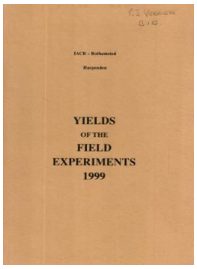
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ROTHAMSTED RESEARCH

Yields of the Field Experiments 1999

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Default Title

Rothamsted Research

Rothamsted Research (2000) *Default Title ;* Yields Of The Field Experiments 1999, pp 0 - 172 **- DOI: https://doi.org/10.23637/ERADOC-1-34**

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IACR – Rothamsted

Harpenden

YIELDS
OF THE
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EXPERIMENTS
1999

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YIELDS

OF THE

FIELD

EXPERIMENTS

1999

This report is produced by members of the Statistics and Crop and Weed Science 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 2000

IACR receives grant-aided support from the Biotechnology and Biological Science Research Council of the United Kingdom.

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CONVENTIONS 1999

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.

Fertilizers

27% N or 34.5% N means N as ammonium nitrate.

46% N means N as urea.

Triple superphosphare contains 47% P_2O_5.

Muriate of potash contains 60% K_2O.

Ashlade Nu Trace	5% magnesium and 1% copper
Manganese sulphate	27% manganese and 24% sulphur
Marshland Liquid Manganese Complex	150 g/l manganese, 7.5 g/l magnesium oxide (4.5 g/l Mg) and 223.6 g/l sulphur trioxide (89.4 g/l S)
Phosyn Manganese	150 g/l manganese
Profol Copper 500	500 g/l copper
Profol RM	5% boron, 7% manganese, 0.4% molybdenum, 13.3% magnesium oxide (8% Mg) and 36.3% sulphur trioxide (14.5% S)
Resistim	10.9% w/w potassium and 6.3% w/w phosphorus combined with natural betaines
Rhodoman	A seed dressing containing manganese
Tiger 90	90% sulphur
Thiovit	80% sulphur
Vytel Manganese	6.4% manganese

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

Cereal straw is removed unless otherwise stated.

https://doi.org/10.23637/ERADOC-1-34

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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.
GS: Growth stage.
tm): Tank mix; two or more products applied together.
tr.: means seed dressing.

Machinery definitions as used in the diary.

Accord	Pneumatic drill with Suffolk coulters 12.5 cm apart.
Carrier	Drill with rigid tines 11.5 cm apart.
Combine drilled	Drill mounted behind a rotary harrower.
Fiona	Drill with Suffolk coulters 12 cm apart
Flexitine	Heavy spring-tine cultivator.
Nodet Gougis	Pneumatic precision drill with variable spacing.
Nordsten	Drill with Suffolk coulters 12 cm apart.
Oyjord	Drill with Suffolk coulters 14.2 cm apart.
Shakerator	Deep tine cultivator with vibrating tines 60 cm apart and 45 cm deep.
Subsoiler	Deep tine cultivator with vibrating tines 60 cm apart and 45 cm deep

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, CAB International and The British Crop Protection Council. CABI Publishing

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
Ally	H	20 % w/w metsulfuron-methyl
Alpha Glyphogan	H	360 g/l glyphosate
Alpha Simazine 50 SC	H	500 g/l simazine
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
Astix	H	600 g/l mecoprop-P
Atlas Chlormequat 700	GR	700 g/l chlormequat
Avadex BW Granular	H	10 % w/w tri-allate
Basagran SG	H	87 % w/w bentazone
BASF 3C Chlormequat 720	GR	720 g/l chlormequat
Bavistin DF	F	50 % w/w carbendazim
Baytan Flowable	F	22.5:187.5 g/l fuberidazole + triadimenol
Benlate Fungicide	F	50 % benomyl
Beret Gold	F	25 g/l fludioxonil
Bravo 500	F	500 g/l chlorothalonil
Bullet	H	150:264 g/l cyanazine + pendimethalin
Butisan S	H	500 g/l metazachlor
Carbetamex	H	70 % w/w carbetamide
Chiltern IPU	H	500 g/l isoproturon
Clayton Metazachlor	H	500 g/l metazachlor
Codacide Oil	AD	95 % emulsifiable vegetable oil
Compass	F	167:167 g/l iprodione + thiophanate-methyl
Corbel	F	750 g/l fenpropimorph
Cropoil	AD	99 % highly refined mineral oil
Cyperkill 10	I	100 g/l cypermethrin
Decis	I	25 g/l deltamethrin
Decoy	M,I	2 % w/w methiocarb
Doff Agricultural Slug Killer with Animal Repellant	M	6 % w/w metaldehyde
Dorin	F	125:375 g/l triadimenol + tridemorph
Dow Shield	H	200 g/l clopyralid
Draza	M,I	4 % w/w methiocarb
Duplosan	H	600 g/l mecoprop-P
Eagle	H	75 % w/w amidosulfron
Enhance	AD	900 g/l alkyl phenol ethylene oxide condensate with silicone anti-foaming agent

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TRADE NAME	FUNCTION	ACTIVE INGREDIENT
Ensign	F	300:150 g/l fenpropimorph + kresoxim-methyl
Evict	I	100 g/l tefluthrin
Fastac	I	100 g/l alpha-cypermethrin
Folicur	F	250 g/l tebuconazole
Folio 575 SC	F	500:75 g/l chlorothalonil + metalaxyl
Fusilade 250 EW	H	250 g/l fluazifop-P-butyl
Garlon 2	H	240 g/l triclopyr
Genamin	AD	An experimental adjuvant
Germipro	F	175:350 g/l carbendazim + iprodione
Gesaprim	H	500 g/l atrazine
Gesaprim 500 SC	H	500 g/l atrazine
Gesatop 500 SC	H	500 g/l simizane
Grasp	H	250 g/l tralkoxydim
Hallmark	I	50 g/l lamda-cyhalothrin
Hardy	M	6 % w/w metaldehyde
Harvest	H	150 g/l glufosinate-ammonium
Hawk	H	12:383 g/l clodinafop-propargyl + trifluralin
Hydraguard	F,I	533:200 g/l gamma-HCH + thiram
Hy-TL	F	225:300 g/l thiabendazole + thiram
Imazamox	H	40 g/l imazamox
Isoguard	H	500 g/l isoproturon
Katamaran	H	350:100 g/l metazachlor + quinmerac
Kerb 50 W	H	50 % w/w propyzamide
Jockey	F	100 g/l fluquinconazole
Landmark	F	125:125 g/l epoxiconazole + kersoxim-methyl
Laser	H	200 g/l cycloxydim
LI-700	AD	350:100:350 g/l modified soya lecithin + alkylphenylhydroxypolyoxyethyle + propionic acid
Lindex-Plus FS Seed Treatment	F,I	545:43:73 g/l gamma-HCH + fenpropimorph + thiram
Liberty	H	125 g/l glufosinate-ammonium
Lo-Gran 20 WG	H	20 % w/w triasulfuron
Mantra	F	125:150:125 g/l epoxiconazole + fenpropimorph + keroxim-methyl
Mesurol	M,I	methiocarb seed treatment
Mon 37500	H	experimental herbicide containing sulfosulfuron
Opogard 500 SC	H	150:350 g/l terbuthylazine + terbutryn
Opus	F	125 g/l epoxiconazole
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
Platform S	H	1.5: 60 % w/w carfentrazone-ethyl + mecoprop-P
Plover 250 EC	F	250 g/l difenoconazole
Prelude 20 LF	F	200 g/l prochloraz
Punch C	F	125:250 g/l carbendazim + flusilazole

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TRADE NAME	FUNCTION	ACTIVE INGREDIENT
Quantum	H	50 % w/w tribenuron-methyl
Raxil S	F	20:20 g/l 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 iprodione
Rovral Liquid FS	F	500 g/l iprodione
Setter 33	H	50:237:43 g/l benazolin + 2,4-DB + MCPA
Sibutol	F	375:23 g/l biteranol + fuberidazole
Sipcam UK Rover 500	F	500 g/l chlorothalonil
Spannit	A,I	480 g/l chlorpyrifos
Sportak 45 EW	F	450 g/l prochloraz
Sprayprover	AD	92 % highly refined mineral oil
Starane 2	H	200 g/l fluroxypyr
Stefes Cypermethrin 2	I	100 g/l cypermethrin
Stefes C-Flo 2	F	500 g/l carbendazim
Sting CT	H	120 g/l glyphosate
Sting ECO	H	120 g/l glyphosate
Stomp 400 SC	H	400 g/l pendimethalin
Swipe 560 EC	H	56:56:224 g/l bromoxynil + ioxynil + mecoprop-P
Sypex	GR	305:155 g/l chlormequat + 2-chloroethylphosphonic acid
Thiram	F	thiram seed dressing
Tolkan Liquid	H	500 g/l isoproturon
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
Vitavax RS	F,I	45:675:90 g/l carboxin + gamma-HCH + thiram

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99/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 156th 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 74-98/R/BK/1.

Areas harvested:

	Section	
Wheat:	0	0.00351
	1	0.00645
	2,3,5 and 6	0.00533
	8 and 9	0.00561
Oats:	4	0.01390
Maize:	7	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
17N0+3FH	17	N2(A)	N2 2(P K (Na) Mg)	N0+3 2(PK Mg)+(A)
18N1+3FH	18	P K Na Mg(A)	N2 2(P K (Na) Mg)	N1+3 2(PK Mg)+(A)
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 2(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: Full rate P K (Na) Mg as above H: Half rate of above

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/W33	9/W41	O/W48	8/W5	6/W22	5/W3	3/W2	7/M	4/O	2/W1
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	F	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
1989	W	W	W	W	W	W	W	P	F	W
1990	W	W	W	W	W	F	W	W	P	W

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99/R/BK/1

SECTION

Section	1	9	0*	8+	6**	5	3	7	4	2
Year										
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
1999	W	W	W	W	W	W	W	M	O	W

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:
22-Sep-98 : **T** : P applied.
23-Sep-98 : **T** : K and Mg applied.
24-Sep-98 : **T** : Na applied.
12-Oct-98 : B : Ploughed.
30-Oct-98 : B : Decoy at 8.0 kg.
15-Jul-99 : B : Hand rogued wild oats.
Cropped sections:
W. wheat:
20-Aug-98 : **T** : Straw chopped (section 0 only), straw baled (sections 1, 3, 4, 5, 6, 7, 8 and 9).
23-Sep-98 : **T** : Autumn N applied.
25-Sep-98 : **T** : Farmyard manure applied.
30-Oct-98 : **T** : Rotary harrowed, Hereward, tr. Sibutol and Evict, drilled at 400 seeds per m^2 with the Nordsten drill.
11-Mar-99 : **T** : Isogard at 1.0 l with Unite A at 0.125 l, Unite B at 1.0 l and Cropoil at 1.0 l in 200 l (except section 8).
01-Apr-99 : **T** : Spring N treatments applied.
15-Apr-99 : **T** : Opus at 0.7 l in 200 l (except section 6).
14-May-99 : **T** : Ally at 30 g in 200 l (except section 6).
27-May-99 : **T** : Opus at 0.75 l and Sipcam UK Rover 500 at 1.0 l in 100 l (except section 6).
18-Jun-99 : **T** : Folicur at 0.25 l in 100 l (except section 6).
05-Jul-99 : **T** : Corbel at 0.75 l in 200l.
23-Jul-99 : **T** : Alpha Glyphogan at 4.0 l in 200 l (except section 6).
04-Aug-99 : **T** : Combine harvested.

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99/R/BK/1

Experimental diary:

W. oats

30-Oct-98 : **T** : Rotary harrowed, Image, tr. Anchor, drilled at 350 seeds per m^2 with the Nordsten drill.
11-Mar-99 : **T** : Isogard at 1.0 l with Unite A at 0.125 l, Unite B at 1.0 l and Cropoil at 1.0 l in 200 l.
14-May-99 : **T** : Ally at 30 g in 200 l.
05-Jul-99 : **T** : Corbel at 0.75 l in 200 l.
04-Aug-99 : **T** : Combine harvested.

Forage maize:

11-Mar-99 : **T** : Isogard at 1.0 l with Unite A at 0.125 l, Unite B at 1.0 l and Cropoil at 1.0 l in 200 l.
01-May-99 : **T** : Sting CT at 4.0 l in 200 l.
05-May-99 : **T** : N treatments applied. Flexitined three times, rotary harrowed, Hudson, tr. Mesurol, drilled at 11 seeds per m^2 with the Nodet Gougis drill.
05-Jul-99 : **T** : Barclay Mutiny at 2.4 l in 200 l.
20-Sep-99 : **T** : Hand harvested.

W. WHEAT

GRAIN TONNES/HECTARE

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

SECTION / PLOT	2/W1	3/W2	5/W3	8/W5	6/W22	1/W33	9/W41	0/W48
01DN4PK	10.07	9.58	8.78	*	8.49	*	*	*
21DN2	9.52	8.07	7.79	5.46	8.01	7.59	7.82	6.67
22D	6.47	3.98	5.23	2.61	4.23	4.78	4.57	3.63
030	1.32	1.40	1.12	0.91	1.11	0.81	0.93	0.82
05F	1.59	1.48	1.12	1.55	1.03	1.17	1.19	1.08
06N1F	4.26	3.05	2.72	1.13	2.88	3.03	3.14	3.19
07N2F	6.97	4.80	5.14	1.77	4.74	5.19	5.19	5.04
08N3F	9.00	5.67	5.60	1.42	4.34	4.80	6.41	4.72
09N4F	9.74	7.31	7.19	4.59	6.32	7.07	6.91	6.93
10N2	6.31	1.02	3.18	0.97	0.77	1.58	1.23	1.29
11N2P	6.76	4.28	2.39	1.06	1.63	2.92	2.54	3.45
12N2PNA	6.74	4.02	2.28	1.25	2.85	2.50	3.41	3.97
13N2PK	6.17	4.47	4.65	1.23	4.71	4.70	5.62	4.69
14N2PKMG	6.72	3.90	4.50	1.15	4.92	5.46	5.42	4.80
15N5F	9.10	6.87	7.11	1.19	6.02	7.59	8.27	7.39
16N6F	9.93	7.31	7.12	1.83	7.19	8.01	7.61	7.87
17N0+3FH	8.62	6.17	6.77	3.18	6.15	6.39	6.91	6.60
18N1+3FH	8.96	6.52	6.58	2.97	6.39	5.73	6.56	6.19
19C	1.72	1.61	1.97	1.13	0.97	1.45	1.11	1.52
20NKMG	*	*	*	*	*	1.86	*	2.28

GRAIN MEAN DM% 86.5

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99/R/BK/1 W. WHEAT

STRAW TONNES/HECTARE

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

SECTION PLOT	2/W1	6/W22	1/W33	9/W41
01DN4PK	7.96	*	*	*
21DN2	7.56	3.81	5.20	3.34
22D	4.12	2.08	3.20	2.33
030	0.42	0.36	0.51	0.30
05F	0.77	0.34	1.04	0.57
06N1F	2.63	1.02	2.02	1.41
07N2F	4.19	2.08	2.69	1.27
08N3F	4.85	0.87	2.44	1.89
09N4F	5.25	2.48	3.66	2.95
10N2	3.12	*	0.76	*
11N2P	3.23	*	1.53	*
12N2PNA	3.26	*	1.47	*
13N2PK	3.29	*	2.58	*
14N2PKMG	3.15	*	3.18	*
15N5F	4.81	2.09	3.96	1.66
16N6F	5.94	1.65	4.59	3.07
17N0+3FH	4.01	*	3.14	*
18N1+3FH	4.46	*	2.92	*
19C	0.62	*	0.69	*
20NKMG	*	*	1.99	*

STRAW MEAN DM% 85.1

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99/R/BK/1 W. OATS

GRAIN TONNES/HECTARE

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

PLOT	GRAIN	STRAW
01(D)(N4)PK	3.05	1.69
21(D)(N2)	3.55	1.28
22(D)	3.33	1.47
030	1.06	0.33
05F	1.16	0.44
06(N1)F	1.54	0.51
07(N2)F	1.52	0.51
08(N3)F	1.35	0.49
09(N4)F	1.20	0.51
10(N2)	1.33	0.41
11(N2)P	1.15	0.42
12(N2)PNA	1.00	0.31
13(N2)PK	0.68	0.21
14(N2)PKMG	0.93	0.33
15(N5)F	0.73	0.25
16(N6)F	1.43	0.54
17(N1)+3FH	1.54	0.57
18N0+3FH	1.81	0.70
19C	1.25	0.38

GRAIN MEAN DM% 84.1

STRAW MEAN DM% 81.5

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

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99/R/BK/1 MAIZE

WHOLE CROP (100% DM) TONNES/HECTARE

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

PLOT	WHOLE CROP
01DN4PK	20.15
21DN2	17.07
22D	14.73
030	2.79
05F	1.94
06N1F	5.65
07N2F	11.62
08N3F	14.83
09N4F	16.81
10N2	7.63
11N2P	7.25
12N2PNA	7.85
13N2PK	9.57
14N2PKMG	9.98
15N5F	16.30
16N6F	14.28
17N3FH	15.20
18N3FH	15.68
19C	3.10

CROP MEAN DM% 26.2

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99/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 148th year, s. barley.

For previous years see 'Details' 1967 and 1973, Station Report for 1966 and 74-98/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	-	-

Form of N: A sulphate of ammonia: N nitrate of soda - each to supply 48 kg N: C castor meal to supply 96 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

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99/R/HB/2

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.

Experimental diary:

17-Nov-98 : B : Roundup at 2.0 l in 200 l.
06-Jan-99 : **T** : P and K applied.
07-Jan-99 : **T** : Farmyard manure and Si applied.
11-Jan-99 : B : Ploughed.
12-Jan-99 : B : Ploughing completed.
08-Feb-99 : B : Spring-tine cultivated.
12-Feb-99 : B : Rotary harrowed, Cooper, tr. Raxil S, drilled at 350 seeds per m^2.
30-Apr-99 : **T** : N applied.
06-May-99 : B : Punch C at 0.4 l in 200 l.
15-May-99 : B : Ally at 30 g with Duplosan at 1.0 l in 200 l.
01-Jun-99 : B : Punch C at 0.5 l in 200 l.
14-Jul-99 : B : Hand rogued wild oats.
29-Jul-99 : B : Roundup Biactive at 4.0 l in 200 l.
24-Aug-99 : B : Combine harvested.

