTARE

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

NITROGEN	
-	7.19
A	8.65
B	9.20
C	9.68
D	9.11
E	9.19
F	8.70
G	9.12
H	8.54
I	9.05
J	8.89
K	8.14
L	9.20
M	9.70
N	8.78
O	9.31
P	9.44
Q	8.35
Mean	8.90

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

NITROGEN
0.226

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	34	0.277	3.1

GRAIN MEAN DM% 88.1

PLOT AREA HARVESTED 0.00437

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98/R/WW/4

WINTER WHEAT

FUSARIUM STUDY

Object: To assess different inocula and inoculum sources on the development of ear blight in mist-irrigated or unirrigated w. wheat - Little Knott.

Sponsors: G.L. Bateman.

Design: 3 randomised blocks of 3 x 2 plots

Whole plot dimensions: 4.0 x 14.0.

Treatments:

1. **FUSARIUM** — *Fusarium* inocula:

U	None
FS	*F. culmorum* as spores
FG	*F. culmorum* as colonised grain

2. **MISTING**

-	None
M	Irrigated

Experimental diary:

17-Sep-97 : B : Scythe LC at 1.5 l with Vassgro Non Ionic at 100 ml in 200 l.
25-Sep-97 : B : Ploughed.
27-Sep-97 : B : Rolled.
06-Oct-97 : B : Rotary harrowed, Charger, dressed Beret Gold drilled at 380 seeds per m^2.
26-Nov-97 : B : Lexus Class WSB at 60 g in 200 l
18-Feb-98 : B : 34.5% N at 120 kg.
31-Mar-98 : **T** : **FUSARIUM** FG: Inoculum applied.
28-Apr-98 : B : 34.5% N at 460 kg.
09-May-98 : B : Ally at 15 g with Topik at 125 ml and Chiltern Cropoil at 1.0 l in 200 l.
18-May-98 : B : Terpal at 1.0 l with Headland Enhance LF at 40 ml in 200 l.
03-Jun-98 : **T** : **FUSARIUM** FS: Inoculation and mist irrigation begun.
13-Jun-98 : **T** : **FUSARIUM** FS: Inoculation and mist irrigation completed.
20-Aug-98 : B : Combine harvested.

Previous crops: W. wheat 1996, w. oats 1997

NOTES: (1) Mist irrigation was applied to pairs of plots in sequence between 03-Jun-98 and 13-Jun 98.
(3) Ear blight was assessed in June. Plant samples were taken in July to assess stem base diseases and isolation of fungal pathogens. Seeds were assessed at harvest for fungal infection.

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98/R/WW/4

GRAIN TONNES/HECTARE

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

MISTING	-	M	Mean
FUSARIUM			
U	7.12	6.84	6.98
FS	3.58	3.70	3.64
FG	6.68	6.38	6.53
Mean	5.79	5.64	5.72

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

FUSARIUM	MISTING	FUSARIUM MISTING
0.231	0.189	0.327

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	10	0.400	7.0

GRAIN MEAN DM% 86.2

PLOT AREA HARVESTED 0.00138

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98/R/WW/5

WINTER WHEAT

SEMIOCHEMICALS AND APHIDS

Object: To test semiochemicals on cereal aphids in autumn and spring migratory periods - Pastures.

Sponsors: L.E. Smart, B.J. Pye, L.J. Wadhams.

Design: 5 x 5 quasi-complete Latin square.

Whole plot dimensions: 6.0 x 6.0.

Treatments:

SEMIOCHM	Semiochemicals:
-	None
A	Methyl salicylate and nepetalactone
B	Methyl salicylate in autumn. Polygodial applied by electrostatic sprayer applied in October and twice in June
C	Camphor
D	AJH/8/158 at 50 g in 200 l applied in May and June

NOTE: Methyl salicylate, camphor and nepetalactone were applied as point sources in the centre of the plots from 21-Oct-98. AJH/8/158 is under commercial development, composition undisclosed.

Experimental diary:

11-Sep-97	B	Harvest at 3.0 l in 300 l.
26-Sep-97	B	Ploughed. Rolled.
06-Oct-97	B	Rotary harrowed, Consort, undressed, drilled at 380 seeds per m^2.
24-Oct-97	B	Tiger 90 at 15 kg.
27-Oct-97	**T**	**SEMIOCHM** B: Polygodial at 50 g ai in 10.4 l.
26-Nov-97	B	Atlas Fieldgard at 5.0 l with MSS Optica at 0.7 l in 100 l.
19-Feb-98	B	34.5% N at 120 kg.
27-Apr-98	B	Opus at 0.6 l with Tripart Brevis at 2.25 l in 200 l.
28-Apr-98	B	34.5% N at 460 kg.
05-May-98	B	Ally at 20 g with Starane 2 at 0.7 l in 200 l.
08-May-98	**T**	**SEMIOCHM** D: AJH/8/158 at 50 g ai in 200 l.
15-May-98	B	Bravo 500 at 1.0 l with Opus at 0.5 l in 200 l.
01-Jun-98	**T**	**SEMIOCHM** D: AJH/8/158 at 50 g ai in 200 l.
04-Jun-98	**T**	**SEMIOCHM** B: Polygodial at 50 g ai in 10.4 l.
15-Jun-98	B	Bavistin DF at 0.5 kg with Folicur at 0.5 l in 100 l.
19-Jun-98	**T**	**SEMIOCHM** B: Polygodial at 50 g ai in 10.4 l.
	T	**SEMIOCHM** D: AJH/8/158 at 50 g ai in 200 l.
19-Aug-98	**T**	Combine harvested.

Previous crops: Ley 1996, s. beans 1997.

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NOTE: Aphid populations were assessed on five occasions in October and November and weekly from mid-May to end of July.

GRAIN TONNES/HECTARE

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

SEMIOCHM

-	10.57
A	10.40
B	10.38
C	10.35
D	10.86
Mean	10.51

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

SEMIOCHM
0.257

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

Stratum	d.f.	s.e.	cv%
ROW.COL	12	0.407	3.9

GRAIN MEAN DM% 88.2

PLOT AREA HARVESTED 0.00138

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98/R/WW/8

WINTER WHEAT

SEED TREATMENTS AND FOLIAR DISEASES A

Object: To test new seed treatments on the control of take-all (*Gaeumannomyces graminis*) and foliar diseases of w. wheat - Highfield IV/Road Piece East.

Sponsors: G.L. Bateman, J.F. Jenkyn, R.J. Gutteridge.

Design: 4 randomised blocks of 3 x 8 + 1 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

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

S	30-Sep-97
O	20-Oct-97
N	13-Nov-97

2. **T** Seed treatment and foliar spray:

	Seed Treatment	Foliar Spray
-	None	None
-F2	None	F2
-F1F2	None	F1 and F2
9R1F2	CR21529 at 200 ml	F2
9R2F2	CR21529 at 300 ml	F2
9R3F2	CR21529 at 450 ml	F2
8R3F2	CR21528 at 450 ml	F2
BF2	Baytan	F2

Plus 1 extra plot:

3. **EXTRA**

PF2	Seedbed inoculated *Phialophora* and F2

F1 = Cyproconazole and prochloraz at growth stage (GS) 30-31 as Sportak Delta 460 HF and Tern 750 EC
F2 = Tebuconazole and azoxystrobin at GS 59 as Standon Tebuconazole and Amistar

NOTE: CR21528 and CR21529 and under commercial development, composition disclosed in confidence.

Experimental diary:
17-Sep-97 : B : Scythe LC at 3.0 l with Vassgro Non Ionic at 100 ml in 200 l.
24-Sep-97 : B : Ploughed and furrow pressed.

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Experimental diary:

30-Sep-97 : **T** : **EXTRA** PF2: Inoculum applied.
: **T** : **SOW DATE** S: Rotary harrowed, Hereward, dressed as treatment, drilled at 380 seeds per m^2.
20-Oct-97 : **T** : **SOW DATE** O: Rotary harrowed, Hereward, dressed as treatment, drilled at 380 seeds per m^2.
13-Nov-97 : **T** : **SOW DATE** N: Rotary harrowed, Hereward, dressed as treatment, drilled at 380 seeds per m^2.
13-Jan-98 : B : Lexus Class WSB at 60 g in 100 l.
13-Feb-98 : B : 34.5% N at 116 kg.
23-Mar-98 : **T** : **SOW DATE** S **T** -F1F2: Sportak Delta 460 HF at 1.0 l with Tern 750 EC at 0.5 l in 200 l.
16-Apr-98 : **T** : **SOW DATE** O, N **T** -F1F2: Sportak Delta 460 HF at 1.0 l with Tern 750 EC at 0.5 l in 220 l.
28-Apr-98 : B : 34.5% N at 460 kg.
08-May-98 : B : Ally at 20 g with Starane 2 at 0.5 l in 200 l.
12-May-98 : **T** : **T** -F2, -F1F2, 9R1F2, 9R2F2, 9R3F2, 8R3F2, BF2 and **EXTRA** PF2: Standon Tebuconazole at 0.5 l with Amistar at 0.5 l in 220 l.
11-Aug-98 : B : Combine harvested.

Previous crops: W. wheat 1996, w. wheat and barley 1997.

NOTE: Plant samples were taken in March for dry weights and disease assessments and in June for disease assessment. Patches of take-all were assessed in July.

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98/R/WW/8

GRAIN TONNES/HECTARE

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

T	-	-F2	-F1F2	9R1F2	9R2F2	9R3F2	8R3F2	BF2	Mean
SOW DATE									
S	6.96	8.29	7.50	8.15	8.14	7.91	8.27	7.50	7.84
O	7.65	7.98	8.85	9.27	8.64	8.58	8.48	8.43	8.48
N	7.97	8.87	9.17	9.04	8.55	8.52	8.60	8.29	8.63
Mean	7.53	8.38	8.51	8.82	8.44	8.34	8.45	8.07	8.32

EXTRA PF2 7.89

Grand mean 8.30

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

SOW DATE	**T**	**SOW DATE T & EXTRA**
0.174	0.285	0.493

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	72	0.697	8.4

GRAIN MEAN DM% 88.2

PLOT AREA HARVESTED 0.00228

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98/R/WW/9

WINTER WHEAT

SEED TREATMENTS AND FOLIAR DISEASES B

Object: To assess the effects of seed treatment and foliar fungicides on foliar diseases in the absence of take-all (*Gaeumannomyces graminis*)- Bones Close

Sponsors: G.L. Bateman, J.F. Jenkyn, R.J. Gutteridge.

Design: 4 randomised blocks of 3 x 8 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. **SOW DATE** Time of sowing:

S	25-Sep-97
O	20-Oct-97
N	13-Nov-97

2. **FUNG** Fungicide:

	Seed Treatment	Foliar Spray
-	None	None
-F2	None	F2
-F1F2	None	F1 and F2
9R1F2	CR21529 at 200 ml	F2
9R2F2	CR21529 at 300 ml	F2
9R3F2	CR21529 at 450 ml	F2
8R3F2	CR21528 at 450 ml	F2
BF2	Baytan	F2

F1 = Cyproconazole and prochloraz at growth stage (GS) 30-31 as Sportak Delta 460 HF and Tern 750 EC
F2 = Tebuconazole and azoxystobin at GS 59 as Standon Tebuconazole and Amistar

NOTE: CR21529 and CR21528 are under commercial development, composition disclosed in confidence.

Experimental diary:

26-Aug-97 : B : Ploughed and furrow pressed.
25-Sep-97 : **T** : **SOW DATE** S: Rotary harrowed, Hereward, dressed as treatment, drilled at 380 seeds per m^2.
20-Oct-97 : **T** : **SOW DATE** O: Rotary harrowed, Hereward, dressed as treatment, drilled at 380 seeds per m^2.
13-Nov-97 : **T** : **SOW DATE** N: Rotary harrowed, Hereward, dressed as treatment, drilled at 380 seeds per m^2.
28-Jan-98 : B : Amazon at 1.0 l in 200 l.
18-Feb-98 : B : 34.5% N at 120 kg.
17-Mar-98 : B : Ally at 20 g with MSS Optica at 1.0 l in 200 l.

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Experimental diary:

23-Mar-98 : **T** : **SOW DATE** S, **FUNG** -F1F2: Sportak Delta 460 HF at 1.0 l with Tern 750 EC at 0.5 l in 220 l.

16-Apr-98 : **T** : **SOW DATE** O, N, **FUNG** -F1F2: Sportak Delta 460 HF at 1.0 l with Tern 750 EC at 0.5 l in 220 l.

28-Apr-98 : B : 34.5% N at 460 kg.

12-May-98 : **T** : **FUNG** -F2, -F1F2, 9R1F2, 9R2F2, 9R3F2, 8R3F2, BF2: Standon Tebuconazole at 0.5 l with Amistar at 0.5 l in 220 l.

18-Aug-98 : B : Combine harvested.

Previous crops: W. cereal 1996, w. rape 1997

NOTE: Plant samples were taken in March for dry weights and in July for disease assessment.

GRAIN TONNES/HECTARE

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

SOW DATE / **FUNG**	S	O	N	Mean
-	7.68	8.05	8.37	8.03
-F2	8.54	8.54	9.19	8.76
-F1F2	9.07	9.37	9.52	9.32
9R1F2	8.77	8.72	8.98	8.82
9R2F2	8.87	8.66	8.87	8.80
9R3F2	9.01	8.58	9.05	8.88
8R3F2	8.37	8.73	8.21	8.44
BF2	8.63	8.07	8.68	8.46
Mean	8.62	8.59	8.86	8.69

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

SOW DATE	**FUNG**	**SOW DATE** **FUNG**
0.099	0.162	0.281

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	69	0.398	4.6

GRAIN MEAN DM% 87.2

PLOT AREA HARVESTED 0.00229

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98/R/WW/12

WINTER WHEAT

FOLIAR SPRAYS AND TAKE-ALL

Object: To test the efficacy of a novel material on the control of take-all (*Gaeumannomyces graminis*) in w. wheat - Highfield IV/Road Piece East.

Sponsors: J.F. Jenkyn, R. Gutteridge.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

TREATMNT	
-	None
ST	CGA 245704 seed treatment
SA	CGA 245704 foliar spray 12-Nov-97
SE	CGA 245704 foliar spray 25-Feb-98
SL	CGA 245704 foliar spray 31-May-98

NOTE: CGA 245704 is under commercial development, composition disclosed in confidence.

Experimental diary:

17-Sep-97 : B : Scythe LC at 3.0 l with Vassgro Non Ionic at 100 ml in 200 l.
24-Sep-97 : B : Ploughed and furrow pressed.
30-Sep-97 : B : Rotary harrowed, Hereward, dressed as treatment, drilled at 400 seeds per m^2.
12-Nov-97 : **T** : **TREATMNT** SA: CGA 245704 at 60 g in 200 l.
06-Jan-98 : B : Atlas Fieldgard at 2.6 l with Stomp 400 SC at 3.3 l in 200 l.
13-Feb-98 : B : 34.5% N at 116 kg. Grasp at 1.4 l with Isoguard at 2.0 l and Output at 0.75 l in 200 l.
25-Feb-98 : **T** : **TREATMNT** SE: CGA 245704 at 60 g in 200 l.
31-Mar-98 : **T** : **TREATMNT** SL: CGA 245704 at 60 g in 200 l.
28-Apr-98 : B : 34.5% N at 400 kg.
08-May-98 : B : Ally at 20 g with Starane 2 at 0.5 l in 200 l.
11-Aug-98 : B : Combine harvested.

Previous crops: W. wheat 1996, w. wheat and barley 1997.

NOTE: Plant samples were taken in November, March and June to assess root and stem base diseases.

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98/R/WW/12

GRAIN TONNES/HECTARE

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

TREATMNT	
-	7.63
ST	6.86
SA	7.64
SE	7.01
SL	7.59
Mean	7.34

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

TREATMNT
0.706

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.998	13.6

GRAIN MEAN DM% 89.8

PLOT AREA HARVESTED 0.00229

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98/R/WW/13

WINTER WHEAT

FUNGICIDE AND TIMINGS

Object: To test some new fungicides on w. wheat - Sawyers II.

Sponsors: C. Peters.

Design: 3 randomised blocks of 3 x 4 + 1 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. **FUNG 1** Fungicides in April, growth stage (GS) 32:

AF	Azoxystrobin at 150 g and epoxiconazole at 38 g
KF	Kresoxim-methyl with epoxiconazole each at 94 g
AKH	Azoxystrobin at 75 g with kresoxim-methyl at 50 g and epoxiconazole at 94 g

2. **FUNG 2** Fungicides in May/June, GS 39 and/or 55 and/or 61:

AP39	Azoxystrobin at 200 g with flutriafol at 50 g at GS 39
AP55	Azoxystrobin at 200 g with flutriafol at 50 g at GS 55
APA	Azoxystrobin at 200 g with flutriafol at 50 g at GS 39 and azoxystrobin at 100 g at GS 61
0	Epoxiconazole at 125 g at GS 39

Plus extra

EXTRA

-	Epoxiconazole at 94 g at GS 32 and difenoconazole at 50 g at GS 61

Experimental diary:

24-Sep-97 : B : PK as (0:20:32) at 1250 kg.
27-Sep-97 : B : Ploughed.
28-Sep-97 : B : Rolled.
29-Sep-97 : B : Rotary harrowed, Abbot, dressed Beret Gold, drilled at 380 seeds per m^2.
13-Jan-98 : B : Lexus Class WSB at 60 g in 100 l.
18-Feb-98 : B : 34.5% N at 120 kg.
23-Apr-98 : **T** : **EXTRA** -: Opus at 0.75 l in 200 l.
: **T** : **FUNG 1** AKH: Amistar at 0.30 l with Landmark at 0.40 l and Opus at 0.35 l in 220 l.
: **T** : **FUNG 1** AF: Amistar at 0.60 l with Opus at 0.30 l in 220 l.
: **T** : **FUNG 1** KF: Landmark at 0.75 l in 220 l.
28-Apr-98 : B : 34.5% N at 460 kg.
: B : Tripart Brevis at 2.25 l in 200 l.
21-May-98 : **T** : **EXTRA** -: Opus at 0.70 l in 220 l.

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98/R/WW/13

Experimental diary:

```
   21-May-98 : T : FUNG 2 0: Opus at 1.0 l in 220 l.
             : T : FUNG 2 AP39, APA: Amistar at 0.80 l with Pointer at
                   0.40 l in 220 l.
   01-Jun-98 : T : FUNG 2 AP55: Amistar at 0.80 l with Pointer at 0.40 l
                   in 220 l.
   12-Jun-98 : T : EXTRA -: Plover 250 EC at 0.20 l in 220 l.
             : T : FUNG 2 APA: Amistar at 0.40 l in 220 l.
   19-Aug-98 : T : Combine harvested.
```

Previous crops: Set-aside 1996, w. and s. beans and lupins 1997.

GRAIN TONNES/HECTARE

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

FUNG 2 / FUNG 1	AP39	AP55	APA	O	Mean
AF	9.45	10.28	10.28	9.35	9.84
KF	9.85	10.15	11.15	9.82	10.24
AKH	10.16	10.14	9.99	9.42	9.93
Mean	9.82	10.19	10.48	9.53	10.00
EXTRA	9.49				

Grand mean 9.96

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

FUNG 1	FUNG 2	FUNG 1 FUNG 2 & EXTRA
0.277	0.320	0.554

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	24	0.679	6.8

GRAIN MEAN DM% 88.5

PLOT AREA HARVESTED 0.00230

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98/R/BW/1

WINTER BARLEY

SEED TREATMENTS, WINTER BARLEY AND TAKE-ALL

Object: To investigate the effects of seed treatment fungicides on a site at risk of take-all (*Gaeumannomyces graminis*) - Harwoods Piece.

Sponsors: G.L. Bateman, J.F. Jenkyn, R.J. Gutteridge.

Design: 4 randomised blocks of 14 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

SEEDFUNG	Seed dressing and/or fungicidal sprays:
-	None
-F1F2	Undressed, fungicide at growth stage (GS) 30-31 and at GS 39
8R1	Dressed CR21528 at 200 ml
8R1F2	Dressed CR21528 at 200 ml and fungicide at GS 39
8R1F1F2	Dressed CR21528 at 200 ml, fungicide at GS 30-31 and at GS 39.
8R2	Dressed CR21528 at 300 ml
8R3	Dressed CR21528 at 450 ml
8R3F2	Dressed CR21528 at 450 ml and fungicide at GS 39
8R3F1F2	Dressed CR21528 at 450 ml, fungicide at GS 30-31 and at GS 39
9R1	Dressed CR21529 at 200 ml
9R2	Dressed CR21529 at 300 ml
9R3	Dressed CR21529 at 450 ml
FX	Dressed Ferrax
FXF1F2	Dressed Ferrax, fungicide at GS 30-31 and at GS 39

NOTE: CR21528 and CR21529 are under commercial development, composition disclosed in confidence.

Experimental diary:

23-Sep-97 : B : Ploughed and furrow pressed.
24-Sep-97 : B : Rolled.
29-Sep-97 : B : Rotary harrowed, Regina, dressed as treatment, drilled at 350 seeds per m^2.
12-Nov-97 : B : Stefes IPU 500 at 2.0 l with Stomp 400 SC at 2.0 l and Cyperkill 10 at 250 ml in 200 l.
13-Feb-98 : B : 34.5% N at 116 kg.
25-Feb-98 : B : Manganese sulphate at 3.0 kg with Tern 750 EC at 0.75 l in 200 l.
17-Mar-98 : **T** : **SEEDFUNG** -F1F2, 8R1F1F2, 8R3F1F2, FXF1F2: Sportak Delta 460 MF at 1.0 l with Tern 750 EC at 0.5 l in 220 l.
31-Mar-98 : B : Tripart Brevis at 2.3 l in 200 l.
27-Apr-98 : B : 34.5% N at 300 kg.

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98/R/BW/1

Experimental diary:
12-May-98 : **T** : **SEEDFUNG** -F1F2, 8R1F2, 8R1F1F2, 8R3F2, 8R3F1F2, FXF1F2:
Opus Team at 1.5 l in 220 l.
10-Jul-98 : B : Alpha Glyphogan at 3.0 l in 400 l.
20-Jul-98 : B : Combine harvested.

Previous crops: Set-aside 1996, s. wheat 1997.

NOTE: Plant samples were taken in March and June to assess diseases. Plant counts and dry weights were also taken in March.

GRAIN TONNES/HECTARE

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

SEEDFUNG	
-	7.78
-F1F2	9.88
8R1	8.33
8R1F2	9.37
8R1F1F2	10.08
8R2	8.23
8R3	8.40
8R3F2	9.82
8R3F1F2	10.08
9R1	8.28
9R2	8.67
9R3	7.88
FX	7.88
FXF1F2	9.73
Mean	8.89

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

SEEDFUNG
0.219

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	39	0.310	3.5

GRAIN MEAN DM% 89.5

PLOT AREA HARVESTED 0.00228

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98/R/BW/2

WINTER BARLEY

SEED TREATMENTS AND WINTER BARLEY

Object: To investigate the effects of seed treatment fungicides on a site not at risk from take-all (*Gaeumannomyces graminis*) - Appletree.

Sponsors: G.L. Bateman, J.F. Jenkyn, R.J. Gutteridge.

Design: 4 randomised blocks of 14 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

SEEDFUNG	Seed dressing and/or foliar fungicidal sprays:
-	None
-F1F2	Undressed, fungicide at growth stage (GS) 30-31 and GS 39
8R1	Dressed CR21528 at 200 ml
8R1F2	Dressed CR21528 at 200 ml and fungicide at GS 39
8R1F1F2	Dressed CR21528 at 200 ml and fungicide at GS 30-31 and GS 39
8R2	Dressed CR21528 at 300 ml
8R3	Dressed CR21528 at 450 ml
8R3F2	Dressed CR21528 at 450 ml and fungicide at GS 39
8R3F1F2	Dressed CR21528 at 450 ml and fungicide at GS 30-31 and GS 39
9R1	Dressed CR21529 at 200 ml
9R2	Dressed CR21529 at 300 ml
9R3	Dressed CR21529 at 450 ml
FX	Dressed Ferrax
FXF1F2	Dressed Ferrax and fungicide at GS 30-31 and GS 39

NOTE: CR21528 and CR21529 are under commercial development, composition disclosed in confidence.