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99/R/HB/2 MAIN PLOTS

GRAIN TONNES/HECTARE

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

N	0	48	96	144	Mean
MANURE					
---	0.79	1.30	1.73	1.78	1.40
-P-	1.87	3.00	3.33	4.41	3.15
--K	0.79	1.37	2.45	2.32	1.73
-PK	1.30	2.40	3.91	4.27	2.97
A--	1.09	1.02	1.49	1.42	1.26
AP-	2.24	3.42	3.38	3.06	3.03
A-K	1.09	1.78	2.18	2.36	1.85
APK	1.41	3.02	4.34	4.93	3.42
N----	0.87	1.01	1.75	2.35	1.49
NP---	2.54	3.68	4.44	3.57	3.56
N-K--	1.54	2.42	2.55	3.03	2.39
NPK--	1.67	3.21	4.85	5.64	3.84
N--S-	0.87	2.43	2.57	2.30	2.04
NP-S-	1.95	3.77	4.66	4.66	3.76
N-KS-	0.88	2.82	3.38	4.26	2.84
NPKS-	2.15	3.96	4.81	5.87	4.20
N---S	1.40	2.08	2.63	2.70	2.20
NP--S	2.61	4.36	4.64	5.13	4.19
N-K-S	1.47	2.55	3.37	4.25	2.91
NPK-S	1.67	3.48	4.64	5.87	3.92
N--SS	1.61	2.09	2.83	3.32	2.46
NP-SS	2.41	3.70	4.59	5.27	3.99
N-KSS	1.62	2.62	3.98	4.66	3.22
NPKSS	1.87	3.36	4.72	5.81	3.94
C(--)	0.92	2.22	2.45	3.87	2.36
C(P-)	2.18	2.48	3.43	4.39	3.12
C(-K)	0.70	2.70	3.02	4.68	2.77
C(PK)	1.71	3.49	3.64	5.22	3.51
D	6.12	6.94	7.39	7.84	7.07
(D)	0.95	3.38	3.00	2.95	2.57
(A)	1.45	1.60	2.09	2.43	1.89
-	0.72	1.40	1.84	2.02	1.49
Mean	1.64	2.78	3.44	3.96	2.95

GRAIN MEAN DM% 87.6

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99/R/HB/2 MAIN PLOTS

STRAW TONNES/HECTARE

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

N / MANURE	0	48	96	144	Mean
---	0.27	0.50	0.50	0.54	0.45
-P-	0.66	1.02	1.13	1.52	1.08
--K	0.19	0.47	0.80	0.66	0.53
-PK	0.35	0.84	1.24	1.35	0.94
A--	0.23	0.27	0.46	0.42	0.35
AP-	0.63	1.29	1.14	0.97	1.00
A-K	0.23	0.59	0.64	0.64	0.53
APK	0.35	0.98	1.27	1.45	1.01
N----	0.21	0.27	0.62	0.56	0.41
NP---	0.63	1.22	1.02	0.56	0.86
N-K--	0.49	0.48	0.55	0.67	0.55
NPK--	0.42	0.68	1.49	1.72	1.08
N--S-	0.21	0.65	0.57	0.36	0.45
NP-S-	0.56	1.01	1.45	1.57	1.15
N-KS-	0.36	0.72	0.99	1.08	0.79
NPKS-	0.43	1.06	1.67	1.78	1.23
N---S	0.35	0.83	1.08	0.70	0.74
NP--S	0.69	1.41	1.33	1.61	1.26
N-K-S	0.41	0.56	0.90	1.22	0.77
NPK-S	0.35	1.25	1.25	1.97	1.20
N--SS	0.49	0.43	0.70	0.99	0.65
NP-SS	0.63	1.00	1.57	1.75	1.24
N-KSS	0.36	0.83	1.00	1.40	0.90
NPKSS	0.49	1.10	1.29	1.69	1.14
D	2.22	2.64	2.75	2.98	2.65
(D)	0.31	1.17	1.18	1.04	0.92
(A)	0.41	0.47	0.72	0.76	0.59
-	0.26	0.46	0.67	0.71	0.53
Mean	0.47	0.86	1.07	1.17	0.89

STRAW MEAN DM% 91.7

EXTRA PLOTS

GRAIN TONNES/HECTARE

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

MANURE / MGNESIUM	551AN2PK	561--PK	571NN2--	581NN2--	Mean
0	4.07	0.47	2.76	1.81	2.28
35	3.49	0.60	2.26	1.37	1.93
Mean	3.78	0.53	2.51	1.59	2.10

GRAIN MEAN DM% 88.6

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99/R/WF/3

WHEAT AND FALLOW

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

The 144th year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-98/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:
07-Oct-98 : **T** : Ploughed.
15-Oct-98 : **T** : Spring-tine cultivated. Rotary harrowed, Hereward tr. Sibutol and Evict, drilled at 380 seeds per m^2.
16-Mar-99 : **T** : Hawk at 2.0 l with Panther at 1.25 l and Cropoil at 1.0 l in 200 l.
01-May-99 : **T** : Opus at 0.7 l in 200 l.
01-Jun-99 : **T** : Folicur at 1.0 l with Sipcam UK Rover 500 at 1.0 l in 100 l.
25-Jun-99 : **T** : Folicur at 0.25 l in 100 l.
29-Jul-99 : **T** : Roundup Biactive at 4.0 l in 200 l.
06-Aug-99 : **T** : Combine harvested.
Fallow plot:
06-Apr-99 : **T** : Spring-tine cultivated.

GRAIN AND STRAW TONNES/HECTARE

	GRAIN	STRAW
YIELD	2.14	0.92
MEAN DM%	80.6	79.6

PLOT AREA HARVESTED 0.023232

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99/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 144th year, w. wheat.

For previous years see 'Details' 1977, 1973 and 74-98/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:
- 23-Sep-98 : **T** : Muriate of potash at 167 kg.

K test:
- 22-Sep-98 : **T** : Triple superphosphate at 107 kg.

All plots:
- 07-Oct-98 : B : Ploughed.
- 09-Oct-98 : B : Spring-tine cultivated. Rotary harrowed, Hereward, tr. Beret Gold, drilled at 380 seeds per m^2.
- 12-Oct-98 : B : Hardy at 7.5 kg.
- 15-Mar-99 : B : Amazon at 1.0 l with Isoguard at 2.0 l and Cropoil at 1.0 l in 200 l.
- 14-Apr-99 : B : 34.5% N at 580 kg.
- 01-May-99 : B : Opus at 0.7 l in 200 l.
- 01-Jun-99 : B : Folicur at 1.0 l with Sipcam UK Rover 500 at 1.0 l in 100 l.
- 25-Jun-99 : B : Folicur at 0.25 l in 100 l.
- 03-Aug-99 : B : Combine harvested.

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99/R/EX/4

P TEST

GRAIN TONNES/HECTARE

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

P RES / OLD RES	O	P1	P2	P3	Mean
O	0.88	4.76	5.59	5.74	4.24
D	5.16	6.75	7.24	7.44	6.65
N	1.67	5.86	6.89	7.40	5.45
P	3.97	6.57	7.57	7.07	6.29
NPKNAMG	3.88	6.74	7.51	7.59	6.43
Mean	3.11	6.14	6.96	7.05	5.81

GRAIN MEAN DM% 88.6

STRAW TONNES/HECTARE

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

P RES / OLD RES	O	P1	P2	P3	Mean
O	0.61	3.14	3.73	3.75	2.81
D	3.04	3.66	3.89	3.97	3.64
N	0.94	3.57	3.95	4.06	3.13
P	3.09	4.29	4.91	4.79	4.27
NPKNAMG	2.70	4.08	4.59	4.49	3.96
Mean	2.07	3.75	4.21	4.21	3.56

STRAW MEAN DM% 82.2

PLOT AREA HARVESTED 0.00589

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99/R/EX/4

K TEST

GRAIN TONNES/HECTARE

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

OLD RES	
O	6.25
D	7.56
N*	6.33
PK	8.38
N*PK	8.03
Mean	7.31

GRAIN MEAN DM% 88.9

STRAW TONNES/HECTARE

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

OLD RES	
O	3.62
D	3.72
N*	3.34
PK	5.14
N*PK	4.73
Mean	4.11

STRAW MEAN DM% 86.8

PLOT AREA HARVESTED 0.00589

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99/R/PG/5

PARK GRASS

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

The 144th year, hay.

For previous years see 'Details' 1977 and 1973 and 74-98/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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99/R/PG/5

2ND CUT (14/10/99) DRY MATTER TONNES/HECTARE

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

LIME / MANURE		A	B	C	D	MEAN
N1	1	1.73	1.81	1.28	0.10	1.23
K	2/1	1.82	2.03	1.57	1.17	1.65
O(D)	2/2	1.67	2.04	1.42	1.34	1.62
O	3	1.65	1.55	1.40	1.57	1.54
P	4/1	1.43	1.47	1.73	1.61	1.56
N2P	4/2	1.16	1.27	0.99	0.34	0.94
N1MN	6	2.67	2.31			2.49
MN	7	2.37	2.86	2.73	1.70	2.41
PNAMG	8	1.43	1.69	1.74	1.46	1.58
MN(N2)	9/1	2.00	2.21	1.37	0.42	1.50
N2MN	9/2	2.19	2.56	2.01	1.33	2.02
N2PNAMG	10	2.00	2.23	2.12	0.94	1.82
N3MN	11/1	2.44	2.66	2.42	2.28	2.45
N3MNSI	11/2	2.61	2.64	2.16	2.51	2.48
O	12	1.31	1.17	1.40	1.25	1.28
(D/F)	13/1	1.62	1.99	1.79	1.66	1.76
D/F	13/2	1.84	2.41	2.56	2.21	2.25
MN(N2*)	14/1	2.30	2.36	2.30	2.11	2.27
N2*MN	14/2	1.79	1.77	1.43	1.45	1.61
MN(N2*)	15	2.75	2.41	2.04	1.06	2.07
N1*MN	16	2.46	2.11	1.99	1.63	2.05
N1*	17	1.87	1.96	1.54	1.36	1.68
N2KNAMG0	18/1			1.29	0.10	0.69
N2KNAMG2	18/2					1.87
N2KNAMG1	18/3	1.67	1.80			1.73
D0	19/1					2.57
D2	19/2					2.24
D1	19/3					2.27
D/N*PK0	20/1					2.33
D/N*PK2	20/2					3.00
D/N*PK1	20/3					2.26

2ND CUT MEAN DM% 26.3

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99/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME / MANURE		A	B	C	D	MEAN
N1	1	5.42	5.28	3.71	1.48	3.97
K	2/1	5.27	6.07	3.43	3.23	4.50
O(D)	2/2	4.79	5.50	3.03	2.91	4.06
O	3	4.65	4.71	3.15	3.51	4.01
P	4/1	4.65	5.21	4.85	4.73	4.86
N2P	4/2	3.49	4.09	3.82	2.85	3.57
N1MN	6	8.76	8.28			8.52
MN	7	8.30	8.45	9.09	5.96	7.95
PNAMG	8	4.30	5.29	4.68	4.72	4.75
MN(N2)	9/1	6.94	8.00	6.33	3.69	6.24
N2MN	9/2	8.33	7.94	8.43	6.74	7.86
N2PNAMG	10	5.57	5.98	6.48	4.79	5.70
N3MN	11/1	8.06	8.66	7.80	7.29	7.95
N3MNSI	11/2	8.24	8.24	6.72	8.17	7.84
O	12	4.00	3.61	3.89	3.65	3.79
(D/F)	13/1	4.67	6.28	6.02	6.23	5.80
D/F	13/2	6.30	7.70	7.65	7.28	7.23
MN(N2*)	14/1	7.26	7.00	7.34	6.95	7.14
N2*MN	14/2	7.35	6.33	5.45	5.08	6.05
MN(N2*)	15	8.59	7.93	7.23	4.36	7.03
N1*MN	16	8.43	7.24	6.84	5.94	7.11
N1*	17	5.58	5.74	4.47	4.54	5.08
N2KNAMG0	18/1			6.73	1.43	4.08
N2KNAMG2	18/2					6.38
N2KNAMG1	18/3	5.00	6.16			5.58
D0	19/1					8.02
D2	19/2					7.53
D1	19/3					7.31
D/N*PK0	20/1					7.72
D/N*PK2	20/2					8.58
D/N*PK1	20/3					7.94

TOTAL OF 2 CUTS MEAN DM% 27.9

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99/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:

NOTE: 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:

26-Feb-99 : B : Rolled.
17-Mar-99 : **T** : Fishmeal, K, Mg, Na and Si applied.
18-Mar-99 : **T** : P applied (except plot 20).
19-Mar-99 : **T** : P to plot 20 only.
02-May-99 : **T** : N applied.
05-Jul-99 : B : Cut.
07-Jul-99 : B : Hay turned.
08-Jul-99 : B : Hay turned.
09-Jul-99 : B : Hay turned.
12-Jul-99 : B : Hay baled.
14-Oct-99 : B : Cut, herbage removed.

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99/R/PG/5

1ST CUT (6/7/99) DRY MATTER TONNES/HECTARE

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

LIME / MANURE		A	B	C	D	MEAN
N1	1	3.69	3.48	2.43	1.38	2.74
K	2/1	3.45	4.04	1.86	2.06	2.85
O(D)	2/2	3.13	3.47	1.60	1.57	2.44
O	3	3.00	3.16	1.75	1.94	2.46
P	4/1	3.22	3.74	3.11	3.12	3.30
N2P	4/2	2.33	2.82	2.83	2.52	2.62
N1MN	6	6.09	5.97			6.03
MN	7	5.93	5.59	6.37	4.26	5.54
PNAMG	8	2.87	3.60	2.94	3.25	3.16
MN(N2)	9/1	4.94	5.78	4.96	3.27	4.74
N2MN	9/2	6.14	5.39	6.42	5.41	5.84
N2PNAMG	10	3.57	3.75	4.36	3.85	3.88
N3MN	11/1	5.62	6.00	5.37	5.01	5.50
N3MNSI	11/2	5.63	5.61	4.56	5.67	5.37
O	12	2.70	2.44	2.50	2.39	2.51
(D/F)	13/1	3.05	4.30	4.24	4.58	4.04
D/F	13/2	4.46	5.29	5.09	5.07	4.98
MN(N2*)	14/1	4.96	4.64	5.04	4.84	4.87
N2*MN	14/2	5.56	4.56	4.03	3.63	4.44
MN(N2*)	15	5.84	5.52	5.19	3.29	4.96
N1*MN	16	5.97	5.13	4.85	4.30	5.06
N1*	17	3.71	3.78	2.92	3.18	3.40
N2KNAMG0	18/1			5.44	1.33	3.39
N2KNAMG2	18/2					4.50
N2KNAMG1	18/3	3.33	4.36			3.84
D0	19/1					5.44
D2	19/2					5.29
D1	19/3					5.04
D/N*PK0	20/1					5.39
D/N*PK2	20/2					5.59
D/N*PK1	20/3					5.68

1ST CUT MEAN DM% 29.6

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99/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, 5th year of clover. Sections 3-6, 5th year of grass/clover.

For previous years see 'Details' 1967 and 1973 and 74-98/R/BN/7.

Plot dimensions: 10.7 x 55.9.

Treatments:

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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99/R/BN/7

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:

18-Mar-99	**T**	P applied.
22-Mar-99	**T**	K applied.
24-Mar-99	**T**	N applied.
11-May-99	**T**	Topped sections 1 and 2.
08-Jun-99	B	Cut, herbage removed.
12-Jul-99	**T**	N applied.
29-Jul-99	B	Garlon 2 at 6.0 l in 200 l, spot treated docks.
	T	Topped sections 1 and 2.
20-Oct-99	B	Cut, herbage removed.

GRASS

1ST CUT (8/6/99) DRY MATTER TONNES/HECTARE

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

N PERCUT / **MANURE**	75	100	125	150	Mean
(D)	4.75	5.08	4.65	4.66	4.79
(D)PK	6.96	6.47	5.30	5.97	6.17
PKMG	6.32	5.86	5.86	6.13	6.04
P	4.85	2.89	1.21	4.92	3.47
PK	6.27	6.50	5.86	6.54	6.29
PMG	4.90	3.45	2.62	4.08	3.76
0	4.19	3.49	3.18	3.37	3.56
Mean	5.46	4.82	4.10	5.09	4.87

MANURE KMG 100 5.47

Grand mean 4.89

1ST CUT MEAN DM% 25.4

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99/R/BN/7

GRASS

2ND CUT (20/10/99) DRY MATTER TONNES/HECTARE

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

N PERCUT MANURE	75	100	125	150	Mean
(D)	1.68	1.98	2.56	3.07	2.32
(D)PK	2.64	3.87	3.44	3.52	3.37
PKMG	2.71	2.50	3.12	2.92	2.82
P	0.77	1.96	1.99	1.38	1.52
PK	2.46	2.84	3.92	4.03	3.31
PMG	0.82	2.05	1.96	1.37	1.55
0	0.86	1.85	2.04	1.17	1.48
Mean	1.71	2.44	2.72	2.49	2.34

MANURE KMG 100 2.76

Grand mean 2.35

2ND CUT MEAN DM% 31.3

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

N PERCUT MANURE	75	100	125	150	Mean
(D)	6.44	7.06	7.21	7.72	7.11
(D)PK	9.60	10.35	8.74	9.48	9.54
PKMG	9.03	8.36	8.99	9.05	8.86
P	5.62	4.85	3.20	6.30	4.99
PK	8.74	9.34	9.79	10.57	9.61
PMG	5.72	5.51	4.58	5.45	5.31
0	5.05	5.34	5.22	4.54	5.04
Mean	7.17	7.26	6.82	7.59	7.21

MANURE KMG 100 8.23

Grand mean 7.24

TOTAL OF 2 CUTS MEAN DM% 28.3

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99/R/BN/7

GRASS/CLOVER

1ST CUT (8/6/99) DRY MATTER TONNES/HECTARE

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

MANURE	(D)	(D)PK	PKMG	P	PK	PMG	0	Mean
	3.33	3.79	3.66	3.41	3.84	3.90	2.72	3.52

1ST CUT MEAN DM% 21.9

2ND CUT (20/10/99) DRY MATTER TONNES/HECTARE

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

MANURE	(D)	(D)PK	PKMG	P	PK	PMG	0	Mean
	1.70	1.98	1.55	0.66	1.53	1.22	0.20	1.26

2ND CUT MEAN DM% 19.9

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

MANURE	(D)	(D)PK	PKMG	P	PK	PMG	0	Mean
	5.02	5.77	5.21	4.08	5.38	5.12	2.92	4.79

TOTAL OF 2 CUTS MEAN DM% 20.9

PLOT AREA HARVESTED 0.00155

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99/R/GC/8

GARDEN CLOVER

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

The 146th year, red clover.

For previous years see 'Details' 1967 and 1973, and 74-98/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:

28-May-99 : B : First cut, hand weeded.
16-Jul-99 : B : Second cut.
14-Oct-99 : B : Third cut.

NOTE: Clover samples were taken for chemical analysis.

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99/R/GC/8

1ST CUT (28/5/99) DRY MATTER TONNES/HECTARE

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

FUNG RES	(-)	B	Mean
	5.54	4.66	5.10

1ST CUT MEAN DM% 17.7

2ND CUT (16/7/99) DRY MATTER TONNES/HECTARE

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

FUNG RES	(-)	B	Mean
	5.95	5.57	5.76

2ND CUT MEAN DM% 18.6

3RD CUT (14/10/99) DRY MATTER TONNES/HECTARE

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

FUNG RES	(-)	B	Mean
	3.66	2.76	3.21

3RD CUT MEAN DM% 25.3

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

FUNG RES	(-)	B	Mean
	15.15	12.99	14.07

TOTAL OF 3 CUTS MEAN DM% 20.5

PLOT AREA HARVESTED 0.00010

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99/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 62nd year, leys, w. beans, w. wheat, w. rye, forage maize.