Experimental diary:

24-Sep-97 : B : Ploughed.
25-Sep-97 : B : Rolled.
29-Sep-97 : B : Rotary harrowed, Regina, dressed as treatment, drilled at 350 seeds per m^2.
12-Nov-97 : B : Stefes IPU 500 at 2.0 l with Stomp 400 SC at 2.0 l and Cyperkill 10 at 250 ml in 200 l.
13-Feb-98 : B : 34.5% N at 116 kg.
25-Feb-98 : B : Manganese sulphate at 3.0 kg with Tern 750 EC at 0.75 l in 200 l.
17-Mar-98 : **T** : **SEEDFUNG** -F1F2, 8R1F1F2, 8R3F1F2, FXF1F2: Sportak Delta 460 HF at 1.0 l with Tern 750 EC at 0.5 l in 220 l.
20-Mar-98 : B : Stefes CCC 700 at 2.3 l in 200 l.
23-Apr-98 : B : 34.5% N at 300 kg.
04-May-98 : B : Grasp at 1.0 l with Output at 1.0 l in 200 l.

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98/R/BW/2

Experimental diary:
12-May-98 : **T** : **SEEDFUNG** -F1F2, 8R1F2, 8R1F1F2, 8R3F2, 8R3F1F2, FXF1F2:
Opus Team at 1.5 l in 220 l.
21-Jul-98 : B : Combine harvested.

Previous crops: Lupins 1996, linseed 1997.

NOTES: (1) Plant samples were taken in December, February, May and June for disease assessments, plant counts and dry weights were also taken in February.
(4) Because of a harvesting error, the yield of one plot with **SEEDFUNG** FXF1F2 was lost. An estimated value was used in the analysis.

GRAIN TONNES/HECTARE

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

SEEDFUNG	
-	4.81
-F1F2	6.66
8R1	5.00
8R1F2	6.62
8R1F1F2	6.68
8R2	5.34
8R3	5.01
8R3F2	6.40
8R3F1F2	7.12
9R1	5.14
9R2	4.87
9R3	5.26
FX	4.49
FXF1F2	6.97
Mean	5.74

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

SEEDFUNG
0.320

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	38	0.452	7.9

GRAIN MEAN DM% 88.0

PLOT AREA HARVESTED 0.00229

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98/R/RAW/1

WINTER OILSEED RAPE

GROWTH OF WEEDS AND RAPE

Object: To investigate factors influencing the vigour of winter rape grown in competition with chickweed and barley - Summerdells II.

Sponsors: P.J.W. Lutman.

Design: 48 plots single replicate.

Whole plot dimensions: 3.0 x 16.0.

Treatments: All singly and certain combinations of:

1. **BARL DEN** Barley (cultivar Gleam), target plants per m^2:

B0	0
B1	20
B2	40
B3	60
B4	80
B5	100
B6	120
B7	150
B8	180
B9	220
B10	260
B11	300
B12	400

2. **CHCK DEN** Chickweed (*stellaria media*), target plants per m^2:

C0	0
C1	30
C2	60
C3	90
C4	120
C5	150
C6	180
C7	220
C8	280
C9	340
C10	400
C11	600
C12	800

NOTE: B0.C0 combination was quadruplicated.

Experimental diary:

11-Aug-97 : B : Disced.
15-Aug-97 : B : Ploughed and furrow pressed.
01-Sep-97 : B : Rotary harrowed.

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Experimental diary:

01-Sep-97	**T**	Barley and chickweed seed broadcast as treatment.
	B	Apex, dressed Vitavax RS, drilled at 120 seeds per m^2.
24-Sep-97	B	Cyperkill 10 at 250 ml in 200 l.
29-Oct-97	**T**	**CHCK DEN** C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12 **BARL DEN** B0 **CHCK DEN** C0: Laser at 1.0 l with Atlas Adjuvant Oil at 1.8 l in 220 l.
	T	: **BARL DEN** B0 **CHCK DEN** C0: Clayton Metazachlor at 1.5 l in 220 l.
07-Nov-97	B	Punch C at 0.4 l in 200 l. Cyperkill 10 at 250 ml in 200 l.
04-Feb-98	B	34.5% N at 290 kg.
17-Feb-98	B	Folicur at 0.5 l in 200 l.
02-Mar-98	B	34.5% N at 350 kg.
27-Apr-98	B	Ronilan FL at 1.0 l in 200 l.
08-May-98	B	Fastac at 200 ml in 260 l.
15-Jul-98	B	Reglone at 3.0 l with Headland Enhance LF at 400 ml in 400 l.
24-Jul-98	B	Combine harvested.

Previous crops: W. wheat 1996, w. barley 1997.

NOTES: (1) Plant populations were assessed in autumn. Plant samples were taken in November, March, May and July to measure relative amounts of biomass. Number of rape flower heads were estimated in April and before harvest an assessment of lodging was made.

(2) The grain yields from all plots contained weed seeds. A sample weighing over 2 kg was taken from each plot. This sample was weighed before and after the removal of weed seeds. These figures were used to estimate the cleaned grain yield.

(3) Two plots were removed from the analysis; B8.C3 because of animal damage; B8.C10 because of severe early lodging.

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98/R/RAW/1

GRAIN TONNES/HECTARE

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

CHCK DEN / BARL DEN	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
B0	4.91	4.49	4.40	4.29	4.37	5.04	4.78	4.54	4.23	4.72	4.61	4.58	4.22
B1	4.47			4.53		4.03		4.58			4.49		
B2	4.79			4.47		4.41		3.91			3.48		
B3	5.11												
B4	4.92			5.16		4.52		4.62			3.93		
B5	4.76												
B6	4.41			3.27		3.87		3.87			3.76		
B7	4.51												
B8	5.25					3.60		4.11					
B9	4.37												
B10	5.56												
B11	4.60												
B12	5.00												

GRAIN MEAN DM% 88.7

CLEAN GRAIN TONNES/HECTARE, AFTER REMOVING WEED SEEDS

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

CHCK DEN / BARL DEN	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
B0	4.81	4.31	4.21	4.18	4.29	4.96	4.73	4.40	4.18	4.66	4.55	4.42	4.14
B1	3.73			4.40		3.87		4.25			4.37		
B2	3.94			4.17		4.29		3.61			3.26		
B3	3.48												
B4	4.69			4.73		4.29		4.29			2.62		
B5	4.09												
B6	4.12			2.96		2.90		2.92			2.45		
B7	4.07												
B8	4.19					2.60		2.60					
B9	3.85												
B10	5.11												
B11	3.96												
B12	3.91												

PLOT AREA HARVESTED 0.00301

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98/R/RAW/3

WINTER OILSEED RAPE

VARIETIES, FUNGICIDE AND DISEASE

Object: To study the development of light leaf spot (*Pyrenopeziza brassicae*) and stem canker (*Leptosphaeria maculans*) and to measure yield loss under various fungicide regimes - Summerdells II.

Sponsors: B.D.L. Fitt, J. Steed.

Design: 3 blocks of 10 plots split into 2.

Whole plot dimensions: 3.0 x 20.0.

Treatments:

Whole plots

1.	**FUNGCIDE**	Fungicide rate (kg) and timing:
	-	None
	R	Tebuconazole at 0.125 kg monthly October to April
	O	Tebuconazole at 0.25 kg in October
	N	Tebuconazole at 0.25 kg in November
	D	Tebuconazole at 0.25 kg in December
	OS	Tebuconazole at 0.125 kg in October and spring
	NS	Tebuconazole at 0.125 kg in November and spring
	DS	Tebuconazole at 0.125 kg in December and spring
	SF	Tebuconazole at 0.25 kg in spring
	FF	Tebuconazole at 0.25 kg during flowering

Sub plots

2.	**CULTIVAR**	Variety:
	B	Bristol
	C	Capitol

Experimental diary:

11-Aug-97 : B : Disced.
15-Aug-97 : B : Ploughed and furrow pressed.
29-Aug-97 : **T** : **CULTIVAR** B: Rotary harrowed, Bristol, dressed Lindex-Plus FS Seed Treatment, drilled at 120 seeds per m^2.
29-Aug-97 : **T** : **CULTIVAR** C: Rotary harrowed, Capitol, dressed Lindex-Plus FS Seed Treatment, drilled at 120 seeds per m^2.
24-Sep-97 : B : Cyperkill 10 at 250 ml in 200 l.
03-Oct-97 : B : Butisan S at 1.5 l in 200 l.
23-Oct-97 : **T** : **FUNGCIDE** R, OS: Folicur at 0.5 l in 260 l.
: **T** : **FUNGCIDE** O: Folicur at 1.0 l in 260 l.
07-Nov-97 : B : Cyperkill 10 at 250 ml in 200 l.
21-Nov-97 : **T** : **FUNGCIDE** R, NS: Folicur at 0.5 l in 200 l.
: **T** : **FUNGCIDE** N: Folicur at 1.0 l in 200 l.
14-Dec-97 : **T** : **FUNGCIDE** R, DS: Folicur at 0.5 l in 200 l.

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Experimental diary:

14-Dec-97 : **T** : **FUNGCIDE** D: Folicur at 1.0 l in 200 l.
23-Jan-98 : **T** : **FUNGCIDE** R: Folicur at 1.0 l in 220 l.
04-Feb-98 : B : 34.5% N at 290 kg.
19-Feb-98 : B : Laser at 0.75 l with Chiltern Cropoil at 1.0 l in 100 l.
25-Feb-98 : **T** : **FUNGCIDE** R: Folicur at 1.0 l in 220 l.
02-Mar-98 : B : 34.5% N at 350 kg.
20-Mar-98 : **T** : **FUNGCIDE** SF: Folicur at 1.0 l in 200 l.
20-Mar-98 : **T** : **FUNGCIDE** R: Folicur at 0.5 l in 200 l.
22-Apr-98 : **T** : **FUNGCIDE** FF: Folicur at 1.0 l in 200 l.
08-May-98 : B : Fastac at 200 ml in 260 l.
15-Jul-98 : B : Reglone at 3.0 l with Headland Enhance LF at 400 ml in 400 l.
22-Jul-98 : B : Combine harvested.

Previous crops: W. wheat 1996, w. barley 1997.

NOTE: Plant samples were taken monthly from October to July for disease assessments. Oil content and grain specific weight were measured at harvest.

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98/R/RAW/3

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

CULTIVAR	B	C	Mean
FUNGCIDE			
-	2.47	3.09	2.78
R	4.34	4.37	4.35
O	2.77	3.57	3.17
N	2.88	3.35	3.11
D	2.80	3.44	3.12
OS	3.29	3.98	3.63
NS	3.41	3.76	3.58
DS	3.37	3.93	3.65
SF	3.66	3.88	3.77
FF	3.47	3.70	3.59
Mean	3.25	3.71	3.48

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

FUNGCIDE	**CULTIVAR**	**FUNGCIDE CULTIVAR**
0.102	0.070	0.187

Except when comparing means with the same level(s) of **FUNGCIDE** 0.222

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP.SP	20	0.272	7.8

GRAIN MEAN DM% 88.2

SUB-PLOT AREA HARVESTED 0.00391

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98/R/RAW/5

WINTER OILSEED RAPE

STEM CANKER STUDY

Object: To test fungicidal spray programmes on two varieties of oilseed rape - Highfield V.

Sponsors: B.D.L. Fitt, J.E. Biddulph, J.S. West, R.H. Williams.

Design: 4 blocks of 5 plots split into 2 sub-plots.

Whole plot dimensions: 3.0 x 15.0.

Treatments:

1. **FUNGCIDE** Difenoconazole and carbendazim (as Plover 250 EC at 0.5 l and Campbell's Carbendazim 50% Flowable at 0.5 l):

-	None
S-F	Applied on five occasions
O-F	Applied on four occasions
N-F	Applied on three occasions
A	Applied on three occasions

2. **CULTIVAR**

C	Capitol
L	Lipton

Experimental diary:

25-Jul-97 : B : Disced.
14-Aug-97 : B : Ploughed and furrow pressed.
26-Aug-97 : **T** : Rotary harrowed, cultivars, undressed, drilled at 120 seeds per m^2. Rolled
17-Sep-97 : B : Butisan S at 1.5 l with Cyperkill 10 at 250 ml in 200 l.
24-Sep-97 : **T** : **FUNGCIDE** S-F: Fungicides applied in 200 l.
23-Oct-97 : **T** : **FUNGCIDE** S-F, O-F, A: Fungicides applied in 260 l.
07-Nov-97 : B : Cyperkill 10 at 250 ml in 200 l.
13-Nov-97 : **T** : **FUNGCIDE** A: Fungicides applied in 200 l.
26-Nov-97 : **T** : **FUNGCIDE** S-F, O-F, N-F: Fungicides applied in 200 l.
16-Jan-98 : **T** : **FUNGCIDE** S-F, O-F, N-F: Fungicides applied in 200 l.
04-Feb-98 : B : 34.5% N at 290 kg.
19-Feb-98 : B : Laser at 0.75 l with Chiltern Cropoil at 1.0 l in 100 l.
24-Feb-98 : **T** : **FUNGCIDE** S-F, O-F, N-F, A: Fungicides applied in 200 l.
02-Mar-98 : B : 34.5% N at 350 kg.
05-May-98 : B : Fastac at 200 ml in 200 l.
10-Jul-98 : B : Reglone at 3.0 l with Headland Enhance LF at 400 ml in 400 l.
19-Jul-98 : B : Combine harvested.

Previous crops W. wheat and barley 1996, w. barley 1997.

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98/R/RAW/5

NOTE: Plant samples were taken regularly through the growing season for disease assessments. Harvested grain was analysed for oil content.

GRAIN TONNES/HECTARE

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

CULTIVAR	C	L	Mean
FUNGCIDE			
-	1.78	2.30	2.04
S-F	2.53	2.92	2.72
O-F	2.55	2.77	2.66
N-F	2.53	3.14	2.84
A	2.86	2.44	2.65
Mean	2.45	2.71	2.58

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

	FUNGCIDE	**CULTIVAR**	**FUNGCIDE CULTIVAR**
	0.189	0.107	0.254
Except when comparing means with the same level(s) of **FUNGCIDE**			0.239

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.268	10.4
BLOCK.WP.SP	15	0.338	13.1

GRAIN MEAN DM% 83.1

SUB-PLOT AREA HARVESTED 0.00156

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98/R/RAW/6

WINTER OILSEED RAPE

WEEDS IN WINTER RAPE

Object: To study the competitive abilities of six broad leaved weeds in winter oilseed rape - Summerdells II.

Sponsors: P.J.W. Lutman.

Design: 3 blocks of (6 x 3) + 2 plots.

Whole plot dimensions: 3.0 x 16.0.

Treatments: All combinations of:-

1. **WEEDS**

VP	*Veronica persicae*
GA	*Galium aparine*
SM	*Stellaria media*
VA	*Viola arvensis*
PR	*Papaver rhoeas*
CB	*Capsella bursa-patoris*

2. **DENSITY**

L	Low
M	Medium
H	High

Plus extra

EXTRA

-	None (duplicated)

Experimental diary:

11-Aug-97 : B : Disced.
15-Aug-97 : B : Ploughed and furrow pressed.
02-Sep-97 : B : Rotary harrowed. Weed seeds broadcast as treatment. Rotary harrowed, Apex, dressed Vitavax RS, drilled at 120 seeds per m^2.
24-Sep-97 : B : Cyperkill 10 at 250 ml in 200 l.
29-Oct-97 : **T** : **EXTRA** -: Clayton Metazachlor at 1.5 l in 220 l.
30-Oct-97 : B : Laser at 1.0 l with Sprayprover at 1.8 l in 200 l.
07-Nov-97 : B : Punch C at 0.4 l in 200 l. Cyperkill 10 at 250 ml in 200 l.
04-Feb-98 : B : 34.5% N at 290 kg.
17-Feb-98 : B : Folicur at 0.5 l in 200 l.
02-Mar-98 : B : 34.5% N at 350 kg.
27-Apr-98 : B : Ronilan FL at 1.0 l in 200 l.
08-May-98 : B : Fastac at 200 ml in 260 l.

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98/R/RAW/6

Experimental diary:
15-Jul-98 : B : Reglone at 3.0 l with Headland Enhance LF at 400 ml in 400 l.
22-Jul-98 : B : Combine harvested.

Previous crops: W. wheat 1996, w. barley 1997.

NOTES: (1) Plant populations were assessed in October, December and March. Rape height and relative plant biomass was measured in January, April and June.
(2) Because of poor establishment the yield of one plot with **WEEDS** SM **DENSITY** H was lost. An estimated value was used in the analysis.
(3) *Capsella bursa-patoris* failed to establish. **WEEDS** CB plots were treated as **EXTRA** plots in the analysis.

GRAIN TONNES/HECTARE

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

DENSITY / **WEEDS**	L	M	H	Mean
VP	3.99	4.12	4.14	4.08
GA	4.03	4.14	4.05	4.07
SM	4.17	3.86	4.05	4.03
VA	3.69	4.02	4.17	3.96
PR	4.03	4.29	4.15	4.16
Mean	3.98	4.09	4.11	4.06

EXTRA 4.11

Grand mean 4.07

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

WEEDS	**DENSITY**	**WEEDS DENSITY**
0.108	0.084	0.187

SED for comparing **EXTRA** with any item in **WEEDS.DENSITY** table is 0.145

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	41	0.230	5.6

GRAIN MEAN DM% 91.8

PLOT AREA HARVESTED 0.00301

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98/R/RAW/8

WINTER OILSEED RAPE

PEST CONTROL IN WINTER RAPE

Object: To test conventional and novel pest control agents - Great Harpenden I.

Sponsors: B.J. Pye, L.E. Smart.

Design: 4 blocks of 3 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

PESTCONT

-	None
I	Deltamethrin
U	*Metarhizium anisopliae*

Experimental diary:

26-Aug-97 : B : Ploughed and furrow pressed. Rolled.
27-Aug-97 : B : Rotary harrowed, Apex, undressed, drilled at 120 seeds per m^2.
03-Oct-97 : B : Clayton Metazachlor at 1.5 l in 200 l.
14-Oct-97 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
22-Oct-97 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
27-Oct-97 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
29-Oct-97 : **T** : **PESTCONT** I: Decis at 500 g in 200 l.
07-Nov-97 : B : Punch C at 0.4 l in 200 l.
12-Nov-97 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
04-Feb-98 : B : 34.5% N at 290 kg.
17-Feb-98 : B : Folicur at 0.5 l in 200 l.
19-Feb-98 : B : Laser at 0.75 l with Chiltern Cropoil at 1.0 l in 100 l.
02-Mar-98 : B : 34.5% N at 350 kg.
27-Mar-98 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
02-Apr-98 : **T** : **PESTCONT** I: Decis at 500 g in 200 l.
08-Apr-98 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
17-Apr-98 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
27-Apr-98 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
16-Jul-98 : B : Reglone at 3.0 l with Headland Enhance LF at 400 ml in 400 l.
24-Jul-98 : B : Combine harvested.

Previous crops: S. barley 1996, w. wheat 1997.

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98/R/RAW/8

NOTE: Plant samples were taken in December and February to assess cabbage stem flea beetle and stem weevil damage. Raceme samples were taken in April to assess pollen beetle damage. Pod samples were taken in June to assess seed weevil damage.

GRAIN TONNES/HECTARE

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

PESTCONT	
-	4.24
I	4.46
U	4.07
Mean	4.26

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

PESTCONT
0.162

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	6	0.230	5.4

GRAIN MEAN DM% 90.9

PLOT AREA HARVESTED 0.00230

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98/W/RAS/1

SPRING OILSEED RAPE

DIAGNOSIS OF S DEFICIENCY

Object: To test sulphur fertilizer on spring oilseed rape - Woburn, Stackyard A II.

Sponsors: S.P. McGrath, M.M.A. Blake-Kalff, F. Zhao.

Design: 4 randomised blocks of 6 plots.

Whole plot dimensions: 3.0 x 12.0.

Treatments:

SULPHUR	Kg S:
S0	None
S1	5
S2	10
S3	20
S4	40
S5	80

Experimental diary:

29-Apr-98 : B : Rotary harrowed. Spring-tine cultivated. Rotary harrowed, Starlight, dressed Lindex Plus FS, drilled at 225 seeds per m^2.
05-May-98 : **T** : **SULPHUR** 5, 10, 20, 40, 80: Gypsum applied at 29, 57, 114, 228 and 457 kg respectively.
: B : 27% N at 370 kg.
12-May-98 : B : Cyperkill 10 at 250 ml in 200 l.
20-May-98 : B : Cyperkill 10 at 250 ml in 200 l.
12-Jun-98 : B : Cyperkill 10 at 250 ml in 200 l.
24-Aug-98 : B : Roundup Biactive at 3.0 l in 200 l.
02-Sep-98 : B : Combine harvested.

Previous crops: Mixed crops 1996 and 7.

NOTES: (1) Plant samples were taken in June, July and at harvest and analysed for sulphur and glutathione content.
(3) The yield of one plot, with **SULPHUR** S4 was lost because of damage caused while netting the experiment. An estimated value was used in the analysis.

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98/W/RAS/1

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

SULPHUR

S0	1.20
S1	1.34
S2	1.46
S3	1.67
S4	1.42
S5	1.53
Mean	1.44

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

SULPHUR
0.154

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	14	0.217	15.1

GRAIN MEAN DM% 80.2

PLOT AREA HARVESTED 0.00276

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98/R/LN/1

LINSEED

WINTER LINSEED DISEASES

Object: To assess the effects of diseases on the growth and yield of winter linseed by using fungicides to control them - Drapers.

Sponsors: B.D.L. Fitt.

Design: 3 blocks of 8 plots.

Plot dimensions: 3.0 x 15.0.

Treatments:

FUNGTIME	Fungicides and timing:
-	None
AF	Tebuconazole in autumn
BM	Benomyl mid-flowering
BMC	Benomyl mid-flowering and at capsule development
AM	Iprodione mid-flowering
AMC	Iprodione mid-flowering and at capsule development
CM	Iprodione with thiophanate-methyl mid flowering
CMC	Iprodione with thiophanate-methyl mid flowering and at capsule development

Experimental diary:

10-Sep-97 : B : PK as (0:20:32) at 1250 kg.
18-Sep-97 : B : Ploughed and rolled.
30-Sep-97 : B : Rotary harrowed, Oliver, dressed Prelude 20 LF, drilled at 950 seeds per m^2.
26-Nov-97 : **T** : **FUNGTIME** AF: Folicur at 0.5 l in 220 l.
19-Feb-98 : B : Laser at 0.75 l with Chiltern Cropoil at 1.0 l in 100 l.
16-Mar-98 : B : Ally at 30 g in 200 l.
20-Mar-98 : B : 34.5% N at 150 kg.
22-Apr-98 : B : Eagle at 30 g in 200 l.
27-Apr-98 : B : BASF Dimethoate 40 at 850 ml in 200 l.
29-May-98 : **T** : **FUNGTIME** BM, BMC: Benlate Fungicide at 1.1 kg in 220 l.
: **T** : **FUNGTIME** CM, CMC: Compass at 3.0 l in 220 l.
: **T** : **FUNGTIME** AM, AMC: Rovral Flo at 2.0 l in 220 l.
25-Jun-98 : **T** : **FUNGTIME** BMC: Benlate Fungicide at 1.1 kg in 220 l.
: **T** : **FUNGTIME** CMC: Compass at 3.0 l in 220 l.
: **T** : **FUNGTIME** AMC: Rovral Flo at 2.0 l in 220 l.
25-Jul-98 : B : Reglone at 3.0 l with Headland Enhance LF at 400 ml in 200 l.
05-Aug-98 : B : Combine harvested.

Previous crops: W. and s. beans 1996, s. wheat 1997.

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98/R/LN/1

NOTE: Disease assessments were made on eleven occasions through the growing season. At harvest thousand grain weights were measured and fungal pathogens on seeds were assessed.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

FUNGTIME	
-	0.53
AF	0.70
BM	1.32
BMC	1.17
AM	0.85
AMC	0.56
CM	1.08
CMC	1.20
Mean	0.93

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

FUNGTIME
0.088

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	14	0.108	11.6

GRAIN MEAN DM% 89.5

PLOT AREA HARVESTED 0.00276

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98/R/LN/3

LINSEED

FUNGICIDES AND SPRING LINSEED

Object: To test fungicidal spray programmes on spring linseed - Summerdells I.

Sponsors: B.D.L. Fitt.

Design: 2 blocks of 2 plots split into 3 x 3 + 3.

Plot dimensions: 3.0 x 15.0.