For previous years see 'Details' 1967 & 1973 and 74-98/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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99/W/RN/3

ROTATION (continued)

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 = forage 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, forage maize 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

1/2 plots:

2. **FYMRES63** Farmyard manure residues, last applied 1963:

   NONE
   FYM 38 t on each occasion

1/8 plots:

3. **N** Nitrogen fertilizer in spring 1999 (kg N) as 27% N:

   0
   70
   140
   210

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99/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

1/2 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 1999 (kg N) as 27% N:

   0
   40
   80
   120

Treatments to leys:

FYM RES Farmyard manure residues:

NONE
FYM 38 t on each occasion, last applied 1966 to 1st and 6th year leys, 1965 to 2nd and 7th year leys, 1964 to 3rd and 8th year leys, 1963 to 4th year leys, 1962 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 01-Sep-98:

Continuous rotations before wheat	No FYM half plots	FYM half plots
AF	300	300
AB	300	300

None to other plots.

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99/W/RN/3

Experimental diary:

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

01-Sep-98 : **T** : Ploughed.
14-Sep-98 : **T** : LC1 and LLC1 only: 27% N at 185 kg.
: **T** : LN1 and LLn1 only: 27% N at 278 kg.
: **T** : Cambridge rolled, rotary harrowed.
20-Sep-98 : **T** : LC1 and LLC1 only: Grass/clover mixture drilled 30 kg.
: **T** : LN1 and LLN1 only: Grass mixture drilled 30 kg.
24-Sep-98 : **T** : Cambridge Rolled.
18-Mar-99 : **T** : LC1 and LLC1 only: Muriate of potash at 330 kg and triple superphosphate at 204 kg.
: **T** : LN1 and LLN1 only: Muriate of potash at 250 kg and triple superphosphate at 204 kg. NK as (24:0:16) at 313 kg.
06-May-99 : **T** : Setter 33 at 5.0 l in 200 l.
21-Jun-99 : **T** : First cut.
30-Jun-99 : **T** : Muriate of potash at 80 kg.
: **T** : LN1 and LLN1 only: 27% N at 278 kg
26-Oct-99 : **T** : Second cut.

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

08-Feb-99 : **T** : Topped.
18-Mar-99 : **T** : Muriate of potash at 250 kg and triple superphosphate at 204 kg. NK as (24:0:16) at 313 kg.
06-May-99 : **T** : Setter 33 at 5.0 l in 200 l.
21-Jun-99 : **T** : First cut.
30-Jun-99 : **T** : Muriate of potash at 80 kg.
: **T** : 27% N at 278 kg.
26-Aug-99 : **T** : LN3 and LLN8 only: Second cut
26-Oct-99 : **T** : Remaining leys: Second cut.

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

08-Feb-99 : **T** : Topped.
18-Mar-99 : **T** : Muriate of potash at 330 kg and triple superphosphate at 204 kg.
06-May-99 : **T** : Setter 33 at 5.0 l in 200 l.
21-Jun-99 : **T** : First cut.
30-Jun-99 : **T** : Muriate of potash at 80 kg.
26-Aug-99 : **T** : LC3 and LLC8 only: Second cut
26-Oct-99 : **T** : Remaining leys: Second cut.

W. beans, 2nd and 3rd treatment crop (**ROTATION** AB, AF, ABe and AM):

19-Sep-98 : **T** : PK as (0:24:24) at 168 kg.
03-Dec-98 : **T** : Punch broadcast at 25 seed/m^2. Ploughed.
07-Dec-98 : **T** : Rotary harrowed.
25-May-99 : **T** : Ronilan FL at 0.5 l with Sipcam UK Rover 500 at 2.0 l in 200 l.
09-Jun-99 : **T** : Ronilan FL at 0.5 l with Sipcam UK Rover 500 at 2.0 l, Aphox at 100 g, Hallmark at 100 ml and Vytel Manganese at 3.0 l in 200 l.
23-Aug-99 : **T** : Combine harvested.

Forage maize, 2nd treatment crop (**ROTATION** ABe):

01-Sep-98 : **T** : Ploughed.
14-Sep-98 : **T** : Cambridge rolled.
06-May-99 : **T** : Rotary harrowed. Orient, tr. Mesurol, drilled at 11 seeds/m^2 with the Nodet Gougis drill.
24-Jun-99 : **T** : Gesaprim at 3.0 l with Cropoil at 5.0 l in 220 l.

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Experimental diary:

Forage maize, 2nd treatment crop (**ROTATION** ABe):
- 30-Jun-99 : **T** : PK as (0:24:24) at 167 kg and muriate of potash at 40 kg. 27% I at 370 kg.
- 21-Sep-99 : **T** : Cut.

W. wheat, 1st test crop (W):
- 01-Sep-98 : **T** : Ploughed.
- 14-Sep-98 : **T** : Cambridge rolled.
- 19-Sep-98 : **T** : PK as (0:24:24) at 260 kg.
- 12-Oct-98 : **T** : Rotary harrowed, Hereward, tr. Sibutol, drilled at 380 seeds/m^2 with the Accord drill.
- 25-Feb-99 : **T** : Platform S at 1.0 kg with Isoguard at 2.0 l in 200 l.
- 12-Apr-99 : **T** : **N** 70, 140, 210: N applied as 27% N.
- 25-Apr-99 : **T** : Folicur at 0.5 l with Tripart Brevis at 2.0 l in 200 l.
- 27-May-99 : **T** : Folicur at 0.75 l with Sipcam UK Rover 500 at 1.0 l in 200 l.
- 22-Aug-99 : **T** : Combine harvested.

W. rye, 2nd test crop (R) and 1st treatment crop (**ROTATION** ABe and AM):
- 01-Sep-98 : **T** : Ploughed.
- 14-Sep-98 : **T** : Cambridge rolled.
- 19-Sep-98 : **T** : R only: PK as (0:24:24) at 260 kg.
- : **T** : ABe and AM only: PK as (0:24:24) at 167 kg.
- 15-Oct-98 : **T** : ABe and AM only: 27% N at 296 kg.
- : **T** : Rotary harrowed, Esprit, tr. Baytan Flowable, drilled at 300 seeds/m^2 with the Accord drill.
- 04-Mar-99 : **T** : Quantum at 30 g in 200 l.
- 13-Apr-99 : **T** : R only: **N** 40, 80, 120: N applied as 27% N.
- 23-Apr-99 : **T** : ABe and AM only: NPK as (20:10:10) at 400kg.
- 25-Apr-99 : **T** : Folicur at 0.5 l with Tripart Brevis at 2.0 l in 200 l.
- 16-May-99 : **T** : Folicur at 1.0 l in 200 l.
- 22-Aug-99 : **T** : Combine harvested.

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LEYS

1ST CUT (21/6/99) DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	3.35	2.78	3.06
LC2	6.79	7.22	7.01
LC3	5.79	6.27	6.03
LN1	5.74	5.35	5.54
LN2	8.57	9.29	8.93
LN3	5.93	6.04	5.99
LLC1	4.59	4.25	4.42
LLC2	7.22	6.67	6.94
LLC3	4.73	4.82	4.77
LLC4	3.50	4.42	3.96
LLC5	5.77	6.13	5.95
LLC6	5.82	4.63	5.23
LLC7	5.77	4.98	5.38
LLC8	2.97	2.28	2.62
LLN1	6.95	7.17	7.06
LLN2	10.19	8.53	9.36
LLN3	7.37	7.13	7.25
LLN4	7.13	6.92	7.02
LLN5	6.32	7.60	6.96
LLN6	7.18	7.31	7.24
LLN7	5.34	5.00	5.17
LLN8	6.68	5.77	6.22
Mean	6.08	5.93	6.01

1ST CUT MEAN DM% 29.5

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99/W/RN/3 LEYS

2ND CUT (26/08/99 AND 27/10/99) DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	1.88	1.56	1.72
LC2	1.92	2.18	2.05
LC3	1.21	1.65	1.43
LN1	1.53	2.05	1.79
LN2	2.67	4.80	3.74
LN3	1.09	0.96	1.02
LLC1	1.45	1.38	1.41
LLC2	2.22	1.62	1.92
LLC3	1.03	1.08	1.05
LLC4	0.54	0.48	0.51
LLC5	1.44	1.15	1.30
LLC6	1.72	0.87	1.29
LLC7	1.20	1.60	1.40
LLC8	0.41	0.60	0.51
LLN1	2.04	2.14	2.09
LLN2	2.20	2.95	2.57
LLN3	1.66	1.87	1.76
LLN4	1.51	1.75	1.63
LLN5	1.94	2.19	2.07
LLN6	2.05	1.56	1.81
LLN7	2.22	1.43	1.82
LLN8	1.86	1.82	1.84
Mean	1.63	1.71	1.67

2ND CUT MEAN DM% 20.0

NOTE: LN3, LLN8, LL3 and LLC8 cut on first date remainder on second date.

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99/W/RN/3 LEYS

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	5.23	4.33	4.78
LC2	8.71	9.40	9.06
LC3	6.99	7.91	7.45
LN1	7.26	7.40	7.33
LN2	11.24	14.09	12.67
LN3	7.02	7.00	7.01
LLC1	6.04	5.63	5.83
LLC2	9.44	8.28	8.86
LLC3	5.75	5.89	5.82
LLC4	4.04	4.90	4.47
LLC5	7.22	7.28	7.25
LLC6	7.54	5.50	6.52
LLC7	6.97	6.58	6.78
LLC8	3.38	2.88	3.13
LLN1	8.99	9.31	9.15
LLN2	12.39	11.48	11.93
LLN3	9.02	8.99	9.01
LLN4	8.64	8.67	8.65
LLN5	8.26	9.80	9.03
LLN6	9.23	8.88	9.05
LLN7	7.56	6.43	6.99
LLN8	8.54	7.59	8.07
Mean	7.70	7.65	7.67

TOTAL OF 2 CUTS MEAN DM% 24.7

PLOT AREA HARVESTED 0.00200

MAIZE

WHOLE CROP (100% DM) TONNES/HECTARE

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

FYMRES	NONE	FYM	Mean
	6.93	8.38	7.66

GRAIN MEAN DM% 26.3

PLOT AREA HARVESTED 0.00054

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W. WHEAT

GRAIN TONNES/HECTARE

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

FYMRES63	NONE	FYM	Mean
ROTATION			
LLN 8	6.01	6.38	6.19
LN 3	5.84	6.00	5.92
LLC 8	4.52	3.94	4.23
LC 3	7.36	7.58	7.47
AF	5.61	5.93	5.77
AB	2.21	1.63	1.92
Mean	5.26	5.24	5.25

N	0	70	140	210	Mean
ROTATION					
LLN 8	3.42	6.59	8.26	6.51	6.19
LN 3	1.69	6.58	7.58	7.83	5.92
LLC 8	1.79	4.65	5.54	4.95	4.23
LC 3	4.42	7.27	8.65	9.54	7.47
AF	0.52	6.55	7.53	8.48	5.77
AB	0.00	1.97	3.44	2.28	1.92
Mean	1.97	5.60	6.83	6.60	5.25

N	0	70	140	210	Mean
FYMRES63					
NONE	1.91	5.59	6.94	6.61	5.26
FYM	2.04	5.62	6.73	6.58	5.24
Mean	1.97	5.60	6.83	6.60	5.25

N	FYMRES63	0	70	140	210
ROTATION					
LLN 8	NONE	4.45	5.34	8.84	5.42
	FYM	2.38	7.85	7.68	7.59
LN 3	NONE	1.44	7.21	7.32	7.40
	FYM	1.93	5.96	7.84	8.26
LLC 8	NONE	1.71	4.91	5.07	6.40
	FYM	1.87	4.39	6.01	3.50
LC 3	NONE	3.83	7.13	8.90	9.59
	FYM	5.01	7.41	8.40	9.48
AF	NONE	0.00	6.11	7.78	8.57
	FYM	1.05	7.00	7.29	8.39
AB	NONE	0.00	2.82	3.73	2.28
	FYM	0.00	1.11	3.15	2.27

GRAIN MEAN DM% 86.4

PLOT AREA HARVESTED 0.00183

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99/W/RN/3

W. RYE

GRAIN TONNES/HECTARE

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

FYMRES62	NONE	FYM	Mean
ROTATION			
LLN 8	7.99	8.23	8.11
LN 3	7.96	7.93	7.95
LLC 8	8.66	8.27	8.47
LC 3	8.04	8.78	8.41
AF	5.34	5.09	5.22
AB	5.40	6.16	5.78
Mean	7.23	7.41	7.32

N	0	40	80	120	Mean
ROTATION					
LLN 8	5.74	7.74	9.31	9.65	8.11
LN 3	5.39	7.49	9.14	9.76	7.95
LLC 8	5.40	9.14	9.42	9.91	8.47
LC 3	5.64	8.96	9.35	9.69	8.41
AF	2.62	4.44	6.16	7.65	5.22
AB	3.03	4.50	7.07	8.51	5.78
Mean	4.64	7.05	8.41	9.20	7.32

N	0	40	80	120	Mean
FYMRES62					
NONE	4.66	7.05	8.13	9.09	7.23
FYM	4.61	7.05	8.68	9.31	7.41
Mean	4.64	7.05	8.41	9.20	7.32

N		0	40	80	120
ROTATION	**FYMRES62**				
LLN 8	NONE	5.64	8.27	9.16	8.89
	FYM	5.85	7.21	9.45	10.42
LN 3	NONE	5.48	7.68	9.00	9.68
	FYM	5.30	7.30	9.28	9.85
LLC 8	NONE	5.59	9.81	9.07	10.19
	FYM	5.21	8.47	9.78	9.64
LC 3	NONE	5.52	7.71	9.17	9.76
	FYM	5.75	10.21	9.53	9.62
AF	NONE	2.76	4.74	6.13	7.74
	FYM	2.48	4.13	6.19	7.56
AB	NONE	3.00	4.06	6.28	8.25
	FYM	3.05	4.94	7.86	8.78

GRAIN MEAN DM% 85.9

PLOT AREA HARVESTED 0.00183

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99/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 35th year, w. wheat.

For previous years see 'Details' 1973 and 74-98/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, 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 and 1999 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, w. wheat 1998
WHEAT B	W. wheat, after w. wheat 1987, potatoes 1988, w. wheat 1989, w. beans 1990, w. wheat 1991-6, w. rye 1997, w. wheat 1998

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

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99/W/RN/12

2. **TREATMNT** Previous treatments: (continued)

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)

Experimental diary:

27-Aug-98	B	Ploughed.
29-Aug-98	B	Cambridge rolled.
19-Sep-98	B	PK as (0:24:24) at 217 kg. Muriate of potash at 52 kg.
12-Oct-98	B	Rotary harrowed. Drilled, Hereward, tr. Sibutol, at 380 seeds/m^2 with the Accord drill.
25-Feb-99	B	Platform S at 1.0 kg with Isoguard at 2.0 l in 200 l.
03-Apr-99	B	34.5% N at 278 kg.
25-Apr-99	B	Tripart Brevis at 2.0 l with Folicur at 0.5 l in 200 l.
27-May-99	B	Folicur at 0.75 l with Sipcam UK Rover 500 at 1.0 l in 200 l.
22-Aug-99	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	5.63	5.54	5.58
LC 8 PT	5.67	5.17	5.42
LC 6 LC	5.84	5.05	5.44
LC 6 LN	5.93	5.66	5.79
FYM	5.90	5.62	5.76
STRAW	6.06	4.84	5.45
FERT-FYM	4.63	4.54	4.59
FERT-STR	5.25	3.97	4.61
Mean	5.61	5.05	5.33

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

TREATMNT	**CROPSEQ*** **TREATMNT**
0.378	0.535

* Within the same level of **CROPSEQ** only

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	14	0.535	10.0

GRAIN MEAN DM% 86.6

MEAN PLOT AREA HARVESTED 0.01169

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99/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 are 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 second year, w. oats, w. wheat, w. rape, w. linseed, w. beans, lupins.

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

Whole plot dimensions: 9.0 x 23.0.
Sub-plot dimensions: 4.5 x 10.0.

Treatments:

Whole plots:

ROTATION Cropping and years:

Rotation no. and cropping sequence	Phase	1998	1999	2000	2001	2002	2003	2004
1	A	O	RA	W	W	RA	W	W
RA, W, W	B	O	O	RA	W	W	RA	W
	C	O	RA	O	RA	W	W	RA
2	A	O	LN	W	W	LN	W	W
LN, W, W	B	O	O	LN	W	W	LN	W
	C	O	RA	O	LN	W	W	LN
3	A	O	LP	W	W	LP	W	W
LP, W, W	B	O	O	LP	W	W	LP	W
	C	O	RA	O	LP	W	W	LP
4	A	O	BE	W	W	BE	W	W
BE, W, W	B	O	O	BE	W	W	BE	W
	C	O	RA	O	BE	W	W	BE
5	A	O	PE	W	W	PE	W	W
PE, W, W	B	O	O	PE	W	W	PE	W
	C	O	RA	O	PE	W	W	PE
6	A	O	W	W	W	W	W	W
W, W, W	B	O	O	W	W	W	W	W
	C	O	RA	O	W	W	W	W
7	A	O	BE	W	LP	W	PE	W
BE, W,	B	O	O	BE	W	LP	W	PE
LP, W,	C	O	RA	O	BE	W	LP	W
PE, W	D	O	O	RA	O	BE	W	LP
	E	O	RA	O	RA	O	BE	W
	F	O	O	RA	O	RA	O	BE
8	A	O	RA	W	LN	W	RA	W
RA, W,	B	O	O	RA	W	LN	W	RA
LN, W	C	O	RA	O	RA	W	LN	W
	D	O	O	RA	O	RA	W	LN
9	A	O	RA	W	BE	W	RA	W
RA, W,	B	O	O	RA	W	BE	W	RA
BE, W	C	O	RA	O	RA	W	BE	W
	D	O	O	RA	O	RA	W	BE
10	A	O	O	W	W	O	W	W
O, W, W	B	O	RA	O	W	W	O	W
	C	O	O	RA	O	W	W	O

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ROTATION Cropping and years: (continued)

Rotation no. and cropping sequence	Phase	1998	1999	2000	2001	2002	2003	2004
11		O	W	W	W	W	W	W
12		O	W	W	W	W	W	W
13		O	W	W	W	W	W	W
14		O	W	W	W	W	W	W
15		O	W	W	W	W	W	W
16		O	W	W	W	W	W	W
17		O	W	W	W	W	W	W

W = w. wheat, O = w. oats, RA = w. rape, LN = w. linseed,
BE = w. beans, PE = w. peas, LP = lupins.

NOTE: The diary entries are done by crop not by treatment.

Experimental diary:

All crops:
- 24-Aug-98 : B : Ploughed and pressed.
- 21-Oct-98 : B : Hardy at 7.5 kg.

W. wheat:
- 18-Sep-98 : **T** : Combination drilled Hereward, tr. Beret Gold, at 380 seeds/m^2 with the Accord drill.
- 19-Sep-98 : **T** : Rolled. Hardy at 7.5 kg.
- 29-Sep-98 : **T** : Combination redrilled Hereward, tr. Beret Gold, at 380 seeds/m^2 with the Accord drill, part of one plot with **ROTATION** 17.
- 15-Feb-99 : **T** : tm) Isogard at 1.0 l in 220 l.
- : **T** : tm) Unite A at 0.125 l in 200 l.
- : **T** : tm) Unite B at 1.0 l in 200 l.
- : **T** : tm) Cropoil at 1.0 l in 200 l.
- 11-Mar-99 : **T** : 34.5% N at 145 kg.
- 14-Apr-99 : **T** : 34.5% N at 435 kg.
- 01-May-99 : **T** : Opus at 0.7 l in 200 l.
- 19-May-99 : **T** : tm) Sypex at 1.5 l in 200 l.
- : **T** : tm) Enhance at 80 ml in 200 l.
- 29-May-99 : **T** : tm) Folicur at 1.0 l in 100 l
- : **T** : tm) Sipcam UK Rover 500 at 1.0 l in 100 l.
- 18-Jun-99 : **T** : Folicur at 0.25 l in 100 l.
- 31-Jul-99 : **T** : Combine harvested and chopped straw **ROTATION** 6A and 11.
- 02-Aug-99 : **T** : Combine harvested and chopped straw, all remaining wheat.

W. oats:
- 28-Sep-98 : **T** : tm) PDQ at 3.0 l in 200 l.
- : **T** : tm) Parable at 200 ml in 200 l.
- 16-Oct-98 : **T** : Combination drilled, Gerald, tr. Sibutol, at 350 seeds/m^2 with the Accord drill.
- 09-Apr-99 : **T** : 34.5% N at 145 kg.
- 27-Apr-99 : **T** : 34.5% N at 145 kg.
- 14-May-99 : **T** : Ally at 30 g in 200 l.
- 21-May-99 : **T** : tm) BASF 3C Chlormequat 720 at 2.25 l in 200 l.
- : **T** : tm) Enhance at 50 ml in 200 l.
- 01-Jun-99 : **T** : Folicur at 0.75 l in 200 l.
- 31-Jul-99 : **T** : Combine harvested.

W. rape:
- 26-Aug-98 : **T** : Combination drilled, Pronto, tr. Lindex-Plus FS Seed Treatment, at 75 seeds/m^2 with the Accord drill.
- 29-Aug-98 : **T** : Rolled. Hardy at 7.5 kg.
- 05-Sep-98 : **T** : Hardy at 7.5 kg.
- 15-Sep-98 : **T** : Cyperkill 10 at 0.25 l in 200 l.

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99/R/RN/22

Experimental diary:

W. rape:
- 17-Sep-98 : T : tm) Katamaran at 2.0 l in 200 l.
- : T : tm) Decis at 250 ml in 200 l.
- 18-Sep-98 : T : Hardy at 7.5 kg.
- 25-Sep-98 : T : 34.5% N at 120 kg.
- 09-Oct-98 : T : Laser at 0.5 l in 200 l.
- : T : tm) Cropoil at 2.0 l in 200 l.
- 04-Dec-98 : T : tm) Punch C at 0.4 l in 200 l.
- : T : tm) Stefes Cypermethrin 2 at 250 ml in 200 l.
- 07-Dec-98 : T : tm) Laser at 0.5 l in 200 l area missed on 09-Oct-98.
- : T : tm) Cropoil at 2.0 l in 200 l area missed on 09-Oct-98.
- 08-Feb-99 : T : 34.5% N at 300 kg.
- 25-Feb-99 : T : Punch C at 0.4 l in 200 l.
- 11-Mar-99 : T : 34.5% N at 300 kg.
- 17-Mar-99 : T : tm) Laser at 2.25 l in 220 l to an area of **ROTATION** 8C.
- : T : tm) Cropoil at 2.0 l in 220 l to an area of **ROTATION** 8C.
- 29-Apr-99 : T : tm) Bavistin DF at 1.0 kg in 200 l.
- : T : tm) Ronilan FL at 0.5 l in 200 l.
- : T : tm) Hallmark at 100 ml in 200 l.
- 07-Jul-99 : T : tm) Reglone at 3.0 l in 400 l.
- : T : tm) Enhance at 400 ml in 400 l.
- 16-Jul-99 : T : Combine harvested and chopped straw.

W. linseed:
- 28-Sep-98 : T : tm) PDQ at 3.0 l in 200 l.
- : T : tm) Parable at 200 ml in 200 l.
- 12-Oct-98 : T : Combination drilled Oliver, tr. Prelude 20 LF, at 950 seeds/m^2 wi the Nordsten drill.
- 26-Mar-99 : T : 34.5% N at 348 kg.
- 30-Apr-99 : T : Eagle at 40 g in 220 l.
- 14-May-99 : T : tm) Laser at 1.5 l in 220 l.
- : T : tm) Cropoil at 2.0 l in 220 l.
- 09-Jul-99 : T : tm) Reglone at 3.0 l in 400 l.
- : T : tm) Enhance at 400 ml in 400 l.
- 24-Jul-99 : T : Combine harvested and chopped straw.

W. beans:
- 28-Sep-98 : T : tm) PDQ at 3.0 l in 200 l.
- : T : tm) Parable at 200 ml in 200 l.
- 09-Oct-98 : T : Drilled Clipper, recleaned, at 25 seeds/m^2 with the Carrier drill
- 19-Oct-98 : T : tm) Gesatop 500 SC at 2.0 l in 220 l.
- : T : tm) Kerb 50 W at 1.7 kg in 220 l.
- 20-May-99 : T : tm) Bavistin DF at 1.0 kg in 200 l.
- : T : tm) Sipcam UK Rover 500 at 2.0 l in 200 l.
- 09-Jun-99 : T : tm) Bavistin DF at 1.0 kg in 200 l.
- : T : tm) Sipcam UK Rover 500 at 2.0 l in 200 l.
- 12-Aug-99 : T : Combine harvested and chopped straw.

W. peas:
- 28-Sep-98 : T : tm) PDQ at 3.0 l in 200 l.
- : T : tm) Parable at 200 ml in 200 l.
- 09-Oct-98 : T : Drilled Victor, tr. Hy-TL and Rhodoman, at 100 seeds/m^2 with the Carrier drill.
- 19-Oct-98 : T : Opogard 500 SC at 3.4 l in 220 l.
- 30-Apr-99 : T : Compass at 3.0 l in 220 l.
- 19-May-99 : T : Hallmark at 150 ml in 200 l.
- 10-Jun-99 : T : tm) Aphox at 100 g in 220 l.
- : T : tm) Hallmark at 150 ml in 220 l.
- 25-Jun-99 : T : Compass at 3.0 l in 220 l.

W. lupins:
- 07-Sep-98 : T : Combination drilled, DTN 20, untreated, at 50 seeds/m^2 with the Accord drill. Rolled. Spannit at 1.5 l in 220 l.
- 11-Sep-98 : T : Hardy at 7.5 kg.
- 18-Sep-98 : T : Hardy at 7.5 kg.

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99/R/RN/22

Experimental diary:
W. lupins:
16-Oct-98 : **T** : tm) Stomp 400 SC at 5.0 l in 220 l.
: **T** : tm) Decis at 300 ml in 220 l.
08-Feb-99 : **T** : Carbetamex at 3.0 kg in 220 l.
17-Mar-99 : **T** : tm) Folicur at 0.5 l in 200 l.
: **T** : tm) Rovral Flo at 1.0 l in 200 l.

NOTE: Yields are presented by crop not by **ROTATION**. Winter peas and lupins failed and therefore there are no yields.

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

WINTER CROPS	GRAIN TONNES/ HECTARE	GRAIN MEAN DM%
OATS	7.44	89.4
WHEAT	10.30	89.0
RAPE	3.96	90.2
LINSEED	1.40	93.1
BEANS	5.39	78.7

SUB-PLOT AREA HARVESTED 0.00230

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99/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 15th year, w. wheat.

For previous years see 85-93,95-98/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 1995-99:
	NONE	None
	CARB	Carbendazim at 0.25 kg
	PRO	Prochloraz at 0.40 kg (0.50 kg in 1993, 1995-1999)
	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:

18-Sep-98	B		Ploughed and furrow pressed, started.
19-Sep-98	B		Ploughed and furrow pressed, completed.
21-Sep-98	B		Combination drilled, Hereward, tr. Beret Gold, at 380 seeds/m^2 with the Accord drill.
01-Dec-98	B		tm) Amazon at 1.0 l in 200 l.
	B		tm) Isogard at 2.0 l in 200 l.
	B		tm) Stefes Cypermethrin 2 at 250 ml in 200 l.
	B		tm) Cropoil at 1.0 l in 200 l.
04-Mar-99	B		34.5% N at 145 kg.
17-Mar-99	**T**	CARB	Stefes C-Flo 2 at 0.5 l in 200 l.
	T	CARB+PRO	Sportak 45 EW at 1.1 l with Stefes C-Flo 2 at 0.5 l in 200 l.

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99/R/CS/302

Experimental diary:

17-Mar-99	**T**	PRO	: Sportak 45 EW at 1.1 l in 200 l.
15-Apr-99	B		: 34.5% N at 435 kg.
19-Apr-99	**T**	CARB	: Stefes C-Flo 2 at 0.5 l in 200 l.
	T	CARB+PRO	: Sportak 45 EW at 1.1 l with Stefes C-Flo 2 at 0.5 l in 200 l.
	T	PRO	: Sportak 45 EW at 1.1 l in 200 l.
25-May-99	B		: tm) Amistar at 0.8 l in 200 l.
	B		: tm) Folicur at 0.5 l in 200 l.
17-Jun-99	B		: tm) Amistar at 0.25 l in 100 l.
	B		: tm) Magnesium sulphate at 5.0 kg in 100 l.
29-Jul-99	B		: Combine harvested.

NOTE: The yield of one plot with **FUNGCIDE** SA and **EYE INOC** W2 was lost during harvesting. An estimate was used in the analysis.

GRAIN TONNES/HECTARE

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

EYE INOC / **FUNGCIDE**	NATURAL	W 19R 1S	W 1R 19S	R 19R 1S	R 1R 19S	Mean
NONE	9.44	8.99	8.95	8.95	9.31	9.18
CARB	8.64	9.14	7.81	8.69	9.13	8.67
PRO	8.87	8.87	9.45	9.15	9.38	9.10
CARB+PRO	9.52	9.54	8.09	9.08	9.51	9.21
Mean	9.12	9.14	8.57	8.97	9.33	9.04

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

EYE INOC	**FUNGCIDE*** **EYE INOC**	
0.273	0.545	min.rep
0.236	0.472	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	23	0.545	6.0

GRAIN MEAN DM% 87.9

SUB-PLOT AREA HARVESTED 0.00138

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99/R/CS/309 and 99/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 15th year, w. wheat.

For previous years see 85-98/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	BTTTTTT
BT1T2	CTTTTTT
BP2	BPPPPPP
BT1P2	CPPPPPP
CT1	CTTTTTT
CT1	CPTTPTT
CT1T2	CTPTTPT
CT1T2	CTTPTTP
CP2	CPPPPPP
CP2	CPTTPTT
CT1P2	CTPTTPT
CT1P2	CTTPTTP

Sub-plots:

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

E	Early
L	Late

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

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NOTES: (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 for straw treatment (i.e. B & C which remain unchanged from year to year) and the current years cultivation treatments and sowing dates are used.

Experimental diary:

Great Knott III (R):

17-Aug-98	**T**	C	Straw chopped.
19-Aug-98	**T**	B	Straw burnt, ash incorporated with discs.
09-Sep-98	**T**	T	Flexitined.
22-Sep-98	**T**	T	Flexitined.
24-Sep-98	B		tm) Alpha Glyphogan at 3.0 l in 200 l.
	B		tm) Mixed wetters at various rates.
29-Sep-98	**T**	P	Ploughed.
12-Oct-98	**T**	E	Combination drilled, Hereward, tr. Sibutol, at 380 seeds/m^2 with the Nordsten drill.
13-Oct-98	B		Hardy at 10.0 kg.
15-Oct-98	B		Hardy at 7.5 kg.
04-Nov-98	B		Decoy at 7.5 kg.
23-Nov-98	**T**	L	Combination drilled, Hereward, tr. Sibutol, at 400 seeds/m^2 with the Nordsten drill.
16-Dec-98	B		Draza at 5.5 kg.
10-Mar-99	B		tm) Isoguard at 1.0 l in 200 l.
	B		tm) Unite A at 0.125 l in 200 l.
	B		tm) Unite B at 1.0 l in 200 l.
	B		tm) Cropoil at 1.0 l in 200 l.
12-Mar-99	B		34.5% N at 145 kg.
01-Apr-99	**T**	CT E	tm) Mon 37500 at 25 g in 200 l.
	T	CT E	tm) Genamin at 400 ml in 200 l.
12-Apr-99	B		34.5% N at 435 kg.
01-May-99	B		Opus at 0.7 l in 200 l.
29-May-99	B		tm) Folicur at 1.0 l in 100 l.
	B		tm) Sipcam UK Rover 500 at 1.0 l in 100 l.
17-Jun-99	B		Folicur at 0.25 l in 100 l.
16-Aug-99	B		Combine harvest started. Chopped straw.
19-Aug-99	B		Combine harvest completed. Chopped straw.

Far Field I (W):

12-Aug-98	**T**	C	Straw chopped.
28-Aug-98	**T**	B	Straw burnt.
30-Aug-98	**T**	T	Flexitined to 10 cm twice.
02-Sep-98	**T**	P	Ploughed.
14-Sep-98	**T**	P	Cambridge rolled.
24-Sep-98	B		tm) Alpha Glyphogan at 3.0 l in 200 l.
	B		tm) Codacide Oil at 0.5 l.
12-Oct-98	B		Rotary harrowed.
	T	E	Combination drilled, Hereward, tr. Sibutol, at 380 seeds/m^2 with the Nordsten drill.
05-Nov-98	B		Hardy at 15 kg.
19-Nov-98	**T**	L	Combination drilled, Hereward, tr. Sibutol, at 450 seeds/m^2 with the Nordsten drill.
23-Nov-98	B		Decoy at 5.0 kg.
18-Feb-99	B		34.5% N at 145 kg.
25-Feb-99	B		tm) Platform S at 1.0 kg in 200 l.
	B		tm) Isoguard at 2.0 l in 200 l.
02-Apr-99	B		34.5% N at 377 kg.
24-Apr-99	B		tm) Folicur at 0.5 l in 200 l.

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99/R/CS/309 and 99/W/CS/309

Experimental diary:

Far Field I (W):

24-Apr-99	B		tm) Tripart Brevis at 2.0 l in 200 l.
27-May-99	B		tm) Folicur at 0.75 l in 200 l.
27-May-99	B		tm) Sipcam UK Rover 500 at 1.0 l in 200 l.
20-Aug-99	B		Combine harvested.

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

GRAIN TONNES/HECTARE

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

SOW DATE / STRAWCUL	E	L	Mean
BT1 BTTTTTT	9.28	8.01	8.64
BT1T2 CTTTTTT	10.59	9.10	9.85
BP2 BPPPPPP	9.77	9.25	9.51
BT1P2 CPPPPPP	9.22	8.91	9.07
CT1 CTTTTTT	10.89	8.17	9.53
CT1 CPTTPTT	10.62	3.20	6.91
CT1T2 CTPTTPT	8.20	6.43	7.31
CT1T2 CTTPTTP	8.32	8.92	8.62
CP2 CPPPPPP	9.33	8.78	9.06
CP2 CPTTPTT	10.58	4.50	7.54
CT1P2 CTPTTPT	8.80	6.13	7.46
CT1P2 CTTPTTP	8.70	8.99	8.85
Mean	9.53	7.53	8.53

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

STRAWCUL	SOW DATE	STRAWCUL SOW DATE
0.337	0.135	0.471

Except when comparing means with the same level(s) of STRAWCUL 0.466

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	33	0.476	5.6
BLOCK.WP.SP	36	0.659	7.7

GRAIN MEAN DM% 82.3

SUB-PLOT AREA HARVESTED 0.00644

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

GRAIN TONNES/HECTARE

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

SOW DATE / STRAWCUL	E	L	Mean
BT1 BTTTTTT	7.50	6.86	7.18
BT1T2 CTTTTTT	2.70	3.71	3.21
BP2 BPPPPPP	8.52	6.40	7.46
BT1P2 CPPPPPP	7.32	5.66	6.49
CT1 CTTTTTT	2.41	3.21	2.81
CT1 CPTTPTT	3.14	5.94	4.54
CT1T2 CTPTTPT	6.19	6.15	6.17
CT1T2 CTTPTTP	8.50	5.92	7.21
CP2 CPPPPPP	7.59	6.06	6.82
CP2 CPTTPTT	3.58	6.06	4.82
CT1P2 CTPTTPT	4.65	4.13	4.39
CT1P2 CTTPTTP	7.94	7.16	7.55
Mean	5.84	5.61	5.72

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

STRAWCUL	SOW DATE	STRAWCUL SOW DATE
0.683	0.111	0.736
Except when comparing means with the same level(s) of STRAWCUL		0.385

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	11	0.683	11.9
BLOCK.WP.SP	12	0.385	6.7

GRAIN MEAN DM% 82.7

SUB-PLOT AREA HARVESTED 0.00690

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99/R/CS/311

EFFECTS OF SHALLOW STRAW INCORPORATION

Object: To study the effects on eyespot of incorporating wheat and rape debris using non-inversion tillage - West Barnfield I.

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

The 15th year, w. wheat.

For previous years see 85-98/R/CS/311.

Design: 6 x 4 criss-cross.

Whole plot dimensions: 4.5 x 12.0.