Treatments: All combinations of:-

1. **VARIETY**

A	Antares
J	Jupiter

Sub-plots

2. **FUNGCIDE** Target organism:

AL	*Alternaria*
BO	*Botrytis*
A+B	*Alternaria* and *Botrytis*

3. **TIMING** Fungicide timing:

MF	Mid-flowering
CD	Capsule development
F+C	Mid-flowering and capsule development

Plus two extra treatments

EXTRA

A	Antares with no fungicide (triplicated)
J	Jupiter with no fungicide (triplicated)

Experimental diary:

10-Sep-97 : B : PK as (0:20:32) at 1250 kg.
09-Oct-97 : B : Ploughed and furrow pressed.
16-Mar-98 : B : Parable at 3.0 l with Luxan Non-Ionic Wetter at 60 ml in 200 l.
29-Apr-98 : B : Spring-tine cultivated.
29-Apr-98 : **T** : **VARIETY** A, **EXTRA** A: Rotary harrowed, Antares, dressed Prelude 20 LF, drilled at 700 seeds per m^2.
29-Apr-98 : **T** : **VARIETY** J, **EXTRA** J: Rotary harrowed, Jupiter, dressed Vitavax RS, drilled at 700 seeds per m^2.
14-May-98 : B : Cyperkill 10 at 250 ml in 200 l.
01-Jun-98 : B : 34.5% N at 150 kg.

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Experimental diary:

```
   24-Jun-98 : B : Vindex at 1.0 l in 200 l.
   07-Jul-98 : T : TIMING MF, F+C, FUNGCIDE AL: Rovral Flo at 2.0 l in
                   220 l.
             : T : TIMING MF, F+C, FUNGCIDE BO: Benlate Fungicide at 1.1 kg
                   in 220 l.
             : T : TIMING MF, F+C, FUNGCIDE A+B: Compass at 3.0 l in 220 l.
   27-Jul-98 : T : TIMING CD, F+C, FUNGCIDE AL: Rovral Flo at 2.0 l in
                   220 l.
             : T : TIMING CD, F+C, FUNGCIDE BO: Benlate Fungicide at 1.1 kg
                   in 220 l.
             : T : TIMING CD, F+C, FUNGCIDE A+B: Compass at 3.0 l in 220 l.
   01-Sep-98 : B : Reglone at 3.0 l with Headland Enhance LF at 400 ml in
                   400 l.
   21-Sep-98 : B : Combine harvested.
```

Previous crops: Set-aside 1996, s. wheat 1997.

NOTE: Disease assessments were made on four occasions in July and August. Grain was assessed for specific weight and fungal pathogens.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

TIMING	MF	CD	F+C	Mean
FUNGCIDE				
AL	1.54	1.59	1.57	1.57
BO	1.94	1.75	2.00	1.90
A+B	2.03	1.78	2.08	1.96
Mean	1.84	1.71	1.88	1.81

VARIETY	A	J	Mean
FUNGCIDE			
AL	1.44	1.69	1.57
BO	1.80	1.99	1.90
A+B	1.91	2.02	1.96
Mean	1.72	1.90	1.81

VARIETY	A	J	Mean
TIMING			
MF	1.80	1.87	1.84
CD	1.59	1.83	1.71
F+C	1.76	2.01	1.88
Mean	1.72	1.90	1.81

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GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

TIMING	MF		CD		F+C	
VARIETY	A	J	A	J	A	J
FUNGCIDE						
AL	1.43	1.64	1.48	1.70	1.41	1.73
BO	1.89	1.99	1.65	1.86	1.88	2.12
A+B	2.09	1.97	1.64	1.92	1.98	2.17

EXTRA	A	J	Mean
	1.41	1.61	1.51

Grand mean 1.73

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

FUNGCIDE	**TIMING**	**VARIETY* FUNGCIDE**
0.073	0.073	0.103

VARIETY* TIMING	**FUNGCIDE TIMING**	**VARIETY* FUNGCIDE TIMING**	**EXTRA**
0.103	0.126	0.178	0.031

* Within the same level of **VARIETY** only

SED for comparing **EXTRA** A or J with any item in **VARIETY.FUNGCIDE.TIMING** table is 0.145 within the same level of **VARIETY** only

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP.SP	26	0.178	10.3

GRAIN MEAN DM% 89.8

PLOT AREA HARVESTED 0.00276

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98/R/TR/1

TURNIP RAPE

PEST CONTROL IN TURNIP RAPE

Object: To monitor pest infestation in turnip rape and their control with conventional and novel insecticides - Great Harpenden I.

Sponsor: B.J. Pye, L.E. Smart.

Design: 4 blocks of 3 plots.

Whole plot dimensions: 10.0 x 3.0.

Treatments:

PESTCONT	Pest control:	
	None	
	Insecticide (Decis)	
	Metarhizium anisopliae	

Experimental diary:

26-Aug-97 : B : Ploughed and furrow pressed. Rolled.
27-Aug-97 : B : Rotary harrowed, Salut undressed, drilled at 4.4 kg.
03-Oct-97 : B : Clayton Metazachlor at 1.5 l in 200 l.
14-Oct-97 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
22-Oct-97 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
27-Oct-97 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
29-Oct-97 : **T** : **PESTCONT** I: Decis at 0.5 kg in 200 l.
07-Nov-97 : B : Punch C at 0.4 l in 200 l.
12-Nov-97 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
17-Feb-98 : B : Folicur at 0.5 l in 200 l.
19-Feb-98 : B : Laser at 0.75 l with Chiltern Cropoil at 1.0 l in 100 l.
02-Mar-98 : B : 34.5% N at 350 kg.
27-Mar-98 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
02-Apr-98 : **T** : **PESTCONT** I: Decis at 0.5 kg in 200 l.
08-Apr-98 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
17-Apr-98 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
27-Apr-98 : **T** : **PESTCONT** U: *Metarhizium anisopliae* in 10 l.
16-Jul-98 : B : Reglone at 3.0 l with Headland Enhance LF at 400 ml in 400 l.
24-Jul-98 : B : Combine harvested.

Previous crops: S. barley 1996, w. wheat 1997.

NOTE: Plant samples were taken in December and February to assess cabbage stem flea beetle and stem weevil damage. Raceme samples were taken in April to assess pollen beetle damage. Pod samples were taken in June to assess seed weevil damage.

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98/R/TR/1

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

PESTCONT	
-	0.59
I	1.05
U	0.50
Mean	0.71

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

PESTCONT
0.139

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	6	0.196	27.7

GRAIN MEAN DM% 82.8

PLOT AREA HARVESTED 0.00230

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98/R/BES/2

SPRING BEANS

WEEDS AND WATER IN SPRING BEANS

Object: To investigate the effects of soil moisture on the competitive effects of weeds in beans - Fosters.

Sponsor: P.J.W. Lutman.

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

Whole plot dimensions: 3.0 x 10.0.

Treatments:

Whole plots

1. **IRRIGATN** Irrigation:

O	None
I	Irrigated

Sub-plots

2. **WEEDS**

-	None
M1	Mustard, low density
M2	Mustard, high density
O1	Oats, low density
O2	Oats, high density

Experimental diary:

27-Aug-97 : B : Ploughed and furrow pressed.
28-Jan-98 : B : Barclay Gallup at 1.5 l with Frigate at 0.5 l in 200 l.
13-Feb-98 : B : Parable at 1.5 l with Scythe LC at 0.5 l and Luxon Non-Ionic Wetter at 0.1 l in 200 l.
23-Mar-98 : B : Heavy spring-tine cultivated, rotary harrowed.
24-Mar-98 : B : Rotary harrowed, Alfred, undressed, drilled at 40 seeds per m^2.
24-Mar-98 : **T** : **WEEDS** M2: Emergo broadcast at 160 seeds per m^2.
: **T** : **WEEDS** M1: Emergo broadcast at 40 seeds per m^2.
: **T** : **WEEDS** O2: Dula broadcast at 160 seeds per m^2.
: **T** : **WEEDS** O1: Dula broadcast at 40 seeds per m^2.
08-Apr-98 : B : Draza at 5.5 kg.
14-Apr-98 : B : Doff Metaldehyde Slug Killer Mini Pellets at 15.0 kg.
22-Apr-98 : B : Cyperkill 10 at 250 ml in 200 l.
08-May-98 : B : Folio 575 SC at 2.0 l in 200 l.
: B : Fastac at 200 ml in 260 l.
14-May-98 : B : Cyperkill 10 at 250 ml in 200 l.
28-May-98 : B : Fastac at 200 ml in 200 l.
12-Jun-98 : B : Folio 575 SC at 2.0 l in 200 l.

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98/R/BES/2

Experimental diary:
19-Jun-98 : B : Aphox at 280 g in 200 l.
14-Sep-98 : B : Combine harvested.

Previous crops: W. rape 1996, w. wheat 1997

NOTES: (1) Plant populations were assessed in April. Plant samples of crop and weeds were taken in April to measure leaf area and dry weight. In June and July samples were taken to measure height and dry weight. At harvest weight of crop and weed seeds were recorded.
(2) Only irrigated plots were harvested.

GRAIN TONNES/HECTARE

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

WEEDS	
-	6.76
M1	5.26
M2	5.07
O1	5.21
O2	4.50
Mean	5.36

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

WEEDS
0.587

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	8	0.719	13.4

GRAIN MEAN DM% *

PLOT AREA HARVESTED 0.00020

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98/R/BES/3

SPRING BEANS

MUSTARD COMPETITION IN BEANS

Object: To study the effects of time of weed (mustard) emergence on the growth and yield of spring beans - Long Hoos I/II.

Sponsor: P.J.W. Lutman.

Design: 3 randomised blocks of 4 x 2 + 2 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

1. **DENSITY** Target population density, plants per m^2:

M1	40
M2	80
M3	160
M4	320

2. **SOW TIME** Date of sowing mustard:

S1	24-Mar-98 (with crop)
S2	07-Apr-98 (80 degree days after crop)

Extra plot

EXTRA	None (duplicated)

Experimental diary:

28-Aug-97 : B : Ploughed and furrow pressed.
28-Jan-98 : B : Barclay Gallup at 1.5 l with Frigate at 0.5 l in 200 l.
13-Feb-98 : B : Parable at 1.5 l with Scythe LC at 0.5 l and Luxon Non-Ionic Wetter at 0.1 l in 200 l.
23-Mar-98 : B : Heavy spring-tine cultivated. Rotary harrowed.
24-Mar-98 : **T** : **DENSITY** M1, M2, M3, M4 **SOW TIME** S1: Mustard seed broadcast.
: B : Rotary harrowed, Alfred, undressed, drilled at 40 seeds per m^2.
07-Apr-98 : **T** : **DENSITY** M1, M2, M3, M4 **SOW TIME** S2: Mustard seed broadcast.
08-Apr-98 : B : Draza at 5.5 kg.
14-Apr-98 : B : Doff Metaldehyde Slug Killer Mini Pellets at 15.0 kg.
22-Apr-98 : B : Cyperkill 10 at 250 ml in 200 l.
08-May-98 : B : Folio 575 SC at 2.0 l in 200 l. Fastac at 200 ml in 260 l.
14-May-98 : B : Cyperkill 10 at 250 ml in 200 l.
28-May-98 : B : Fastac at 200 ml in 200 l.
12-Jun-98 : B : Folio 575 SC at 2.0 l in 200 l.
19-Jun-98 : B : Aphox at 280 g in 200 l.

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98/R/BES/3

Experimental diary:
24-Jul-98 : B : Alto 240 EC at 330 ml with Bravo 500 at 1.5 l in 200 l.
14-Sep-98 : B : Combine harvested.

Previous crops: W. rape 1996, w. wheat 1997

NOTE: Emergence counts and cover assessments were made in April and May. Plants were sampled monthly May to September for dry weight and leaf area.

GRAIN TONNES/HECTARE

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

SOW TIME / **DENSITY**	S1	S2	Mean
M1	5.70	6.13	5.92
M2	5.55	5.64	5.59
M3	4.88	5.74	5.31
M4	4.34	5.47	4.91
Mean	5.12	5.75	5.43
EXTRA	6.71		

Grand mean 5.69

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

DENSITY	**SOW TIME**	**DENSITY SOW TIME**
0.327	0.231	0.463

SED for comparing **EXTRA** with any item in **DENSITY.SOW TIME** table is 0.401

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	19	0.567	10.0

GRAIN MEAN DM% *

PLOT AREA HARVESTED 0.00020

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98/R/BES/5

SPRING BEANS

INDUCTION AGENT AND SPRING BEANS

Object: To test in the field an 'induction agent' on the control of aphids in spring beans - Highfield VI.