Treatments: Combinations of:-

1. **STRAW** (on 'columns') Treatments to straw of previous crop (only wheat in 1999):

BU	Burnt (duplicated)
BA	Baled and removed (duplicated)
CH	Chopped and incorporated (duplicated)

2. **GLYPHOS** (on 'rows') Glyphosate and crop:

-	W. wheat 'as usual'
G	W. wheat after glyphosate in 1998
RAS	S. rape (no yields)
WR	W. wheat given glyphosate in 1999 (no yields)

Experimental diary:

12-Aug-98	: **T** :	BA	:	Straw baled and removed
	: **T** :	CH	:	Straw chopped and incorporated
19-Aug-98	: **T** :	BU	:	Straw burnt and ash incorporated to 10cm.
02-Sep-98	: B :		:	Flexitined.
22-Sep-98	: B :		:	Flexitined.
	: B :		:	Rotary harrowed.
23-Sep-98	: **T** :	-,G,WR	:	Hereward, tr. Beret Gold, drilled at 380 seeds/m^2 with the Massey Ferguson 30 drill.
24-Sep-98	: **T** :	-,G,WR	:	Rolled.
26-Sep-98	: **T** :	-,G,WR	:	Hardy at 7.5 kg.
18-Nov-98	: **T** :	RAS	:	Roundup at 3.0 l in 200 l.
	: **T** :	-,G,WR	:	Avadex BW Granular at 22.5 kg.
01-Dec-98	: **T** :	-,G,WR	:	tm) Amazon at 1.0 l in 200 l.
	: **T** :	-,G,WR	:	tm) Isogard at 2.0 l in 200 l.
	: **T** :	-,G,WR	:	tm) Stefes Cypermethrin 2 at 250 ml in 200
	: **T** :	-,G,WR	:	tm) Cropoil at 1.0 l in 200 l.
12-Mar-99	: **T** :	-,G,WR	:	34.5% N at 145 kg.
31-Mar-99	: **T** :	RAS	:	tm) PDQ at 3.0 l in 200 l.
	: **T** :	RAS	:	tm) Enhance at 100 ml in 200 l.
01-Apr-99	: **T** :	-,G,WR	:	tm) Mon 37500 at 25 g in 200 l.
	: **T** :	-,G,WR	:	tm) Genamin at 400 ml in 200 l.
07-Apr-99	: **T** :	RAS	:	Flexitined.
	: **T** :	RAS	:	Combination drilled, Canyon, tr. Rovral Liquid FS and Hydraguard, at 250 seeds/m^2 with the Nordsten drill.
	: **T** :	RAS	:	Rolled.

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99/R/CS/311

Experimental diary:

07-Apr-99	: **T** :	RAS	:	Decoy at 15 kg.
08-Apr-99	: **T** :	RAS	:	Clayton Metazachlor at 1.0 l in 200 l.
15-Apr-99	: B :		:	34.5% N at 435 kg.
19-May-99	: **T** :	RAS	:	Hallmark at 150 ml in 200 l.
29-May-99	: **T** :	-,G,WR	:	tm) Folicur at 1.0 l in 100 l.
	: **T** :	-,G,WR	:	tm) Sipcam UK Rover 500 at 1.0 l in 100 l.
09-Jun-99	: **T** :	RAS	:	Hallmark at 150 ml in 200 l.
25-Jun-99	: **T** :	WR	:	Roundup at 4.0 l in 200 l.
	: **T** :	-,G	:	tm) Folicur at 0.25 l in100 l.
	: **T** :	-,G	:	tm) Magnesium sulphate at 5.0 kg in 100 l.
29-Jul-99	: **T** :	-,G	:	Combine harvested.
25-Aug-99	: **T** :	RA	:	Combine harvested, no yields.

NOTE: Yields were only taken from the 'rows' in w. wheat; - and G.

GRAIN TONNES/HECTARE

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

GLYPHOS	-	G	Mean
STRAW			
BU	9.49	10.20	9.85
BA	3.98	9.81	6.90
CH	5.19	9.10	7.15
Mean	6.22	9.71	7.96

GRAIN MEAN DM% 86.7

SUB-PLOT AREA HARVESTED 0.00276

https://doi.org/10.23637/ERADOC-1-34

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99/R/CS/323

CEREAL SEQUENCES AND TAKE-ALL

Object: To study the effect of seed treatment on take-all (*Gaeumannomyces graminis*) in w. wheat grown after various cereal sequences - West Barnfield II.

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

The 12th year, w. wheat.

For previous years see 88-96,98/R/CS/323.

Design: 3 randomised blocks of 26 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

1. **FUN99** Seed dressing in 1999:

NONE	None
FLUQUIN	Fluquinconazole

2. **GROUP** Crop sequences and levels of take-all decline:

I	Old sequences with well established take-all decline
II	Old sequences with less well established take-all decline
III	Old sequences with take-all decline possibly not established

Experimental diary:

15-Sep-98	B		Ploughed and furrow pressed.
24-Sep-98	**T**	NONE	Combination drilled, Hereward, recleaned, at 380 seeds/m^2 with the Accord drill.
	T	FLUQUIN	Combination drilled, Hereward, treated, at 380 seeds/m^2 with the Accord drill.
25-Sep-98	B		Rolled.
01-Dec-98	B		tm) Amazon at 1.0 l in 200 l.
	B		tm) Isogard at 2.0 l in 200 l.
	B		tm) Stefes Cypermethrin 2 at 250 ml in 200 l.
	B		tm) Cropoil at 1.0 l in 200 l.
12-Feb-99	B		Muriate of potash at 600 kg.
12-Mar-99	B		34.5% N at 145 kg.
18-Mar-99	B		Triple superphosphate at 300 kg.
15-Apr-99	B		34.5% N at 435 kg.
01-May-99	B		Opus at 0.7 l in 200 l.
29-May-99	B		tm) Folicur at 1.0 l in 100 l.
	B		tm) Sipcam UK Rover 500 at 1.0 l in 100 l.
25-Jun-99	B		tm) Folicur at 0.25 l in 100 l.
	B		tm) Magnesium sulphate at 5.0 kg in 100 l.
29-Jul-99	B		Combine harvested.

Previous crops: Set-aside 1997, w. wheat 1998.

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99/R/CS/323

GRAIN TONNES/HECTARE

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

FUNG99 GROUP	NONE	FLUQUIN	Mean
I	9.50	9.97	9.73
II	9.05	9.69	9.37
III	9.00	9.81	9.41
Mean	9.18	9.82	9.50

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

GROUP	FUNG99	GROUP FUNG99
0.160	0.131	0.227

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	64	0.555	5.8

GRAIN MEAN DM% 87.6

PLOT AREA HARVESTED 0.00227

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99/R/CS/326 and 99/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, P.C. Brookes.

The 13th year, w. wheat.

For previous years see 87-98/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	5.8	5.6
2 NORMAL	Twice normal	11.6	11.2
4 NORMAL	Four times normal	23.2	22.4

Experimental diary:

Great Knott III (R):

20-Aug-98	**T**	NONE	Straw removed.
	T	NORMAL,2 NORMAL,4 NORMAL	Straw applied and chopped.
08-Oct-98	B		Ploughed.
13-Oct-98	B		Rotary harrowed. Drilled Hereward, tr. Sibutol, at 380 seeds/m^2 with the Nordsten drill.
	B		Hardy at 10.0 kg.
15-Oct-98	B		Hardy at 7.5 kg.
04-Nov-98	B		Decoy at 7.5 kg.
10-Mar-99	B		tm) Isoguard at 1.0 l in 200 l.
	B		tm) Unite A at 0.125 l in 200 l.
	B		tm) Unite B at 1.0 l in 200 l.
	B		tm) Cropoil at 1.0 l in 200 l.
15-Mar-99	B		34.5% N at 145 kg.
12-Apr-99	B		34.5% N at 435 kg.
01-May-99	B		Opus at 0.7 l in 200 l.
29-May-99	B		tm) Folicur at 1.0 l in 100 l.
	B		tm) Sipcam UK Rover 500 at 1.0 l in 100 l.
17-Jun-99	B		Folicur at 0.25 l in 100 l.
23-Aug-99	B		Combine harvested.

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99/R/CS/326 and 99/W/CS/326

Experimental diary:

Far Field I (W):

17-Aug-98	**T**	NONE	Straw removed
	T	NORMAL,2 NORMAL, 4 NORMAL	Straw applied and chopped.
02-Sep-98	B		Ploughed.
14-Sep-98	B		Cambridge rolled.
12-Oct-98	B		Rotary harrowed. Drilled Hereward, tr. Sibutol, at 325 seeds/m^2 with the Accord drill.
05-Nov-98	B		Hardy at 15 kg.
18-Feb-99	B		34.5% N at 145 kg.
25-Feb-99	B		tm) Platform S at 1.0 kg in 200 l.
	B		tm) Isoguard at 2.0 l in 200 l.
02-Apr-99	B		34.5% N at 377 kg.
24-Apr-99	B		tm) Folicur at 0.5 l in 200 l.
	B		tm) Tripart Brevis at 2.0 l in 200 l.
27-May-99	B		tm) Folicur at 0.75 l in 200 l.
	B		tm) Sipcam UK Rover 500 at 1.0 l in 200 l
20-Aug-99	B		Combine harvested.

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

GRAIN TONNES/HECTARE

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

STRAW	
NONE	8.83
NORMAL	7.91
2 NORMAL	7.75
4 NORMAL	7.73
Mean	8.06

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

STRAW
1.022

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	9	1.445	17.9

GRAIN MEAN DM% 88.3

STRAW TONNES/HECTARE

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

STRAW	
NONE	4.22
NORMAL	4.45
2 NORMAL	4.34
4 NORMAL	4.75
Mean	4.44

STRAW MEAN DM% 80.9

PLOT AREA HARVESTED 0.00310

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

GRAIN TONNES/HECTARE

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

STRAW	
NONE	8.44
NORMAL	8.63
2 NORMAL	8.38
4 NORMAL	8.12
Mean	8.39

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

STRAW
0.259

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	6	0.317	3.8

GRAIN MEAN DM% 81.5

STRAW TONNES/HECTARE

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

STRAW	
NONE	3.95
NORMAL	3.99
2 NORMAL	3.98
4 NORMAL	4.07
Mean	4.00

STRAW MEAN DM% 92.2

PLOT AREA HARVESTED 0.00333

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99/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 ninth year, w. wheat.

For previous years see 91-98/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:

09-Sep-98	B		Ploughed and furrow pressed, started.
10-Sep-98	B		Ploughed and furrow pressed, continued.
15-Sep-98	B		Ploughed and furrow pressed, completed.
19-Sep-98	B		Rotary harrowed.
21-Dec-98	B		Combination drilled, Mercia, tr Beret Gold, at 650 seeds/m^2 with the Nordsten drill.
10-Mar-99	B		tm) Isoguard at 1.0 l in 200 l.
	B		tm) Unite A at 0.125 l in 200 l.
	B		tm) Unite B at 1.0 l in 200 l.
	B		tm) Cropoil at 1.0 l in 200 l.
27-Apr-99	**T**	50,100,150,200,250,300	34.5% N at 145, 290, 435, 580, 725, 870 kg respectively.
30-Apr-99	B		tm) Opus at 0.7 l in 200 l.
	B		tm) Tripart Brevis at 2.0 l in 200 l.
01-Jun-99	B		tm) Folicur at 0.75 l in 100 l.
	B		tm) Sipcam UK Rover 500 at 1.0 l in 100 l.
11-Jun-99	B		tm) Grasp at 0.5 l in 200
	B		tm) Output at 0.7 l in 200 l.
25-Jun-99	B		tm) Folicur at 0.25 l in 100 l.
	B		tm) Magnesium sulphate at 5.0 kg in 100 l.
23-Aug-99	B		Combine harvested.

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99/R/CS/355

GRAIN TONNES/HECTARE

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

N	
0	2.31
50	3.65
100	5.12
150	7.38
200	7.73
250	8.24
300	8.10
Mean	6.07

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

N
0.554

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.678	11.2

GRAIN MEAN DM% 87.4

PLOT AREA HARVESTED 0.00483

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99/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 seventh year, grass.

For previous years see 94-98/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:

07-Apr-99	: B :		: Decoy at 15 kg.
	: B :		: Starane 2 at 1.0 l in 220 l eastern 6 m.
	: B :		: Starane 2 at 1.0 l in 400 l except eastern 6 m.
03-Jun-99	: **T** :	N1	: 34.5% N at 174 kg
	: **T** :	N2	: 34.5% N at 348 kg
27-Jan-00	: B :		: Cut.

DRY MATTER TONNES/HECTARE

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

N	-	N1	N2	Mean
	14.49	14.05	14.76	14.44

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

N
0.163

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	4	0.200	1.4

MEAN DM% 52.4

AVERAGE PLOT AREA HARVESTED 0.00041

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99/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 seventh year, grass.

For previous year see 94-98/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:

07-Apr-99	B		Decoy at 15 kg.
09-Apr-99	B		Roundup at 4.0 l in 220 l.
03-Jun-99	**T**	N1	34.5% N at 174 kg.
11-Jan-00	B		Cut.

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99/R/CS/411

DRY MATTER TONNES/HECTARE

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

N	-	N1	Mean
VARIETY			
CAVIN R	10.78	13.27	12.03
KANLOW	12.15	11.46	11.81
PATHFIND	11.65	10.21	10.93
SUNBURST	9.76	9.52	9.64
FORESTB	10.14	8.60	9.37
NEBR 28	10.33	11.36	10.85
DACOTAH	7.11	7.89	7.50
Mean	10.28	10.33	10.30

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

VARIETY	N	VARIETY N
0.777	0.415	1.099

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	26	1.346	13.1

MEAN DM% 56.7

PLOT AREA HARVESTED 0.00047

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99/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 fifth year, w. wheat.

For previous years see 98/W/CS/427.

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:

24-Sep-98	B	tm)	Alpha Glyphogan at 3.0 l in 200 l.
	B	tm)	Codacide Oil at 0.5 l in 200 l.
16-Oct-98	**T**		Sludges applied as treatment.
17-Nov-98	B		Mechanical spade cultivated.
19-Nov-98	B		Rolled. Drilled Riband, tr. Anchor, at 380 seeds/m^2 with the Accord drill.
23-Nov-98	B		Decoy at 5.0 kg.
19-Mar-99	B	tm)	Isoguard at 2.0 l in 200 l.
	B	tm)	Platform S at 1.0 kg in 200 l.
03-Apr-99	B		34.5% N at 116 kg.
25-Apr-99	B	tm)	Folicur at 0.5 l in 200 l.
	B	tm)	Tripart Brevis at 2.0 l in 200 l.
29-Apr-99	B		Muriate of potash at 150 kg. 27% N at 370 kg.

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99/W/CS/427

Experimental diary:

07-May-99	: B :	:	Ally at 30 g in 200 l.
27-May-99	: B :	:	tm) Folicur at 0.75 l in 200 l.
	: B :	:	tm) Sipcam UK Rover 500 at 1.0 l in 200 l.
22-Aug-99	: B :	:	Combine harvested, straw chopped.

NOTE: The yield of one plot was lost because of pest damage, with treatment T18. An estimated value was used in the analysis.

GRAIN TONNES/HECTARE

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

SLUDGE	
T1	3.51
T2	4.91
T3	3.48
T4	4.41
T5	4.54
T6	4.23
T7	4.61
T8	3.40
T9	4.03
T10	4.08
T11	4.31
T12	3.87
T13	4.29
T14	3.93
T15	4.16
T16	4.44
T17	3.59
T18	4.50
T19	3.85
T20	4.42
Mean	4.15

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

SLUDGE	
0.815	min.rep
0.706	max-min
0.576	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	46	0.998	24.1

GRAIN MEAN DM% 85.4 PLOT AREA HARVESTED 0.00184

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99/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 fifth year, s. wheat.

For previous year see 98/W/CS/428.

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:

22-Dec-98	B	Raked. Broadcast Riband, tr. Beret Gold, at 600 seeds/m^2 by hand. Raked.
19-Mar-99	B	Raked. Broadcast Chablis, tr. Sibutol, at 330 seeds/m^2 by hand. Raked.
29-Apr-99	B	Muriate of potash at 167 kg. 27% N at 630 kg.
07-May-99	B	Ally at 30 g in 200 l.
20-Aug-99	B	Hand harvested.

NOTE: The w. wheat failed and was resown to s. wheat.

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99/W/CS/428

GRAIN TONNES/HECTARE

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

SLUDGE	
T21	1.83
T22	1.85
T23	2.55
T24	2.80
T25	2.37
T26	2.42
T27	1.85
T28	1.62
T29	2.40
T30	2.81
T31	1.71
Mean	2.14

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

SLUDGE	
0.569	min.rep
0.492	max-min
0.402	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	0.696	32.5

GRAIN MEAN DM% 89.1

PLOT AREA HARVESTED (MEAN) 0.00043

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99/R/CS/429

WINTER RYE AS AN ENERGY CROP

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

Sponsor: D.G. Christian.

The sixth year, w. rye.

For previous years see 94-98/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:

25-Aug-98	B		Alpha Glyphogan at 4.0 l in 220 l.
18-Sep-98	B		Ploughed.
25-Sep-98	B		Cambridge rolled.
	B		Combination drilled, Esprit, undressed, at 350 seeds/m^2 with the Accord drill.
26-Sep-98	B		Cambridge rolled.
02-Oct-98	B		Hardy at 15 kg.
20-Oct-98	**T**		Hand broadcast Esprit, undressed, at 380 seeds/m^2 to all misses.
21-Oct-98	B		Hardy at 7.5 kg.
04-Nov-98	B		Decoy at 7.5 kg.
07-Apr-99	B		Decoy at 15 kg.
09-Apr-99	B		Quantum at 0.03 kg in 200 l.
23-Apr-99	**T**	N1,N2,N3,N4	34.5% N applied as treatment.
27-May-99	B		Folicur at 1.0 l in 200 l.
03-Aug-99	B		Combine harvested.

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99/R/CS/429

GRAIN TONNES/HECTARE

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

N	
-	6.75
N1	7.30
N2	7.74
N3	8.11
N4	8.00
Mean	7.58

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

N
0.630

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	8	0.772	10.2

GRAIN MEAN DM% 87.6

STRAW TONNES/HECTARE

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

N	
-	5.41
N1	6.16
N2	6.64
N3	8.21
N4	7.42
Mean	6.77

STRAW MEAN DM% 83.1

PLOT AREA HARVESTED 0.00230

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99/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.

The fifth year, s. wheat. For previous year see 98/W/CS/439.

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:

22-Dec-98	B	Raked. Broadcast Riband, tr. Beret Gold, at 600 seeds/m^2 by hand. Raked.
19-Mar-99	B	Raked. Broadcast Chablis, tr. Sibutol, at 330 seeds/m^2 by hand. Raked.
29-Apr-99	B	Muriate of potash at 183 kg. 27% N at 648 kg.
07-May-99	B	Ally at 30 g in 200 l.
20-Aug-99	B	Hand harvested.

NOTES: (1) The winter wheat failed and was resown to s. wheat.
(2) The yields of two plots with treatments CD1 and CU2 were lost due to poor establishment. Estimated values were used in the analysis.

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99/W/CS/439

GRAIN TONNES/HECTARE

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

SALTS	
A	1.02
ZN1	1.18
ZN2	0.72
ZN3	1.29
CU1	0.79
CU2	0.35
CU3	1.09
CD1	2.01
CD2	1.40
CD3	1.31
Mean	1.11

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

SALTS	
0.414	min.rep
0.359	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	19	0.508	45.8

GRAIN MEAN DM% 89.4

PLOT AREA HARVESTED

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99/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 96-98/W/CS/446.

The fourth year, w. wheat.

Design: 4 randomised blocks of 10 x 2 plots.

Whole plot dimensions: 6.0 x 10.0.

Treatments:

All combinations of:-

Whole plots

1. **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. **CULT**		Time of ploughing in 1996:
	(PE)	Early (17 May)
	(PL)	Late (14 Aug)

Experimental diary:

25-Sep-98	B	:	Disced.
28-Sep-98	B	:	Ploughed and pressed.
13-Oct-98	B	:	Combination drilled, Rialto, tr. Sibutol, at 380 seeds/m^2 with the Nordsten drill.
14-Oct-98	B	:	Hardy at 7.5 kg.
22-Feb-99	B	:	34.5% N at 145 kg.
23-Feb-99	B	:	Platform S at 1.0 kg with Isoguard at 2.0 l and manganese sulphate at 1.0 l in 200 l.
02-Apr-99	B	:	34.5% N at 377 kg.
03-Apr-99	B	:	tm) Topik at 125 ml in 200 l.
	B	:	tm) Cropoil at 2.5 l in 200 l.
	B	:	tm) Profol Manganese 500 at 1.0 l in 200 l.
	B	:	tm) Profol Copper 500 at 0.25 l in 200 l.

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99/W/CS/446

Experimental diary:

28-Apr-99	B	tm)	Folicur at 0.5 l in 200 l.
	B	tm)	Tripart Brevis at 2.0 l in 200 l.
	B	tm)	Profol Manganese 500 at 1.0 l in 200 l.
21-May-99	B		Ally at 30 g with Starane 2 at 0.5 l in 200 l.
27-May-99	B		Folicur at 1.0 l in 200 l.
21-Aug-99	B		Combine harvested, straw chopped.

GRAIN TONNES/HECTARE

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

CULT / **CROP**	(PE)	(PL)	Mean
(R)	6.45	5.45	5.95
(RW)	6.64	6.85	6.75
(RI)	6.39	5.96	6.17
(RWI)	7.00	8.04	7.52
(M)	6.79	6.45	6.62
(MW1)	6.84	7.71	7.27
(MW2)	7.45	6.60	7.03
(MW3)	7.24	6.80	7.02
(MW4)	5.83	6.14	5.99
(MW5)	6.46	6.68	6.57
Mean	6.71	6.67	6.69

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

CROP	**CULT**	**CROP** **CULT**
0.392	0.175	0.555

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	57	0.784	11.7

GRAIN MEAN DM% 84.8

PLOT AREA HARVESTED 0.00459

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99/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 third 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 treatment and year:

	1997	1998	1999
---(duplicated)	None	None	None
E-E	CR21528	None	CR21528
-E-	None	CR21528	None
EEE	CR21528	CR21528	CR21528
B-B	CR21529	None	CR21529
-B-	None	CR21529	None
BBB	CR21529	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:

09-Sep-98	B		Ploughed and furrow pressed, started.
10-Sep-98	B		Ploughed and furrow pressed, completed.
25-Sep-98	B		Rolled.
26-Sep-98	**T**	BW	Combination drilled, Regina, tr. as treatment, at 350 seeds/m^2 with the Accord drill.
	T	WW	Combination drilled, Hereward tr. as treatment, at 380 seeds/m^2 with the Accord drill.
28-Sep-98	B		Hardy at 7.5 kg.
11-Nov-98	B		Avadex BW Granular at 22.5 kg.
03-Dec-98	B		tm) Isoguard at 2.0 l in 200 l.
	B		tm) Stomp 400 SC at 3.0 l in 200 l.
	B		tm) Stefes Cypermethrin 2 at 250 ml in 200 l.
10-Mar-99	B		34.5% N at 145 kg.
30-Mar-99	B		34.5% N at 315 kg.
07-May-99	B		tm) Ally at 10 g in 200 l.
	B		tm) Starane 2 at 0,5 l in 200 l.
28-Jul-99	**T**	BW	Combine harvested.
30-Jul-99	**T**	WW	Combine harvested.

NOTE: The yield of one plot with **FUNGCIDE** BBB and **CROP** BW was lost because of lodging. An estimated value was used in the analysis.

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99/R/CS/472

GRAIN TONNES/HECTARE

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

CROP / FUNGCIDE	WW	BW	Mean
---	8.50	7.74	8.12
E-E	8.26	8.00	8.13
-E-	7.56	7.39	7.48
EEE	8.49	7.85	8.17
B-B	8.71	7.76	8.23
-B-	7.54	7.94	7.74
BBB	8.31	8.13	8.22
Mean	8.23	7.82	8.03

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

FUNGCIDE	CROP	FUNGCIDE CROP	
0.261		0.369	min.rep
0.226	0.131	0.320	max-min
		0.261	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	46	0.522	6.5

GRAIN MEAN DM% 87.6

PLOT AREA HARVESTED 0.00227

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99/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: J.F. Jenkyn, R.G. Gutteridge, G.L. Bateman.

The third year, w. wheat.

For previous years see 97-98/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 treatment to the 1997 crop:
	(F97)	Seed treated
	(-97)	None
2. **FUNG98**		Fungicidal seed treatment to the 1998 crop:
	(F98)	Seed treated
	(-98)	None
3. **FUNG99**		Fungicidal seed treatment to the 1999 crop:
	F99	Seed treated
	-99	None

NOTE: The seed treatment was fluquinconazole at 75 g/100 kg of seed.

Experimental diary:

26-Sep-98	B	:	Ploughed.
12-Oct-98	B	:	Spring-tined.
	B	:	Combination drilled, Hereward, tr as treatment, at 380 seeds per m^2 with the Accord drill.
	B	:	Hardy at 7.5 kg.
09-Mar-99	B	:	tm) Isoguard at 1.0 l in 200 l.
	B	:	tm) Unite A at 0.125 l in 200 l.
	B	:	tm) Unite B at 1.0 l in 200 l.
	B	:	tm) Cropoil at 1.0 l in 200 l.
12-Mar-99	B	:	34.5% N at 145 kg.
14-Apr-99	B	:	34.5% N at 435 kg.
29-Jul-99	B	:	Combine harvested.

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99/R/CS/476

GRAIN TONNES/HECTARE

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

FUNG98	(F98)	(-98)	Mean
FUNG97			
(F97)	6.26	6.00	6.13
(-97)	5.95	6.01	5.98
Mean	6.10	6.01	6.06

FUNG99	F99	-99	Mean
FUNG97			
(F97)	6.45	5.81	6.13
(-97)	6.24	5.72	5.98
Mean	6.35	5.77	6.06

FUNG99	F99	-99	Mean
FUNG98			
(F98)	6.44	5.76	6.10
(-98)	6.25	5.77	6.01
Mean	6.35	5.77	6.06

	FUNG99	F99	-99
FUNG97	**FUNG98**		
(F97)	(F98)	6.26	6.26
	(-98)	6.65	5.36
(-97)	(F98)	6.63	5.26
	(-98)	5.84	6.18

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

FUNG97	**FUNG98**	**FUNG99**	**FUNG97** **FUNG98**
0.359	0.359	0.359	0.508

FUNG97 **FUNG99**	**FUNG98** **FUNG99**	**FUNG97** **FUNG98** **FUNG99**
0.508	0.508	0.718

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	21	1.015	16.8

GRAIN MEAN DM% 87.0

PLOT AREA HARVESTED 0.00227

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99/R/CS/477

CONTINUOUS MAIZE

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

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

The third year, forage maize and s. barley.

For previous years see 97-98/R/CS/477

Design: 3 randomised blocks of 6 plots.

Plot dimensions: 12.0 x 25.0.

Treatments:-

CROP	Crop and straw treatments:
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
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

Experimental diary:

17-Sep-98	**T**	BTM,MTB	:	10 t maize tops spread, finished 18-Sep.
23-Sep-98	B		:	Muriate of potash at 167 kg.
	B		:	Triple superphosphate at 171 kg.
20-Oct-98	B		:	Ploughed, started.
21-Oct-98	B		:	Ploughed, completed.
06-Apr-99	B		:	Spring-tined.
16-Apr-99	**T**	B,BM,BTM	:	Combination drilled, Cooper, tr. Raxil S, at 350 seeds per m^2 with the Accord drill.
05-May-99	B		:	34.5% N at 275 kg.
	T	M,MB,MTB	:	Rotary harrowed.
	T	M,MB,MTB	:	Hudson, tr. Mesurol, drilled at 11 seeds/m^2 with the Nodet Gougis drill
06-May-99	B	B,BM,BTM	:	Punch C at 0.4 l in 200 l.
15-May-99	**T**	B,BM,BTM	:	tm)Ally at 30 g in 200 l.
	T	B,BM,BTM	:	tm)Duplosan at 1.0 l in 200 l.
01-Jun-99	**T**	B,BM,BTM	:	Punch C at 0.5 l in 200 l.
23-Jun-99	**T**	M,MB,MTB	:	tm)Gesaprim at 3.0 l in 200 l.
	T	M,MB,MTB	:	tm)Cropoil at 5.0 l in 200 l.
25-Aug-99	**T**	B,BM,BTM	:	Combine harvested.
20-Sep-99	**T**	M,MB,MTB	:	Hand harvested.

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99/R/CS/477

MAIZE

WHOLE CROP TONNES/HECTARE

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

CROP	
M	14.03
MB	14.10
MTB	13.60
Mean	13.91

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

CROP
0.519

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	4	0.636	4.6

GRAIN MEAN DM% 27.7

PLOT AREA HARVESTED 0.00108

SPRING BARLEY

GRAIN TONNES/HECTARE

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

CROP	
BM	5.91
BTM	5.77
B	5.72
Mean	5.80

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

CROP
0.159

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	4	0.195	3.4

GRAIN MEAN DM% 86.0

PLOT AREA HARVESTED 0.00575

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99/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 third year, forage maize and s. barley.

For previous years see 97-98/W/CS/478.

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, 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:

17-Sep-98	**T**	MTB,BTM	Chopped maize tops at 10 t.
19-Sep-98	B		PK as (0:24:24) at 334 kg. Muriate of potash at 47 kg.
29-Sep-98	B		Ploughed.
19-Mar-99	B		Sting ECO at 4.0 l in 200 l.
12-Apr-99	**T**	B,BM,BTM	Combination drilled, Cooper, tr. Raxil S, at 370 seeds/m^2 with the Accord drill.
04-May-99	B		27% N at 356 kg.
06-May-99	**T**	M,MB,MTB	Rotary harrowed. Drilled, Hudson, tr. Mesurol, at 11 seeds/m^2 with the Nodet Gougis drill.
07-May-99	**T**	B,BM,BTM	Ally at 30 g in 200 l.
10-Jun-99	**T**	B,BM,BTM	Astix at 2.0 l with Dorin at 1.0 l in 200 l.
24-Jun-99	**T**	M,MB,MTB	Gesaprim at 3.0 l with Cropoil at 5.0 l in 220 l.
23-Aug-99	**T**	B,BM,BTM	Combine harvested.
21-Sep-99	**T**	M,MB,MTB	Hand harvested.

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99/W/CS/478 MAIZE

WHOLE CROP YIELD TONNES/HECTARE

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

CROP	
M	9.14
MB	9.80
MTB	9.52
Mean	9.49

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

CROP
0.861

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	4	1.055	11.1

GRAIN MEAN DM% 32.8

PLOT AREA HARVESTED 0.00108

S. BARLEY

GRAIN TONNES/HECTARE

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

CROP	
BM	3.98
BTM	4.39
B	3.87
Mean	4.08

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

CROP
0.120

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	4	0.147	3.6

GRAIN MEAN DM% 85.8

PLOT AREA HARVESTED 0.00575

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99/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.

For previous year see 98/R/CS/480.

The third year, grasses.

Design: 3 randomised blocks of 15 plots.

Plot dimensions: 5.0 x 5.0.

Treatments:-

GENOTYPE

1	Giganteus/M1 Lasel 1
2	Giganteus/M53 ILP53
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:

12-Mar-99	B		tm) PDQ at 3.0 l in 200 l.
	B		tm) Enhance at 100 ml in 200 l.
03-Jun-99	B		Muriate of potash at 276 kg.
	B		Triple superphosphate at 213 kg.
	B		34.5% N at 174 kg.
28-Jan-00	B		Cut.

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99/R/CS/480

DRY MATTER TONNES/HECTARE

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

GENOTYPE	
1	9.18
2	12.72
3	12.23
4	12.08
5	6.28
6	11.26
7	12.31
8	5.39
9	12.80
10	11.06
11	6.45
12	5.51
13	7.29
14	3.10
15	4.53
Mean	8.81

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

GENOTYPE
0.893

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	28	1.094	12.4

MEAN DM% 67.7

PLOT AREA HARVESTED 0.00090

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99/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 second year, w. wheat.

For previous year see 98/W/CS/482.

Design: 4 randomised blocks of 6 plots.

Plot dimensions: 3.0 x 12.0.

Treatments:-

SULPHUR	Kg of sulphur applied twice as gypsum (17.5% S):
S0	None
S1	5
S2	10
S3	20
S4	40
S5	80

Experimental diary:

04-Sep-98	B		Ploughed and pressed.
21-Sep-98	**T**	S1,S2,S3,S4,S5	Gypsum at 29, 57, 114, 229 or 457 kg respectively.
	B		Rotary harrowed.
25-Sep-98	B		Drilled, Rialto, tr. Beret Gold, at 380 seeds/m^2 with the Accord drill.
01-Feb-99	B		Muriate of potash at 200 kg.
18-Feb-99	B		34.5% N at 145 kg.
25-Feb-99	B		Platform S at 1.0 kg with Isoguard at 2.0 l in 200 l.
03-Apr-99	B		34.5% N at 377 kg.
14-Apr-99	**T**	S1,S2,S3,S4,S5	Gypsum at 29, 57, 114, 229 or 457 kg respectively.
25-Apr-99	B		tm) Folicur at 0.5 l in 200 l.
	B		tm) Tripart Brevis at 2.0 l in 200 l.
27-May-99	B		tm) Folicur at 0.75 l in 200 l.
	B		tm) Sipcam UK Rover 500 at 1.0 l in 200 l.
20-Aug-99	B		Combine harvested.

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99/W/CS/482

GRAIN TONNES/HECTARE

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

SULPHUR

S0	2.51
S1	4.89
S2	4.41
S3	4.19
S4	5.11
S5	4.52
Mean	4.27

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

SULPHUR
0.463

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	0.655	15.3

GRAIN MEAN DM% 81.3

PLOT AREA HARVESTED 0.00230

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99/R/CS/488

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 - Bones Close.

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: Combinations of:-

1. **FUNGCIDE** Fungicide in spring:

-	None
P	Prochloraz
C	Cyprodinil
Z	Azoxystrobin
D	HGCA 1

2. **CULTIVAR**

L	Lynx
A	Abbot
M	Mercia
S	Soissons

NOTE: Treatment HGCA 1 is under commercial development, composition disclosed in confidence.

Experimental diary:

29-Aug-98	B		Ploughed and furrow pressed, started.
30-Aug-98	B		Ploughed and furrow pressed, completed.
29-Sep-98	B		tm) PDQ at 3.0 l in 200 l.
	B		tm) Enhance at 200 ml in 200 l.
09-Oct-98	B		Spring-tined.
12-Oct-98	**T**	A	Combination drilled, Abbot, recleaned, at 380 seeds/m^2 with the Accord drill.
	T	L	Combination drilled, Lynx, recleaned, at 380 seeds/m^2 with the Accord drill.
	T	M	Combination drilled, Mercia, recleaned, at 380 seeds/m^2 with the Accord drill.
	T	S	Combination drilled, Soissons, recleaned, at 400 seeds/m^2 with the Accord drill.
15-Oct-98	B		Hardy at 7.5 kg.
13-Feb-99	B		tm) Chiltern IPU at 1.0 l in 200 l.
	B		tm) Unite A at 0.125 l in 200 l.
	B		tm) Unite B at 1.0 l in 200 l.
	B		tm) Cropoil at 1.0 l.
12-Mar-99	B		34.5% N at 145 kg.
09-Apr-99	**T**	C	Unix at 1.0 l in 220 l.
	T	D	HGCA1 at 1.5 l in 220 l.
	T	P	Sportak 45 EW at 0.889 l in 220 l.
	T	Z	Amistar at 1.0 l in 220 l.
16-Apr-99	B		34.5% N at 435 kg.
14-Jun-99	B		Starane 2 at 0.75 l in 200 l.
23-Jul-99	B		Alpha Glyphogan at 4.0 l in 200 l.
30-Jul-99	B		Combine harvested.

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99/R/CS/488

Previous crops: W. rape 1997, w. wheat 1998.

GRAIN TONNES/HECTARE

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

FUNGCIDE / CULTIVAR	-	P	C	Z	D	Mean
L	7.01	6.32	7.12	5.99	6.57	6.60
A	6.50	6.00	6.61	6.49	7.20	6.56
M	5.61	6.31	6.68	6.67	7.02	6.46
S	6.11	6.67	5.51	7.26	5.05	6.12
Mean	6.31	6.32	6.48	6.60	6.46	6.43

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

CULTIVAR	FUNGCIDE	CULTIVAR FUNGCIDE
0.284	0.318	0.636

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	57	0.899	14.0

GRAIN MEAN DM% 88.3

PLOT AREA HARVESTED 0.00228

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99/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 with and without fresh sulphur - Woburn, Stackyard III.

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

The second year, w. rape.

For previous year see 98/W/CS/491.

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

Whole plot dimensions: 4.0 x 12.0.
Sub-plot dimensions: 2.0 x 12.0.

Treatments: All combinations of:-

Whole plots:

1.	**S FORM**	Form of sulphur in 1998:
	(T+A)	Tiger 90 and ammonium sulphate
	(AS)	Ammonium sulphate
	(T90)	Tiger 90
	(NAS)	Sodium thiosulphate
2.	**APP TIME**	Time of application in 1998:
	(SB)	To the seedbed
	(MAR)	17-Mar-98

Sub-plots:

3.	**GYPSUM**	Gypsum (17.5% S) in 1999:
	SG	Sulphur at 30 kg
	S-	None
	EXTRA	
	-	None (duplicated)

Experimental diary:

02-Sep-98	B	:	Ploughed and pressed.
04-Sep-98	B	:	Rotary harrowed. Drilled Apex, tr. Lindex-Plus FS Seed Treatment, at 120 seeds/m^2 with the Accord drill.
16-Sep-98	B	:	34.5% N at 101 kg.
17-Sep-98	B	:	tm) Butisan S at 1.0 l in 200 l.
	B	:	tm) Cyperkill 10 at 250 ml in 200 l.
02-Dec-98	B	:	tm) Cyperkill 10 at 250 ml in 200 l.
	B	:	tm) Punch C at 0.4 l in 200 l.
22-Feb-99	B	:	34.5% N at 290 kg.

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99/W/CS/491

Experimental diary:

23-Feb-99	B		Punch C at 0.4 l in 200 l.
15-Apr-99	**T**	SG	Gypsum at 171 kg.
06-May-99	B		Bavistin DF at 1.0 kg in 200 l.
	B		Fastac at 200 ml.
13-Jul-99	B		tm)Reglone at 3.0 l in 400 l.
	B		tm)Enhance at 400 ml in 400 l.
22-Jul-99	B		Combine harvested.