Sponsor: B.J. Pye, J. Martin, L.E. Smart.

Design: 6 x 6 quasi-complete Latin square.

Whole plot dimensions: 6.0 x 6.0.

Treatments:

TREATMNT	Induction agent
C	None (triplicated)
R1	AJH/8/158 on 22-May-98
R2	AJH/8/158 on 22-May-98 and 01-Jun-98
R3	AJH/8/158 on 22-May-98 and 19-Jun-98

NOTE: Agent AJH/8/158 is under commercial development, composition undisclosed.

Experimental diary:

05-Nov-97 : B : Farmyard manure at 25 t.
07-Nov-97 : B : Ploughed.
06-Feb-98 : B : Rotary harrowed, Alfred, undressed, drilled at 40 seeds per m^2.
13-Feb-98 : B : Opogard 500 SC at 3.4 l in 200 l.
08-May-98 : B : Standon Bentazone at 1.5 l in 200 l. Folio 575 SC at 2.0 l in 200 l.
22-May-98 : **T** : **TREATMNT** R1, R2, R3: AJH/8/158 at 50 g in 200 l.
01-Jun-98 : **T** : **TREATMNT** R2: AJH/8/158 at 50 g in 200 l.
08-Jun-98 : B : Folio 575 SC at 2.0 l in 200 l.
19-Jun-98 : **T** : **TREATMNT** R3: AJH/8/158 at 50 g in 200 l.
16-Jul-98 : B : Bavistin DF at 0.5 l with Bravo 500 at 2.0 l in 200 l.
28-Aug-98 : B : Combine harvested.

Previous crops: W. barley 1996 and 1997.

NOTE: Aphid infestation was assessed weekly mid-May to end of June.

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98/R/BES/5

GRAIN TONNES/HECTARE

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

TREATMNT	
C	2.04
R1	2.10
R2	2.05
R3	1.99
Mean	2.04

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

TREATMNT	
0.358	min.rep
0.292	max-min

	TREATMNT
min.rep	Any of the remainder
max-min	C v any of the remainder

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

Stratum	d.f.	s.e.	cv%
ROW.COL	22	0.620	30.4

GRAIN MEAN DM% 80.2

PLOT AREA HARVESTED 0.00138

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98/R/LP/1

LUPINS

LUPIN GENOTYPES

Object: To assess the overwinter survival, crop structure, date of maturity and yield potential of new lines of winter lupins - Osier.

Sponsors: I.F. Shield, H.J. Stevenson.

Design: 3 blocks of 54 plots in an alpha design.

Whole plot dimensions: 2.0 x 4.5.

Treatments:

GENOTYPE	
51	G151
52	G152
53	G153
54	G154
55	G155
56	G156
57	G157
58	G158
59	G159
60	G160
61	G161
62	G162
63	G163
64	G164
65	G165
66	G166
67	G167
68	G168
69	G169
70	G170
71	G171
72	G172
73	G173
74	G174
75	G175
76	G176
77	G177
78	G178
79	G179
80	G180
81	G181
82	G182
83	G183
84	G184
85	G185
86	G186

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98/R/LP/1

GENOTYPE (continued)

87	G187
88	G188
89	G189
90	G190
91	G191
92	G192
93	G193
LU	Lucyane
AG	Agena
AR	Arthur

Experimental diary:

13-Aug-97 : B : Ploughed and furrow pressed.
04-Sep-97 : B : Spannit at 1.1 l in 200 l. Rotary harrowed.
: **T** : **GENOTYPE**: Genotypes drilled at 40 seeds per m^2.
: B : Rolled.
24-Sep-97 : B : Danadim Dimethoate 40 at 850 ml in 200 l.
27-Oct-97 : B : Checkmate at 1.75 l with Atlas Adjuvant Oil at 2.0 l in 200 l.
26-Nov-97 : B : Gesatop 500 SC at 2.5 l in 200 l.
18-Feb-98 : B : Folicur at 0.5 l in 200 l.
24-Feb-98 : B : Rovral Flo at 1.0 l in 200 l.
16-Mar-98 : B : Skirmish at 1.0 l in 200 l.
02-Apr-98 : B : Danadim Dimethoate 40 at 850 ml in 200 l.
20-May-98 : B : Folicur at 0.5 l in 200 l. Aphox at 280 g in 200 l.
12-Jun-98 : B : Alto 240 EC at 0.33 l with Bravo 500 at 1.5 l in 200 l.
20-Sep-98 : B : Combine harvested.

Previous crops: Industrial rape 1996, w. barley 1997.

NOTES: (1) Plant populations were assessed on five occasions. Apical dissections were made from October to March. Date of flowering and final main stem leaf numbers were noted. Plant heights were measured in February and August and in September the amount of lodging.

(2) Seed was severely infected with bean yellow mosaic virus which spread to most plants.

(3) The experiment was analysed as an alpha design and as a randomised block design. There was no appreciable difference and the randomised block design is presented.

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98/R/LP/1

GRAIN TONNES/HECTARE

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

GENOTYPE	
51	0.40
52	0.40
53	1.33
54	0.46
55	0.91
56	0.80
57	0.70
58	0.84
59	0.67
60	0.55
61	0.68
62	0.56
63	1.01
64	1.10
65	0.32
66	0.85
67	1.43
68	0.59
69	0.67
70	0.54
71	0.41
72	0.67
73	0.42
74	0.76
75	0.76
76	0.66
77	0.71
78	0.24
79	0.25
80	2.07
81	1.15
82	0.62
83	0.35
84	0.44
85	0.47
86	1.34
87	0.81
88	1.59
89	1.34
90	0.73
91	0.94
92	0.73
93	0.47
LU	1.10
AG	2.12
AR	1.30
Mean	0.85

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98/R/LP/1

GRAIN TONNES/HECTARE

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

GENOTYPE
0.315 min.rep
0.235 max-min

GENOTYPE
min.rep
max-min

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	114	0.385	45.2

GRAIN MEAN DM% 72.5

PLOT AREA HARVESTED 0.00084

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98/R/LP/2

LUPINS

LINES AND SOWING DATES

Object: To test the effect of sowing date on plant structure, light interception, dry matter accumulation and yield of seven lupin genotypes - Osier.

Sponsors: H.J. Stevenson, I. Shield, J.E. Leach, T. Scott.

Design: 3 randomised blocks of 8 plots.

Whole plot dimensions: 8.0 x 9.0.

Treatments:

LINE	Line	Seed dressing	Seed rate seeds per m^2	Sowing date
12S	DETN 12	undressed	40	15-Sep-97
20S	DETN 20	undressed	40	15-Sep-97
LDS	Ludet	Germipro	40	15-Sep-97
LYS	Lucyane	Germipro	40	15-Sep-97
LDM	Ludet	Germipro	80	10-Mar-98
LWM	Wodjil	undressed	80	10-Mar-98
AMM	Merritt	undressed	80	31-Mar-98
ATM	Tallerack	undressed	80	31-Mar-98

Experimental diary:

12-Aug-97 : B : Ploughed and furrow pressed.
15-Sep-97 : B : Flat rolled.
: **T** : **LINE** LYS, LDS, 12S, 20S: Rotary harrowed. Cultivars drilled as treatment. Rolled.
29-Sep-97 : **T** : **LINE** LDM, AMM, ATM, LWM: Rotary harrowed.
02-Oct-97 : **T** : **LINE** LDM, AMM, ATM, LWM: Harrowed, rotary harrowed.
03-Oct-97 : **T** : **LINE** LDM, AMM, ATM, LWM: Rotary harrowed, cultivars Lucyane, Ludet, DETN 12 and DETN 20 drilled as treatment.
27-Oct-97 : B : Stomp 400 SC at 5.0 l in 200 l.
26-Nov-97 : B : Gesatop 500 SC at 2.5 l in 200 l.
18-Feb-98 : B : Folicur at 0.5 l in 200 l.
24-Feb-98 : B : Rovral Flo at 1.0 l in 200 l.
05-Mar-98 : **T** : **LINE** LDM, LWM: Heavy spring-tine cultivated twice.
10-Mar-98 : **T** : **LINE** LDM, LWM: Rotary harrowed. Cultivars drilled as treatment.
16-Mar-98 : **T** : **LINE** LYS, LDS, 12S, 20S: Skirmish at 1.0 l in 220 l.
17-Mar-98 : **T** : **LINE** LWM, LDM: MSS Simazine 50 FL at 2.0 l in 220 l.
30-Mar-98 : **T** : **LINE** AMM, ATM: Heavy spring-tine cultivated. Rotary harrowed.
31-Mar-98 : **T** : **LINE** AMM, ATM: Cultivars drilled as treatment.
01-Apr-98 : **T** : **LINE** AMM, ATM: MSS Simazine 50 FL at 2.0 l in 220 l.
02-Apr-98 : B : Danadim Dimethoate 40 at 850 ml in 200 l.

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98/R/LP/2

Experimental diary:

27-Apr-98 : **T** : **LINE** LYS, LDS, 12S, 20S: Laser at 1.25 l with Chiltern Cropoil at 2.5 l in 220 l.
20-May-98 : B : Folicur at 0.5 l in 200 l. Aphox at 280 g in 200 l.
12-Jun-98 : B : Alto 240 EC at 0.33 l with Bravo 500 at 1.5 l in 200 l.
17-Sep-98 : **T** : **LINE** LYS, LDS, LWM: Combine harvested.
23-Sep-98 : **T** : **LINE** 12S, 20S: Combine harvested.

NOTES: (1) A sowing on the 02-Oct-97 failed to grow and was resown in spring.
(2) **LINE** LDM, AMM and ATM failed to produce a harvestable crop.
- **LINE** DETN 12 was severely infected by bean yellow mosaic.
- Apical dissections were made October to March (autumn sown) April to May (spring sown). Plant counts were taken on five (autumn) and three (spring) occasions. Dates of flowering and final main stem leaf numbers were noted. Branch and leaf numbers were counted, plant heights were measured. Degree of lodging was assessed and components of yield at harvest were measured.

Previous crops: Industrial rape 1996, w. barley and wheat 1997.

GRAIN TONNES/HECTARE

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

LINE	
12S	2.11
20S	2.72
LDS	3.04
LYS	2.48
LWM	1.65
Mean	2.40

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

LINE
0.357

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	8	0.438	18.2

GRAIN MEAN DM% 75.1

PLOT AREA HARVESTED .00207

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98/R/LP/3

LUPINS

POD DEVELOPMENT AND YIELD

Object: To monitor the role of nitrogen in pod abortion, development and yield. To determine the relationship between leaves and pods in supplying carbohydrate to the seed - Fosters West.

Sponsors: J.E. Leach, I.F. Shield.

Design: 2 randomised blocks of 2 plots split into 5.

Whole plot dimensions: 6.0 x 9.0.

Treatments:

Whole plots

1.	**IRRIGATN**	Irrigation:
	O	None
	I	Irrigated

Sub-plots

2.	**T**	Nitrogen or leaf removal:
	-	None
	SN	Spring nitrogen
	FN	Foliar nitrogen
	HR	Half leaves removed
	AR	All leaves removed

Experimental diary:

27-Aug-97 : B : Ploughed and furrow pressed.
12-Sep-97 : B : Rolled, rotary harrowed, DTN 20, undressed, drilled at 60 seeds per m^2. Rolled.
15-Sep-97 : B : Stomp 400 SC at 5.0 l in 200 l.
18-Sep-97 : B : Spannit at 1.1 l in 200 l.
05-Dec-97 : B : Gesatop 500 SC at 2.3 l in 200 l.
19-Feb-98 : B : Folicur at 0.5 l in 200 l.
24-Feb-98 : B : Rovral Flo at 1.0 l in 200 l.
16-Mar-98 : B : Skirmish at 1.0 l in 200 l.
02-Apr-98 : B : Danadim Dimethoate 40 at 850 ml in 200 l.
08-Apr-98 : **T** : **T** SN: 46% N at 217 kg.
30-Apr-98 : **T** : **T** SN: 46% N at 217 kg.
09-May-98 : B : Laser at 1.25 l with Chiltern Cropoil at 1.0 l in 200 l.
20-May-98 : B : Folicur at 0.5 l in 200 l. Aphox at 280 g in 200 l.
04-Jun-98 : **T** : **IRRIGATN** I: Irrigated 12 mm.
05-Jun-98 : **T** : **IRRIGATN** I: Irrigated 12 mm.
12-Jun-98 : B : Alto 240 EC at 0.33 l with Bravo 500 at 1.5 l in 200 l.
03-Jul-98 : **T** : **T** FN: 46% N at 32.6 kg in 220 l.
15-Jul-98 : **T** : **T** FN: 46% N at 32.6 kg in 220 l.

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98/R/LP/3

Experimental diary:

```
   22-Jul-98 : T : T HR, AR: Leaf removal started.
   23-Jul-98 : T : IRRIGATN: Irrigated 25 mm.
   24-Jul-98 : T : T FN: 46% N at 32.6 kg in 220 l.
   31-Jul-98 : T : T FN: 46% N at 32.6 kg in 220 l.
   07-Aug-98 : T : T HR, AR: Leaf removal finished.
   12-Aug-98 : T : IRRIGATN: Irrigated 20 mm.
   25-Sep-98 : B : Combine harvested.
```

Previous crops: W. rape 1996, w. wheat 1997.

NOTE: Plants were sampled regularly for biomass production and nitrogen content. Leaf and pod photosynthesis was measured regularly and light interception weekly. Flowering date was also noted.

GRAIN TONNES/HECTARE

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

T / IRRIGATN	-	SN	FN	Mean
O	3.50	3.05	3.12	3.34
I	3.04	2.77	2.90	2.96
Mean	3.27	2.91	3.01	3.15

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

T	IRRIGATN* T	
0.216	0.305	min.rep
0.176	0.249	max-min

* within the same level of **IRRIGATN** only

min.rep Any of the remainder
max-min - v any of the remainder

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP.SP	12	0.305	9.7

GRAIN MEAN DM% 69.9

SUB-PLOT AREA HARVESTED 0.00223

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98/R/LP/5

LUPINS

PESTS AND DISEASES

Object: To test methods of bean seed fly control, identify possible causes of plant blindness and identify the link between insect damage and fungal pathogens - Osier.

Sponsors: I.F. Shield, G.L. Bateman, H.J. Stevenson, J.V. Etheridge.

Design: 3 blocks of 12 plots.

Plot dimensions: 2.0 x 9.0.

Treatments:

PESTCONT

–	New seed undressed
2Y-	Two year old seed, undressed
–	One year old seed, undressed
YS	One year old seed, undressed, drilled into a stale seedbed
Y-C	One year old seed, undressed, plus chlorpyrifos at 1.0 l post drilling
Y-CI	One year old seed, undressed, plus chlorpyrifos at 1.0 l incorporated into seedbed
YCIF	One year old seed, undressed, plus chlorpyrifos at 1.0 l incorporated into seedbed then tebuconacole at 250 g in November
YG1	One year old seed dressed furathiocarb
YG2	One year old seed dressed imidacloprid
YX	One year old seed dressed bendiocarb
YD	One year old seed, dressed furathiocarb, then deltamethrin at 8.8 g at 2-4 leaf stage
YM	One year old seed, dressed furathiocarb, then dimethoate at 340 g at 2-4 leaf stage

Experimental diary:

12-Aug-97	B	Ploughed and furrow pressed.
	T	**PESTCONT** YS: Rotary harrowed.
26-Aug-97	**T**	**PESTCONT** YS: Scythe LC at 2.0 l in 220 l.
01-Sep-97	**T**	**PESTCONT** All except YS: Rotary harrowed.
02-Sep-97	**T**	**PESTCONT** Y-CI, YCIF: Spannit at 1.5 l in 220 l.
	B	Rotary harrowed. Lucyanne dressed as treatment, drilled at 40 seeds per m^2.
	T	**PESTCONT** Y-C: Spannit at 1.5 l in 220 l.
05-Sep-97	**T**	Stomp 400 SC at 5.0 l in 200 l.
29-Sep-97	**T**	**PESTCONT** YD: Decis at 300 ml in 220 l.
	T	**PESTCONT** YM: Atlas Dimethoate 40 at 850 ml in 220 l.
27-Oct-97	B	Checkmate at 1.75 l with Atlas Adjuvant Oil at 2.0 l in 200 l.
12-Nov-97	**T**	**PESTCONT** YCIF: Folicur at 1.0 l in 220 l.

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98/R/LP/5

Experimental diary:

```
26-Nov-97 : B : Gesatop 500 SC at 2.5 l in 200 l.
16-Mar-98 : B : Skirmish at 1.0 l in 200 l.
02-Apr-98 : B : Danadim Dimethoate 40 at 850 ml in 200 l.
20-May-98 : B : Folicur at 0.5 l in 200 l.  Aphox at 280 g in 200 l.
12-Jun-98 : B : Alto 240 EC at 0.33 l with Bravo 500 at 1.5 l in 200 l.
17-Sep-98 : B : Combine harvested.
```

Previous crops: Set-aside and industrial rape 1996, w. wheat and w. barley 1997.

NOTE: Apical dissections were made in December and January. Plant populations were assessed on six occasions. Bean seed fly and slug damage was assessed in September 97 and lodging in September 98.

GRAIN TONNES/HECTARE

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

PESTCONT	
-	0.76
2Y-	1.33
Y-	1.25
YS	1.78
Y-C	1.00
Y-CI	1.36
YCIF	1.44
YG1	1.30
YG2	1.72
YX	1.27
YD	1.20
YM	1.54
Mean	1.33

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

PESTCONT
0.355

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	22	0.435	32.7

GRAIN MEAN DM% 80.5

PLOT AREA HARVESTED 0.00134

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98/R/LP/6

LUPINS

FOLIAR DISEASES AND FUNGICIDES

Object: To test fungicides to control foliar diseases on lupins - Fosters West.

Sponsors: G.L. Bateman, J.V. Etheridge.

Design: 3 randomised blocks of (3 x 7) + 3.

Plot dimensions: 3.0 x 9.0.

Treatments: All combinations of:-

1. **FUNGCIDE** Fungicide:

C	Iprodione and thiophanate-methyl (Compass at 3.0 l in 220 l)
F	Tebuconazole (Folicur at 1.0 L in 220 l)
S	Prochloraz (Sportak 45 HF at 1.0 l in 220 l)

2. **TIMING**

1	07-Apr-98
2	05-May-98
3	01-Jun-98
12	1 + 2 as above
13	1 + 3 as above
23	2 + 3 as above
123	1 + 2 + 3 as above

Plus extra plots

EXTRA

-	None (triplicated)

Experimental diary:

27-Aug-97 : B : Ploughed and furrow pressed.
12-Sep-97 : B : Rolled. DTN 20 undressed, drilled at 60 seeds per m^2. Rolled.
15-Sep-97 : B : Stomp 400 SC at 5.0 l in 200 l.
18-Sep-97 : B : Spannit at 1.1 l in 200 l.
05-Dec-97 : B : Gesatop 500 SC at 2.3 l in 200 l.
16-Mar-98 : B : *Pleiochaeta setosa* inoculum applied. Skirmish at 1.0 l in 200 l.
02-Apr-98 : B : Danadim Dimethoate 40 at 850 ml in 200 l.
07-Apr-98 : **T** : **TIMING** 1, 12, 13, 123: Fungicides applied.
05-May-98 : **T** : **TIMING** 2, 12, 23, 123: Fungicides applied.
09-May-98 : B : Laser at 1.25 l with Chiltern Cropoil at 1.0 l in 200 l.
20-May-98 : B : Aphox at 280 g in 200 l.

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98/R/LP/6

Experimental diary:
01-Jun-98 : **T** : **TIMING** 3, 13, 23, 123: Fungicides applied.
24-Sep-98 : B : Combine harvested.

Previous crops: W. rape 1996, w. wheat 1997.

NOTES: (1) *Pleiochaeta* inoculum was on sterile oat grain applied at 200 kg.
(3) Assessments of brown rot were made in April, May and June. Rust was assessed in June and July. Harvested seed was examined for fungal infection.

GRAIN TONNES/HECTARE

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

TIMING	1	2	3	12	13	23	123	Mean
FUNGCIDE								
C	1.45	1.36	1.60	1.44	1.62	1.53	1.65	1.52
F	1.51	1.39	2.97	1.54	2.84	2.97	2.70	2.27
S	1.38	1.30	1.66	1.44	1.47	1.50	1.64	1.48
Mean	1.45	1.35	2.08	1.47	1.98	2.00	2.00	1.76

EXTRA 1.46

Grand mean 1.72

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

FUNGCIDE	**TIMING**	**FUNGCIDE TIMING**
0.052	0.080	0.138

SED for comparing - with any item in **TIMING.FUNGCIDE** table is 0.112

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	48	0.169	9.8

GRAIN MEAN DM% 77.2

AVERAGE PLOT AREA HARVESTED 0.00219

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98/R/LP/7

LUPINS

GENOTYPE, ROW SPACING AND SEED RATE

Object: To test seed rates and row spacings on the structure and yield of standard and new dwarf-determinate genotypes of lupins - Osier.

Sponsors: I.F. Shield, J.E. Leach.

Design: 3 blocks of (4 x 2 x 2) + 2 extra plots.

Whole plot dimensions: 8.0 x 9.0.

Treatments: All combinations of:-

1. **GENOTYPE**

LY	Lucyane dressed Germipro
LB	Ludet dressed Germipro
12	DTN 12 undressed
20	DTN 20 undressed

2. **ROW SPAC** Row spacing (cm):

R1	12.5
R2	37.5

3. **SEED RAT** Seed rate seeds per m^2:

S1	40
S2	80

Plus extra

EXTRA

X1	Ludet at 50 cm and 40 seeds per m^2
X2	DTN 20 at 50 cm and 40 seeds per m^2

Experimental diary:

12-Aug-97 : B : Ploughed and furrow pressed.
15-Sep-97 : B : Rolled. Rotary harrowed.
16-Sep-97 : **T** : Genotypes drilled as treatment.
18-Sep-97 : B : Rolled. Stomp 400 SC at 5.0 l with Spannit at 1.1 l in 200 l.
27-Oct-97 : B : Checkmate at 1.75 l with Atlas Adjuvant Oil at 2.0 l in 200 l.
26-Nov-97 : B : Gesatop 500 SC at 2.5 l in 200 l.
18-Feb-98 : B : Folicur at 0.5 l in 200 l.
24-Feb-98 : B : Rovral Flo at 1.0 l in 200 l.
16-Mar-98 : B : Skirmish at 1.0 l in 200 l.
02-Apr-98 : B : Danadim Dimethoate 40 at 850 ml in 200 l.
20-May-98 : B : Folicur at 0.5 l in 200 l. Aphox at 280 g in 200 l.

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98/R/LP/7

Experimental diary:
12-Jun-98 : B : Alto 240 EC at 0.33 l with Bravo 500 at 1.5 l in 200 l.
17-Sep-98 : **T** : **GENOTYPE** LY, LB: Combine harvested.
23-Sep-98 : **T** : **GENOTYPE** 12, 20: Combine harvested.

Previous crops: Set-aside and industrial rape 1996, w. wheat and w. barley 1997.

NOTE: Plant populations were counted after establishment and in April. Light interception was measured, plants were sampled to measure dry matter accumulation. Lodging was assessed before harvest and at harvest components of yield were measured.

GRAIN TONNES/HECTARE

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

ROW SPAC	R1	R2	Mean
GENOTYPE			
LY	1.91	2.22	2.07
LD	3.04	2.72	2.88
12	1.56	1.53	1.54
20	2.08	2.42	2.25
Mean	2.15	2.22	2.19

SEED RAT	S1	S2	Mean
GENOTYPE			
LY	1.99	2.14	2.07
LD	2.81	2.96	2.88
12	1.59	1.50	1.54
20	2.44	2.05	2.25
Mean	2.21	2.17	2.19

SEED RAT	S1	S2	Mean
ROW SPAC			
R1	2.23	2.06	2.15
R2	2.18	2.27	2.22
Mean	2.21	2.17	2.19

ROW SPAC	R1		R2	
SEED RAT	S1	S2	S1	S2
GENOTYPE				
LY	1.84	1.99	2.14	2.30
LD	3.10	2.98	2.52	2.93
12	1.57	1.56	1.60	1.45
20	2.43	1.72	2.45	2.39

EXTRA	X1	X2	Mean
	1.93	0.66	1.30

Grand mean 2.09

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98/R/LP/7

GRAIN TONNES/HECTARE

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

GENOTYPE	ROW SPAC	SEED RAT	GENOTYPE ROW SPAC
0.173	0.122	0.122	0.244

GENOTYPE SEED RAT	ROW SPAC SEED RAT	GENOTYPE ROW SPAC SEED RAT & EXTRA
0.224	0.173	0.345

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	34	0.423	20.3

GRAIN MEAN DM% 75.1

PLOT AREA HARVESTED **ROW SPAC** R1 0.00207
PLOT AREA HARVESTED **ROW SPAC** R2 0.00202
PLOT AREA HARVESTED **EXTRA** PLOTS 0.00225

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98/R/LP/8

LUPINS

HERBICIDE STUDY

Object: To assess the effects of herbicides on winter lupins - Osier.