NOTE: One sub-plot with treatment **EXTRA** - received the wrong treatment an estimated value was used in the analysis.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

APP TIME / **S FORM**	(SB)	(MAR)	Mean
(T+A)	3.02	2.85	2.94
(AS)	2.59	2.90	2.75
(T90)	2.72	3.10	2.91
(NAS)	2.78	2.74	2.76
Mean	2.78	2.90	2.84

GYPSUM / **S FORM**	SG	S-	Mean
(T+A)	3.41	2.47	2.94
(AS)	3.21	2.28	2.75
(T90)	3.51	2.32	2.91
(NAS)	3.36	2.16	2.76
Mean	3.37	2.31	2.84

GYPSUM / **APP TIME**	SG	S-	Mean
(SB)	3.28	2.27	2.78
(MAR)	3.46	2.34	2.90
Mean	3.37	2.31	2.84

S FORM	**GYPSUM** / **APP TIME**	SG	S-
(T+A)	(SB)	3.49	2.55
	(MAR)	3.32	2.39
(AS)	(SB)	3.20	1.98
	(MAR)	3.22	2.58
(T90)	(SB)	3.21	2.22
	(MAR)	3.80	2.41
(NAS)	(SB)	3.22	2.33
	(MAR)	3.50	1.98

EXTRA - 1.88

GRAND MEAN 2.73

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99/W/CS/491

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

	S FORM	APP TIME	GYPSUM	S FORM APP TIME
	0.183	0.130	0.107	0.259

	S FORM GYPSUM	APP TIME GYPSUM	S FORM APP TIME GYPSUM
	0.237	0.168	0.336

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

S FORM	0.213
APP TIME	0.151
S FORM.APP TIME	0.302

S.e.d. for comparing **EXTRA** - with any item **S FORM.APP TIME.GYPSUM** is 0.300

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	24	0.367	13.4
BLOCK.WP.SP	27	0.427	15.6

GRAIN MEAN DM% 88.1

PLOT AREA HARVESTED 0.00175

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99/R/CS/494

TAKE-ALL, PHIALOPHORA AND SEED TREATMENTS

Object: To test 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, J.F. Jenkyn.

The second year, w. wheat.

For previous year see 98/R/CS/494.

Design: 4 randomised blocks of 18 plots.

Plot dimensions: 3.0 x 10.0.

Treatments: Selected 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; fluquinconazole at 75 g/100 kg
	PS0	*Phialophora* inoculum and seed treatment fungicide fluquinconazole at 75 g/100 kg

Experimental diary:

11-Sep-98	B		Ploughed and furrow pressed, started.
14-Sep-98	B		Ploughed and furrow pressed, completed.
15-Oct-98	B		Combination drilled, Hereward, recleaned, at 380 seeds/m^2 with the Nordsten drill.
	T	P9	Inoculum applied at 23 g/m^3.
	T	T9	Inoculum applied at 23 g/m^3.
16-Oct-98	B		Hardy at 7.5 kg.
06-Nov-98	B		Decoy at 15 kg.
13-Feb-99	B		tm) Chiltern IPU at 1.0 l in 200 l.
	B		tm) Unite A at 0.125 l in 200 l.
	B		tm) Unite B at 1.0 l in 200 l.
	B		tm) Cropoil at 1.0 l in 200 l
10-Mar-99	B		34.5% N at 145 kg.
30-Apr-99	B		tm) Ally at 30 g in 200 l.
	B		tm) Starane 2 at 0.5 l in 200 l.
	B		tm) Opus at 0.7 l in 200 l.
27-May-99	B		tm) Opus at 0.75 l in 100 l.
	B		tm) Sipcam UK Rover 500 at 1.0 l in 100 l.
16-Jun-99	B		Folicur at 0.25 l in 100 l.

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99/R/CS/494

Experimental diary:
23-Jul-99 : B : : Alpha Glyphogan at 4.0 l in 200 l.
13-Aug-99 : B : : Combine harvested.

Previous crops: W. beans and lupins 1997, s. wheat 1998.

GRAIN TONNES/HECTARE

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

TRT1999	-9	P9	T9
TRT1998			
(-8)	9.81	9.83	*
(P8)	9.90	10.01	9.13
(T8)	7.73	7.51	*

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

A = (P8),P9
B = (P8),-9 or (P8),T9 or (T8),-9
C = (T8),P9
D = (-8),-9 or (-8),P9

For comparing items between groups A, B, C or D

B	0.294	0.240		
C	0.277	0.219		
D	0.268	0.208	0.183	0.170
	A	B	C	D

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	62	0.480	5.3

GRAIN MEAN DM% 81.6

PLOT AREA HARVESTED 0.00227

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99/W/CS/497

DIAGNOSIS OF S DEFICIENCY

Object: Diagnosis of S deficiency in oilseed rape - Woburn, Stackyard A II.

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

The first year, w. rape failed re-sown to s. rape.

Design: 4 blocks of 6 plots.

Plot dimensions: 3.0 x 12.0.

Treatments:-

SULPHUR	Rates of sulphur (kg) applied as gypsum (17.5% S):
S0	None
S1	5
S2	10
S3	20
S4	40
S5	80

Experimental diary:

02-Sep-98	B		Ploughed.
04-Sep-98	B		Rotary harrowed. Drilled, Apex, tr. Lindex-Plus FS Seed Treatment, at 120 seeds/m^2 with the Accord drill. Rolled.
16-Sep-98	B		34.5% N at 101 kg.
17-Sep-98	B		Butisan S at 1.0 l in 200 l.
	B		Cyperkill 10 at 250 ml.
02-Dec-98	B		tm) Cyperkill 10 at 0.25 l in 200 l.
	B		tm) Punch C at 0.4 l in 200 l.
25-Feb-99	B		Sting CT at 4.0 l in 200 l.
30-Mar-99	B		Strimmed nettles.
31-Mar-99	B		Combination drilled, Starlight, tr. Lindex-Plus FS Seed Treatment, at 180 seeds/m^2 with the Accord drill.
01-Apr-99	**T**	S1,S2,S3,S4,S5	Gypsum applied at 29, 57, 114, 229 or 457 kg respectively.
	B		Rolled.
	B		Butisan S at 1.0 l in 220 l.
19-Apr-99	B		34.5% N at 290 kg.
12-May-99	B		Removed all the nettles by hand.
09-Jun-99	B		Fastac at 200 ml in 200 l.
23-Aug-99	B		Combine harvested, straw chopped.

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99/W/CS/497

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

SULPHUR

SO	0.47
S1	0.57
S2	0.81
S3	0.89
S4	0.96
S5	0.82
Mean	0.75

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

SULPHUR
0.067

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	0.095	12.6

GRAIN MEAN DM% 87.0

PLOT AREA HARVESTED 0.00230

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99/R/CS/498

PANICUM VIRGATUM STUDY

Object: To test *Panicum* cultivars for biomass production - Highfield IV/Road Piec East.

Sponsors: D. G. Christian.

The second year, grass.

Design: 3 randomised blocks of 16 plots.

Whole plot dimensions: 2.0 x 4.5.

Treatments:

CULTIVAR

A	Alamo
B	Blackwell
C	Caddo
D	Cave-in-Rock
E	Forestburg
F	Kanlow
G	Nebraska-28
H	NI 93-1
I	NI 93-2
J	NU 94-2
K	Reap 921
L	Shelter
M	SU 94-1
N	9005439
O	9005438

Plus 3 unreplicated plots of mixtures

X1	G+K
X2	B+L
X3	F+Carthage

Experimental diary:

13-May-98	B	:	Ploughed
14-May-98	B	:	Rolled.
16-Jun-98	B	:	Muriate of potash at 190 kg, triple superphosphate at 247 kg.
22-Jun-98	B	:	Rotary harrowed twice.
	T	:	Cultivars drilled with Oyjord drill.
24-Jun-98	B	:	Rolled.
24-Jul-98	B	:	Basagran SG at 1.1 l in 200 l.
06-Aug-98	B	:	Swipe 560 EC at 3.5 l in 200 l.
26-Jan-99	B	:	Cut.
12-Mar-99	B	:	tm) PDQ at 3.0 l in 200 l.
	B	:	tm) Enhance at 100 ml in 200 l.
09-Apr-99	B	:	Gesaprim 500 SC at 3.0 l in 200 l.
21-May-99	B	:	Hardy at 15 kg.
20-Dec-99	B	:	Cut for yield.
25-Jan-00	B	:	Cut and cleared.

NOTES: (1) The yield of two plots, with **CULTIVAR** H were lost because of poor establishment. An estimate was used in the analysis.
(2) The yields for 1998, crop establishment year were negligible and are not published.

Previous crops: Fallow 1996, mixed cereal 1997, sown to w. wheat for 1998 and ploughed out in May.

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99/R/CS/498

TOTAL DRY WEIGHT TONNES/HECTARE

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

CULTIVAR	
A	6.56
B	10.24
C	10.09
D	10.31
E	5.71
F	8.40
G	6.90
H	4.63
I	7.64
J	9.09
K	5.89
L	7.73
M	12.38
N	5.77
O	5.78
X1	7.84*
X2	8.43*
X3	11.55*
Mean	7.81

* Unreplicated and not included in analysis or mean

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

CULTIVAR
1.626

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	26	1.992	25.5

MEAN DM% 64.1

PLOT AREA HARVESTED 0.00019

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99/R/CS/499

PANICUM VIRGATUM AND NITROGEN

Object: To test cultivars of *Panicum* with and without nitrogen for biomass production - Road Piece West.

Sponsors: D.G. Christian.

The second year, grass.

Design: 3 randomised blocks of 5 x 2 + 3 + 1.

Whole plot dimensions: 5.0 x 8.0.

Treatments: All combinations of:-

1. **CULTIVAR**

B	Blackwell
CT	Carthage
CR	Cave-in-Rock
P	Pangburn
S	Summer

2. **NITROGEN** Kg N:

N-	None
N3	75

EXTRA Cultivar Cave-in-Rock, nitrogen kg N:

N1	25
N2	50
N4	150

Plus an extra plot per block for destructive sampling, no yields

Experimental diary:

20-May-98	B	tm) Roundup at 4.0 l in 200 l.
	B	tm) LI-700 at 1.0 l in 200 l.
16-Jun-98	B	Muriate of potash at 190 kg, triple superphosphate at 247 kg.
22-Jun-98	B	Rotary harrowed.
	T	Cultivars drilled with the Oyjord drill.
24-Jun-98	B	Cambridge rolled.
24-Jul-98	B	Basagran SG at 1.1 l in 200 l.
06-Aug-98	B	Swipe 560 EC at 3.5 l in 200 l.
26-Jan-99	B	Cut.
12-Mar-99	B	tm) PDQ at 3.0 l in 200 l.
	B	tm) Enhance at 100 ml in 200 l.
09-Apr-99	B	Gesaprim at 3.0 l in 200 l.
19-Apr-99	B	tm) PDQ at 3.0 l in 200 l.
	B	tm) Enhance at 100 ml in 200 l.
14-May-99	B	Dow Shield at 0.5 l in 220 l, spot treated thistles.
	B	Duplosan at 2.3 l in 220 l, spot treated nettles.
21-May-99	B	Hardy at 15 kg.
15-Jun-99	B	Dow Shield at 1.0 l in 220 l, spot treated thistles.
17-Jun-99	**T**	Nitrogen treatments applied as 34.5% N.
17-Jan-00	B	Cut for yield.
25-Jan-00	B	Cut and cleared started.
28-Jan-00	B	Cut and cleared finished.

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99/R/CS/499

NOTES: (1) The yield of one plot, with **CULTIVAR** P **NITROGEN** N- was lost because of poor establishment. An estimate was used in the analysis.
(2) The yields for 1998, crop establishment year were negligible and are not published.

Previous crops: Fallow 1996, mixed cereal 1997.

TOTAL DRY WEIGHT TONNES/HECTARE

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

NITROGEN	N-	N3	Mean
CULTIVAR			
B	9.29	9.16	9.22
CT	10.04	9.73	9.88
CR	8.68	8.64	8.66
P	8.79	6.52	7.65
S	9.60	8.66	9.13
Mean	9.28	8.54	8.91

EXTRA	N1	N2	N4	Mean
	8.85	8.25	9.01	8.70

Grand mean 8.86

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

CULTIVAR	**NITROGEN**	**CULTIVAR NITROGEN & EXTRA**
0.468	0.296	0.662

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	23	0.811	9.1

MEAN DM% 67.7

PLOT AREA HARVESTED 0.00074

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99/R/CS/504

BREAK CROPS AND TAKE-ALL

Object: To test effects of different break crops on take-all (*Gaeumannomyces graminis*) in the following wheats - Great Harpenden II.

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

Design: 4 Blocks of 7 plots.

The first year, w. wheat, w. oats, w. rape, w. linseed, w. beans, w. peas, and w. lupins

Whole plot dimensions: 6.0 x 10.0.

Treatments:

CROP

BEW	Winter beans
LNW	Winter linseed
LP	Winter lupins
WW	Winter wheat
RAW	Winter oilseed rape
OW	Winter oats
PEW	Winter peas

Experimental diary:

19-Aug-98	B		Shakerated.
20-Aug-98	B		Ploughed and furrow pressed, started.
21-Aug-98	B		Ploughed and furrow pressed, completed.
27-Aug-98	T	RAW	Combination drilled, Apex, tr. Lindex-Plus FS Seed Treatment, at 120 seeds/m^2 with the Accord drill.
29-Aug-98	B		Hardy at 7.5 kg.
07-Sep-98	T	LP	Rolled.
	T	LP	Combination drilled, DTN 20, untreated, at 50 seeds/m^2 with the Accord drill.
	T	LP	Spannit at 1.5 l in 220 l.
11-Sep-98	T	LP	Hardy at 7.5 kg.
16-Sep-98	B		Hardy at 7.5 kg.
17-Sep-98	T	RAW	tm) Katamaran at 2.0 l in 200 l.
	T	RAW	tm) Decis at 250 ml in 200 l.
21-Sep-98	T	WW	Combination drilled, Hereward, tr. Beret Gold, at 380 seeds/m^2 with the Accord drill.
25-Sep-98	T	RAW	34.5% N at 120 kg.
12-Oct-98	T	LNW	Combination drilled, Oliver, tr. Prelude 20 LF, at 950 seeds/m^2 with the Nordsten drill.
13-Oct-98	T	WW	Combination drilled, Hereward, tr. Sibutol, at 380 seeds/m^2, plot 1 only with the Accord drill.
	B		Hardy at 7.5 kg.
15-Oct-98	T	BEW	Drilled, Clipper, recleaned, at 25 seeds/m^2 with the Fiona drill.
	T	PEW	Drilled, Victor, tr. Hy-TL and Rhodoman, at 100 seeds/m^2 with the Fiona drill.
16-Oct-98	T	OW	Combination drilled, Gerald, tr. Sibutol, at 350 seeds/m^2 with the Accord drill.
	T	LP	tm) Stomp 400 SC at 5.0 l in 220 l.
	T	LP	tm) Decis at 300 ml in 220 l.
19-Oct-98	T	PEW	Opogard 500 SC at 3.4 l in 220 l.
	T	BEW	tm) Gesatop 500 SC at 2.0 l in 220 l.
	T	BEW	tm) Kerb 50 W at 1.7 kg in 220 l.
04-Dec-98	T	RAW	tm) Punch C at 0.4 l in 200 l.

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99/R/CS/504

Experimental diary:

04-Dec-98	T	RAW	tm) Stefes Cypermethrin 2 at 250 ml in 200 l.
07-Dec-98	T	RAW	tm) Laser at 0.5 l in 200 l.
	T	RAW	tm) Cropoil at 2.0 l in 200 l.
16-Dec-98	B		Draza at 5.5 kg.
29-Jan-99	T	LNW, LP, BEW	tm) Laser at 1.0 l in 220 l.
	T	LNW, LP, BEW	tm) Cropoil at 2.0 l in 220 l.
10-Feb-99	T	RAW	34.5% N at 300 kg, northern 5.0 m of (OW) also treated, in error.
09-Mar-99	T	WW	tm) Isoguard at 1.0 l in 200 l.
	T	WW	tm) Unite A at 0.125 l in 200 l.
	T	WW	tm) Unite B at 1.0 l in 200 l.
	T	WW	tm) Cropoil at 1.0 l in 200 l.
15-Mar-99	T	RAW	Punch C at 0.4 l in 200 l.
16-Mar-99	T	WW	34.5% N at 145 kg.
17-Mar-99	T	LP	tm) Folicur at 0.5 l in 200 l.
	T	LP	tm) Rovral Flo at 1.0 l in 200 l.
23-Mar-99	T	RAW	34.5% N at 300 kg.
26-Mar-99	T	LNW	34.5% N at 348 kg.
09-Apr-99	T	OW	34.5% N at 145 kg.
23-Apr-99	T	WW	34.5% N at 435 kg.
27-Apr-99	T	OW	34.5% N at 145 kg.
29-Apr-99	T	RAW	tm) Bavistin DF at 1.0 kg in 200 l.
	T	RAW	tm) Ronilan FL at 0.5 l in 200 l.
	T	RAW	tm) Hallmark at 100 ml in 200 l.
30-Apr-99	T	LNW	tm) Ally at 20 g in 200 l.
	T	LNW	tm) Eagle at 30 g in 220 l.
	T	BEW	Compass at 3.0 l in 220 l.
19-May-99	T	BEW	tm) Bavistin DF at 1.0 kg in 220 l.
	T	BEW	tm) Bravo 500 at 2.0 l in 220 l.
21-May-99	T	OW	tm) BASF 3C Chlormequat 720 at 2.25 l in 220 l.
	T	OW	tm) Enhance at 50 ml in 220 l.
26-May-99	T	WW	Opus at 1.0 l in 220 l.
01-Jun-99	T	OW	Folicur at 0.75 l in 220 l.
10-Jun-99	T	BEW	tm) Bavistin DF at 1.0 kg in 220 l.
	T	BEW	tm) Compass at 2.0 l in 220 l.
	T	BEW	tm) Sipcam UK Rover 500 at 2.0 l in 220 l.
	T	BEW	tm) Aphox at 100 g in 220 l.
	T	BEW	tm) Hallmark at 150 ml in 220 l.
18-Jun-99	T	LP	tm) Aphox at 280 g in 200 l.
	T	LP	tm) Enhance at 50 ml in 200 l.
25-Jun-99	T	BEW	Compass at 3.0 l in 220 l.
	T	LP	Folicur at 0.75 l in 220 l.
07-Jul-99	T	RAW	tm) Enhance at 400 ml in 400 l.
	T	RAW	tm) Reglone at 3.0 l in 400 l.
09-Jul-99	T	LNW	tm) Reglone at 3.0 l in 400 l.
	T	LNW	tm) Enhance at 400 ml in 400 l.
17-Jul-99	T	RAW	Combine harvested.
19-Jul-99	T	RAW	Baled straw.
24-Jul-99	T	LNW	Combine harvested.
31-Jul-99	T	WW,OW	Combine harvested.
12-Aug-99	T	BEW	Combine harvested.
26-Aug-99	T	LP	Combine harvested.
27-Aug-99	B		Baled all remaining straw.