Sponsors: H.J. Stevenson, I.F. Shield.

Design: 3 randomised blocks of 8 plots.

Whole plot dimensions: 4.0 x 9.0.

Treatments:

HERBCIDE	Herbicide and timing:		
	Pre-emergence	Autumn	Spring
-	None	None	None
SFP	Pendimethalin	Carbetamide and simazine	Isoxaben and terbuthylazine
S3	Pendimethalin	Carbetamide and simazine	Triasulfuron
S4	Pendimethalin	Carbetamide and simazine	Rimsulfuron
S5	Pendimethalin	Sethoxydim and simazine	Isoxaben and terbuthylazine
S6	Pendimethalin	Carbetamide, with diflufenican and simazine	Isoxaben and terbuthylazine
S7	Pendimethalin	Carbetamide, metazachlor with quinmerac and simazine	Isoxaben and terbuthylazine
S8	Pendimethalin	Carbetamide, carfentrazone-ethyl with flupyrsulfuron-methyl and simazine	Isoxaben and terbuthylazine

Experimental diary:

12-Aug-97 : B : Ploughed and furrow pressed.
15-Sep-97 : B : Rolled. Rotary harrowed. DTN 20, undressed, drilled at 40 seeds per m^2. Rolled.
16-Sep-97 : **T** : **HERBCIDE** SFP, S3, S4, S5, S6, S7, S8: Stomp 400 SC at 5.0 l in 220 l.
18-Sep-97 : B : Spannit at 1.1 l in 200 l.
12-Nov-97 : **T** : **HERBCIDE** SFP, S3, S4: Carbetamex at 3.0 kg with MSS Simazine 50 FL at 2.3 l in 220 l.
: **T** : **HERBCIDE** S5: MSS Simazine 50 FL at 2.3 l with Checkmate at 1.75 l and Atlas Adjuvant Oil at 0.10 l in 220 l.
: **T** : **HERBCIDE** S6: Diflufenican at 0.10 l as Amazon TP with Carbetamex at 3.0 kg and MSS Simazine 50 FL at 2.3 l in 220 l.
: **T** : **HERBCIDE** S7: Carbetamex at 3.0 kg with Katamaran at 2.0 l and MSS Simazine 50 FL at 2.3 l in 220 l.

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Experimental diary:

```
   12-Nov-97 : T : HERBCIDE S8: Carbetamex at 3.0 l with Lexus Class WSB
                       at 60 g and MSS Simazine 50 FL at 2.3 l in 220 l.
   18-Feb-98 : B : Folicur at 0.5 l in 200 l.
   24-Feb-98 : B : Rovral Flo at 1.0 l in 200 l.
   16-Mar-98 : T : HERBCIDE SFP, S5, S6, S7, S8: Skirmish at 1.0 l in
                       220 l.
   02-Apr-98 : B : Danadim Dimethoate 40 at 850 ml in 200 l.
   27-Apr-98 : T : HERBCIDE S3: Logran 20 WG at 19 g in 220 l.
             : T : HERBCIDE S4: Titus at 50 g with Luxon Non-Ionic Wetter
                       at 0.3 l in 220 l.
   20-May-98 : B : Folicur at 0.5 l in 200 l.  Aphox at 280 g in 200 l.
   12-Jun-98 : B : Alto 240 EC at 0.33 l with Bravo 500 at 1.5 l in 200 l.
   23-Sep-98 : B : Combine harvested.
```

Previous crops: Industrial rape 1996, w. barley 1997.

NOTE: Plant populations were assessed on four occasions. Biomass was measured on three occasions. Lodging was assessed in September.

GRAIN TONNES/HECTARE

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

HERBCIDE	
-	2.34
SFP	2.86
S3	2.64
S4	1.38
S5	2.86
S6	2.57
S7	2.79
S8	2.28
Mean	2.46

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

HERBCIDE
0.442

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	14	0.541	22.0

GRAIN MEAN DM% 70.8

PLOT AREA HARVESTED 0.00207

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98/R/M/5

MIXED 5

EFFECTS OF BEHAVIOUR MODIFYING CHEMICALS

Object: To test insect behaviour modifying chemicals on oilseed rape and to provide an attractive trap crop; turnip rape - Great Harpenden I.

Sponsor: L.E. Smart, J. Martin.

Design: 6 x 6 quasi-complete Latin square.

Whole plot dimensions: 9.0 x 9.0.

Treatments:

CROPCHEM	Crop, chemical and timing:
-	Oilseed rape, no chemical
A	Oilseed rape, 0.5% Agral in 200 l applied 22-Oct-97, 29-Oct-97, 13-Nov-97. AJH/8/158 at 50 g in 10.4 l 25-Feb-98, 31-Mar-98
B	Oilseed rape, 2-Phenylethyl isothiocyanate point source
C	Oilseed rape, (Z)-3-hexen-1-0L point source
D	Oilseed rape, 5-hexenitrile in autumn, phenylacetonitrile in spring, point sources
TR	Turnip rape, no chemical

NOTE: AJH/8/158 is under commercial development, composition undisclosed.

Experimental diary:

26-Aug-97 : B : Ploughed and furrow pressed. Rolled.
27-Aug-97 : **T** : **CROPCHEM** -, A, B, C, D: Rotary harrowed, Apex, undressed, drilled at 120 seeds per m^2.
27-Aug-97 : **T** : **CROPCHEM** TR: Salut, undressed, broadcast at 8.8 kg.
03-Oct-97 : B : Clayton metazachlor at 1.5 l in 200 l.
22-Oct-97 : **T** : **CROPCHEM** A: Agral at 1.0 l in 200 l.
29-Oct-97 : **T** : **CROPCHEM** A: Agral at 1.0 l in 200 l.
07-Nov-97 : B : Punch C at 0.4 l in 200 l.
13-Nov-97 : **T** : **CROPCHEM** A: Agral at 1.0 l in 200 l.
04-Feb-98 : B : 34.5% N at 290 kg.
17-Feb-98 : B : Folicur at 0.5 l in 200 l.
19-Feb-98 : B : Laser at 0.75 l with Chiltern Cropoil at 1.0 l in 100 l.
25-Feb-98 : **T** : **CROPCHEM** A: AJH/8/158 at 50 g in 10.4 l.
02-Mar-98 : B : 34.5% N at 350 kg.
31-Mar-98 : **T** : **CROPCHEM** A: AJH/8/158 at 50 g in 10.4 l.
27-Apr-98 : B : Ronilan FL at 1.0 l in 200 l.
16-Jul-98 : B : Reglone at 3.0 l with Headland Enhance LF at 400 ml in 400 l.
24-Jul-98 : B : Combine harvested.

Previous crops: S. barley 1996, w. wheat 1997.

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NOTES: (1) Plant samples were taken in December and February to assess cabbage stem flea beetle and stem weevil damage. Raceme samples were taken in April and May to assess for pollen beetle damage. Pod samples were taken in May and June to assess seed weevil damage.
(4) The yield of one plot of **CROPCHEM** A was lost because of a combine error. An estimated value was used in the analysis.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

CROPCHEM	
-	4.34
A	4.19
B	4.41
C	4.34
D	4.39
TR	1.64
Mean	3.89

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

CROPCHEM
0.124

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

Stratum	d.f.	s.e.	cv%
ROW.COL	19	0.215	5.5

GRAIN MEAN DM% 89.6

PLOT AREA HARVESTED 0.00207

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METEOROLOGICAL RECORDS 1998 - ROTHAMSTED

(Departure from 30-year means in brackets)

MONTH	Total sunshine: hours		Mean temperature: °C Air(1)		Dew point	In ground under grass 30cm	100cm
JAN	62	(+10)	4.8	(+1.7)	3.0	5.7	7.4
FEB	117	(+52)	6.4	(+3.2)	3.7	5.7	6.5
MAR	76	(-30)	7.3	(+2.1)	5.0	7.5	7.4
APR	102	(-36)	7.7	(+0.1)	5.3	9.1	8.5
MAY	205	(+18)	12.7	(+1.8)	9.0	12.9	10.7
JUN	156	(-35)	14.4	(+0.5)	12.4	15.2	13.0
JUL	180	(-9)	15.7	(-0.2)	11.8	16.6	14.5
AUG	232	(+53)	16.3	(+0.4)	11.8	16.9	15.5
SEP	139	(-1)	15.0	(+1.5)	12.5	15.5	15.0
OCT	88	(-16)	10.3	(-0.1)	8.6	12.4	13.6
NOV	68	(+3)	5.3	(-0.7)	3.3	7.6	10.2
DEC	38	(-9)	5.5	(+1.5)	3.5	6.2	7.9
YEAR*	1463	0	10.1	(+1.0)	7.5	10.9	10.9

MONTH	Ground frosts (2)	Total rainfall:mm 12.7cm (5 in) gauge		Rain days (3)	Drainage through 50.8cm (20 in) soil:mm	Wind km per hour (4)
JAN	17	70	(+5)	13	59	10.1
FEB	15	9	(-39)	7	0	7.5
MAR	11	63	(+6)	12	30	8.1
APR	9	115	(+62)	25	74	6.7
MAY	2	20	(-33)	8	0	4.9
JUN	1	103	(+46)	22	30	4.3
JUL	0	39	(-8)	12	4	4.9
AUG	0	29	(-25)	9	0	4.0
SEP	0	130	(+75)	14	65	4.8
OCT	5	115	(+50)	21	77	9.5
NOV	17	81	(+17)	18	67	4.7
DEC	14	68	(-1)	21	56	7.4
YEAR*	91	842	(+154)	182	462	6.4

30-year means are for the period 1961-90

(1) Mean of maximum and minimum

(2) Number of nights grass min. was below 0.0°C

(3) Number of days rainfall was 0.2 mm or more

(4) At 2 metres above ground level

*Mean or total

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METEOROLOGICAL RECORDS 1998 - WOBURN

(Departure from 30-year means in brackets)

Mean temperature: °C

MONTH	Total sunshine: hours		Air (1)		Dew point	In ground under grass 30 cm	100 cm	Ground frosts (2)	Total rainfall: mm 12.7 cm (5in) gauge		Rain days (3)	Wind km per hour (4)
JAN	46	(-3)	5.2	(+1.8)	3.0	5.3	7.7	15	54	(+2)	16	9.4
FEB	112	(+53)	7.2	(+3.7)	3.7	6.0	6.9	13	8	(-32)	5	7.2
MAR	70	(-33)	7.6	(+2.1)	5.0	7.6	7.8	9	51	(-1)	16	5.9
APR	103	(-26)	7.8	(+0.2)	5.3	9.0	8.8	10	124	(+74)	25	3.1
MAY	190	(+11)	12.6	(+1.6)	9.0	13.7	10.9	5	14	(-40)	10	8.4
JUN	126	(-58)	14.5	(+0.5)	11.3	15.8	13.3	1	113	(+58)	21	4.0
JUL	150	(-30)	15.9	(-0.1)	11.1	17.0	14.7	0	29	(-20)	11	3.9
AUG	225	(+56)	16.1	(+0.3)	11.3	17.8	15.7	1	25	(-33)	11	3.6
SEP	111	(-24)	15.0	(+1.4)	12.0	15.4	15.1	0	103	(+52)	17	3.0
OCT	80	(-21)	10.5	(+0.1)	8.2	11.7	13.6	5	103	(+47)	24	8.2
NOV	54	(-7)	5.3	(-1.0)	3.5	6.7	10.4	17	70	(+14)	14	3.4
DEC	36	(-7)	5.6	(+1.3)	3.5	5.5	8.1	14	58	(-1)	20	7.4
YEAR*	1303	(-90)	10.3	(+1.0)	7.2	11.0	11.1	90	751	(+119)	190	5.1

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