Previous crops: w. wheat 1997, w. wheat 1998

NOTE: W. peas failed therefore no yield.

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99/R/CS/504

GRAIN TONNES/HECTARE

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

CROP	
BEW	6.05
LNW	1.93
LP	3.18
WW	6.28
RAW	4.70
OW	7.63
Mean	4.96

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

CROP
0.478

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	0.676	13.6

GRAIN MEAN DM% 84.7

PLOT AREA HARVESTED 0.00230

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99/R/CS/508

SEED TREATMENT SEQUENCES AND TAKE-ALL

Object: To determine effects of a seed treatment fungicide on take-all (*Gaeumannomyces graminis*) and populations of the causal fungus - Stackyard.

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

The first year, w. wheat.

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

Plot dimensions: 6.0 x 10.0.

Treatments:

S1999	Seed dressing and year applied:
-99	1999 none
F99	1999 fluquinconazole

Randomised for treatments as above in three subsequent years

Experimental diary:

11-Sep-98	B		Ploughed and furrow pressed, started.
14-Sep-98	B		Ploughed and furrow pressed, completed.
15-Oct-98	**T**	-99	Combination drilled, Hereward, recleaned, at 380 seeds/m^2 with the Accord drill.
	T	F99	Combination drilled, Hereward, tr. fluquinconazole, at 380 seeds/m^2 with the Accord drill.
16-Oct-98	B		Hardy at 7.5 kg.
06-Nov-98	B		Decoy at 15 kg.
13-Feb-99	B		tm) Chiltern IPU at 1.0 l in 200 l.
	B		tm) Unite A at 0.125 l in 200 l.
	B		tm) Unite B at 1.0 l in 200 l.
	B		tm) Cropoil at 1.0 l in 200 l
10-Mar-99	B		34.5% N at 145 kg.
16-Apr-99	B		34.5% N at 435 kg.
30-Apr-99	B		tm) Ally at 30 g in 200 l.
	B		tm) Starane 2 at 0.5 l in 200 l.
	B		tm) Opus at 1.0 l in 200 l.
27-May-99	B		tm) Opus at 0.75 l in 100 l.
	B		tm) Sipcam UK Rover 500 at 1.0 l in 100 l.
16-Jun-99	B		Folicur at 0.25 l in 100 l.
23-Jul-99	B		Alpha Glyphogan at 4.0 l in 200 l.
16-Aug-99	B		Combine harvested.

Previous crops: W. beans and lupins 1997, s. wheat 1998

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99/R/CS/508

GRAIN TONNES/HECTARE

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

	S1999
-99	9.72
F99	9.74
Mean	9.73

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

S1999
0.149

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	59	0.596	6.1

GRAIN MEAN DM% 81.8

PLOT AREA HARVESTED 0.00227

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99/R/CS/511

MANAGEMENT OF HERBICIDE RESISTANT CROPS

Object: To identify possible benefits and potential management problems that may arise in farm rotations that include herbicide resistant rape and beet - Black Horse.

Sponsors: P.J.W. Lutman.

The first year, w. rape.

Design: 2 replicates of 2 plots split into 4 sub-plots.

Whole plot dimensions: 96.0 x 120.0.
Sub-plot dimensions: 24.0 x 120.0.

Treatments: All combinations of:-

1. **CROP ROT** Crop rotations in 1999, 2000, 2001 and 2002:

   R1 Rape, cereal, cereal, rape
   R2 Rape, cereal, beet, cereal

2. **RESIST** Herbicide resistance or none:

   RR Glyphosate resistant
   LL Glufosinate resistant
   IME Imazamox resistant
   CON Conventional

Experimental diary:

08-Aug-98	: B :		:	Baled, started.
09-Aug-98	: B :		:	Carted bales, completed.
20-Aug-98	: B :		:	Shakerated, started.
21-Aug-98	: B :		:	Shakerated, completed.
29-Aug-98	: B :		:	Rolled.
01-Sep-98	: B :		:	Ploughed and furrow pressed, started.
02-Sep-98	: B :		:	Ploughed and furrow pressed, completed.
04-Sep-98	: **T** :	CON	:	Combination drilled, Apex, tr. Lindex-Plus FS Seed Treatment, at 120 seeds/m^2 with the Accord drill.
	: **T** :	IME	:	Combination drilled at 120 seeds/m^2 with the Accord drill.
	: **T** :	LL	:	Combination drilled at 120 seeds/m^2 with the Accord drill.
	: **T** :	RR	:	Combination drilled at 120 seeds/m^2 with the Accord drill.
07-Sep-98	: B :		:	Hardy at 7.5 kg.
18-Sep-98	: B :		:	Stefes Cypermethrin 2 at 250 ml in 200 l.
	: B :		:	Hardy at 7.5 kg.
24-Sep-98	: B :		:	34.5% N at 120 kg.
28-Sep-98	: **T** :	CON	:	Butisan S at 1.5 l in 200 l.
09-Oct-98	: **T** :	IME	:	Imazamox at 1.75 l in 200 l.
11-Nov-98	: **T** :	RR	:	Roundup Biactive at 3.0 l in 200 l.
	: **T** :	LL	:	tm) Harvest at 0.6 l in 200 l.
	: **T** :	LL	:	tm) Liberty at 2.4 l in 200 l.
	: **T** :	CON	:	tm) Laser at 0.5 l in 200 l.
	: **T** :	CON	:	tm) Cropoil at 2.0 l in 200 l.
	: **B** :		:	tm) Punch C at 0.4 l in 200 l.
	: **B** :		:	tm) Stefes Cypermethrin 2 at 250 ml in 200 l.
13-Nov-98	: **T** :	R2 IME	:	tm) Laser at 0.5 l in 200 l.

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99/R/CS/511

Experimental diary:

13-Nov-98	: **T** :	R2 IME	:	tm)Cropoil at 2.0 l in 200 l.
10-Feb-99	: B :		:	34.5% N at 300 kg.
24-Feb-99	: B :		:	Punch C at 0.4 l in 200 l.
04-Mar-99	: B :		:	34.5% N at 300 kg.
16-Apr-99	: B :		:	tm)Profol RM at 3.0 kg in 200 l.
	: B :		:	tm)Hallmark at 150 ml in 200l.
29-Apr-99	: B :		:	tm)Bavistin DF at 1.0 l in 200 l.
	: B :		:	tm)Ronilan FL at 0.5 l in 200 l.
	: B :		:	tm)Hallmark at 100 ml in 200 l.
14-Jul-99	: B :		:	tm)Reglone at 3.0 l in 400 l.
	: B :		:	tm)Enhance at 400 ml in 400 l.
21-Jul-99	: B :		:	Combine harvested.
	: B :		:	Chopped straw.

Previous crops: W. wheat 1997, w. oats 1998.

NOTE: Because of contractual reasons the yields are not published in this edition.

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99/R/CS/512

MANAGEMENT OF RESISTANT VOLUNTEER RAPE

Object: To identify possible benefits and potential management problems that may arise in farm rotations that include herbicide resistant rape -Black Horse.

Sponsors: P.J.W. Lutman.

The first year, w. wheat.

Design: 3 randomised blocks of 4 plots.

Plot dimensions: 12.0 x 48.0.

Treatments:

RESIST	Rape; conventional or herbicide resistant undersown into w. wheat
RR	Glyphosate
LL	Glufosinate
IME	Imazamox
CON	Conventional

Experimental diary:

20-Aug-98	B		Shakerated, started.
21-Aug-98	B		Shakerated, completed.
29-Aug-98	B		Rolled.
02-Sep-98	B		Ploughed and furrow pressed.
	T	CON	Apex, recleaned, hand broadcast at 10,000 seeds/m^2.
	T	IME	Hand broadcast at 10,000 seeds/m^2.
	T	LL	Hand broadcast at 10,000 seeds/m^2.
	T	RR	Hand broadcast at 10,000 seeds/m^2.
07-Sep-98	B		Hardy at 7.5 kg.
16-Sep-98	B		Combination drilled, Hereward, tr. Beret Gold, at 260 seeds/m^2 with the Nordsten drill.
17-Sep-98	B		Rolled.
18-Sep-98	B		Hardy at 7.5 kg.
03-Dec-98	B		tm) Isoguard at 2.0 l in 200 l.
	B		tm) Stomp 400 SC at 3.0 l in 200 l.
04-Mar-99	B		34.5% N at 145 kg.
15-Apr-99	B		34.5% N at 435 kg.
30-Apr-99	B		tm) Ally at 30 g in 200 l.
	B		tm) Duplosan at 2.0 l in 200 l.
	B		tm) Opus at 1.0 l in 200 l.
14-May-99	B		tm) Grasp at 1.0 l in 200 l.
	B		tm) Output at 1.0 l in 200 l.
25-May-99	B		tm) Amistar at 0.8 l in 200 l.
	B		tm) Folicur at 0.5 l in 200 l.
17-Jun-99	B		tm) Amistar at 0.25 l in 100 l.
	B		tm) Magnesium sulphate at 5.0 kg in 100 l.
31-Jul-99	B		Combine harvested, started.
01-Aug-99	B		Combine harvested, completed.

Previous crops: W. wheat 1997, w. oats 1998.

NOTE: Because of contractual reasons the yields are not published in this edition.

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99/W/WW/1

WINTER WHEAT

CROP DENSITY AND LIGHT INTERCEPTION

Object: To study the timing of canopy closure and measure light interception at different crop densities - Woburn, Broad Mead I/IV.

Sponsors: J. Storkey, J.W. Cussans.

Design: 3 randomised blocks of 4 plots

Plot dimensions: 4.0 x 10.0.

Treatments:

DENSITY	Crop density, plants/m^2:
D0	0
D1	50
D2	125
D3	320

Experimental diary:

23-Sep-98	B		tm)Alpha Glyphogan at 3.0 l in 200 l.
	B		tm)Codacide Oil at 0.5 l in 200 l.
02-Oct-98	B		Hardy at 7.5 kg.
13-Oct-98	B		Rotary harrowed.
	T	D1,D2,D3	Drilled Consort, tr Beret Gold, as treatment with the Nordsten drill.
14-Oct-98	B		Hardy at 7.5 kg.
09-Feb-99	B		Muriate of potash at 600 kg.
17-Feb-99	B		tm)Isoguard at 2.0 l in 200 l.
	B		tm)Platform S at 1.0 kg in 200 l.
19-Feb-99	B		34.5% N at 145 kg.
02-Apr-99	B		34.5% N at 377 kg.
03-Apr-99	B		tm)Topik at 125 ml in 200 l.
	B		tm)Ally at 30 g in 200 l.
	B		tm)Cropoil at 2.5 l in 200 l.
08-Apr-99	B		tm)Folicur at 0.5 l in 200 l.
	B		tm)Atlas Chlormequat 700 at 2.0 l in 200 l.
	B		tm)Marshland Liquid Manganese Complex at 2.0 l in 200 l.
	B		tm)Profol Copper 500 at 0.2 l in 200 l.
30-Apr-99	B		Starane 2 at 0.5 l in 200 l.
26-May-99	B		Folicur at 1.0 l in 200 l.
10-Jun-99	B		Folicur at 0.25 l in 200 l.
22-Aug-99	B		Combine harvested.

Previous crops: W. wheat 1998, lupins 1997.

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99/W/WW/1

GRAIN TONNES/HECTARE

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

DENSITY	
D1	7.95
D2	7.95
D3	7.78
Mean	7.89

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

DENSITY
0.569

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	4	0.697	8.8

GRAIN MEAN DM% 84.9

PLOT AREA HARVESTED 0.00230

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99/W/WW/2

WINTER WHEAT

TESTING WEED CONTROL THRESHOLDS

Object: To test the validity of threshold values for weed density - Woburn, Lansome II.

Sponsors: J.W. Cussans, P.J.W. Lutman, A. Blair (ADAS), S. Ingle (ADAS).

Design: 3 blocks of 3 x 3 + 3.

Plot dimensions: 4.0 x 17.5.

Treatments: All combinations of:-

1. **HERB DEC** — Herbicide and timing:

E	Autumn
L	Spring
U	Selective herbicides

2. **WEEDSPEC** — Weed species:

MP	Mayweed (*Matricaria perforata*)
SM	Chickweed (*Stellaria media*)
AM	Black-grass (*Alopecurus myosuroides*)

   EXTRA — None (triplicated)

Experimental diary:

13-Oct-98	B		Rotary harrowed.
	T	MP,SM,AM	Weed seed broadcast as treatment.
	B		Consort, tr. Beret Gold, drilled at 380 seeds/m^2 with the Accord drill.
20-Oct-98	B		Hardy at 7.5 kg.
22-Jan-99	**T**	E MP,E SM,E AM	Tolkan Liquid at 4.0 l with Panther at 2.0 l in 225 l.
20-Feb-99	B		34.5% N at 145 kg.
03-Apr-99	B		34.5% N at 145 kg.
08-Apr-99	**T**	L AM	Topik at 0.25 with Ally at 30 g in 225 l.
	T	U SM	Dow Shield at 0.5 l in 225 l.
	T	U AM,L SM,L MP	Ally at 30 g in 225 l.
30-Apr-99	B		tm)Folicur at 0.5 l in 200 l.
	B		tm)Atlas Chlormequat 700 at 2.0 l in 200 l.
21-Aug-99	B		Combine harvested.

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99/W/WW/2

GRAIN TONNES/HECTARE

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

HERB DEC / WEEDSPEC	E	L	U	Mean
MP	6.57	6.16	5.16	5.96
SM	7.72	6.25	5.21	6.40
AM	7.82	6.55	6.33	6.90
Mean	7.37	6.32	5.57	6.42

EXTRA - 6.50

GRAND MEAN 6.44

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

WEEDSPEC	HERB DEC	WEEDSPEC HERB DEC
0.339	0.339	0.587

S.e.d. for comparing - with any item in **HERB DEC.WEEDSPEC** table is 0.479

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	24	0.718	11.2

GRAIN MEAN DM% 85.8

PLOT AREA HARVESTED 0.00308

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99/R/WW/3

WINTER WHEAT

PLANT N INDICATORS

Object: To calibrate plant monitoring methods for fine-tuning fertiliser N applications - Little Hoos.

Sponsor: P.B. Barraclough.

Design: 3 randomised blocks of 18 plots.

Whole plot dimensions: 3.0 x 20.0.

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-98 : B :   : Ploughed and furrow pressed, started.
14-Sep-98 : B :   : Ploughed and furrow pressed, completed.
19-Sep-98 : B :   : Rotary harrowed.
22-Sep-98 : B :   : Tiger 90 at 15 kg.
23-Sep-98 : B :   : Combination drilled, Hereward, tr. Beret Gold, at 380
                    seeds/m² with the Accord drill.
24-Sep-98 : B :   : Rolled.
28-Sep-98 : B :   : Hardy at 7.5 kg.
21-Oct-98 : B :   : Hardy at 7.5 kg.
30-Oct-98 : B :   : Decoy at 8.0 kg.
09-Mar-99 : B :   : tm) Isoguard at 1.0 l in 200 l.
          : B :   : tm) Unite A at 0.125 l in 200 l.
          : B :   : tm) Unite B at 1.0 l in 200 l.
          : B :   : tm) Cropoil at 1.0 l in 200 l.
16-Mar-99 : T :   : Nitrogen applied as 34.5% N (GS 24).
14-Apr-99 : T :   : Nitrogen applied as 34.5% N (GS 31).
01-May-99 : B :   : Opus at 0.7 l in 200 l.
13-May-99 : T :   : Nitrogen applied as 34.5% N (GS 37).
```


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99/R/WW/3

Experimental diary:

19-May-99	: B :	:	tm)Sypex at 1.5 l in 200 l.
	: B :	:	tm)Enhance at 80 ml in 200 l.
21-May-99	: B :	:	Irrigated, 11 mm.
28-May-99	: **T** :	:	Nitrogen applied as 34.5% N (GS 51).
	: B :	:	tm)Opus at 1.0 l in 200 l.
	: B :	:	tm)Sipcam UK Rover 500 at 1.0 l in 200 l.
16-Jun-99	: B :	:	Folicur at 0.25 l in 100 l.
06-Aug-99	: B :	:	Combine harvested.

Previous crops: W. rape and turnip rape 1997, w. oats 1998.

GRAIN TONNES/HECTARE

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

NITROGEN	
-	4.13
A	7.70
B	9.12
C	10.36
D	9.45
E	10.65
F	11.27
G	10.23
H	11.05
I	11.24
J	10.67
K	5.95
L	7.60
M	8.72
N	6.80
O	8.39
P	10.46
Q	11.03
Mean	9.16

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

NITROGEN
0.248

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	34	0.304	3.3

GRAIN MEAN DM% 86.0

PLOT AREA HARVESTED 0.00352

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99/R/WW/4

WINTER WHEAT

FUSARIUM STUDY

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

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

Design: 3 randomised blocks of 6 x 2 plots

Whole plot dimensions: 6.0 x 8.5.

Treatments: All combinations of:-

1. **T** — Seed and *Fusarium* inocula:

D O	Diseased seed, no inoculum
H O	Healthy seed, no inoculum
H A	Healthy seed, inoculated with *Fusarium culmorum* to soil in spring
H B	Healthy seed, inoculated with *Fusarium culmorum* to ears at anthesis
H C	Healthy seed, inoculated with *Microdochium nivale* to ears at anthesis

2. **IRRIGATN** — Irrigation:

-	None
I	Irrigated

Experimental diary:

14-Sep-98	B			Ploughed and furrow pressed.
19-Sep-98	B			Rotary harrowed.
23-Sep-98	**T**	D		Combination drilled, Charger, homesaved, at 380 seeds/m^2 with the Accord drill.
	T	H		Combination drilled, Charger, tr. Beret Gold, at 380 seeds/m^2 with the Accord drill.
23-Feb-99	B			tm) Isoguard at 1.0 l in 200 l.
	B			tm) Unite A at 0.125 l in 200 l.
	B			tm) Unite B at 1.0 l in 200 l.
	B			tm) Cropoil at 1.0 l in 200 l.
12-Mar-99	B			34.5% N at 145 kg.
18-Mar-99	B			Triple superphosphate at 300 kg.
31-Mar-99	**T**	H A		Inoculated with colonised sterile oat grain, at 1.1 kg to the central 6 x 3 metre area of each plot.
15-Apr-99	B			34.5% N at 435 kg.
31-May-99	**T**	I		Plots misted during anthesis, four at a time, for 2 days, between 31-May and 8-Jun, immediately after spore inoculum applied to ears.
	T	H B		Inoculated between 31-May and 6-Jun, by spraying spore suspensions onto plots during anthesis.
	T	H C		Inoculated 31-May to 6-Jun, by spraying spore suspensions onto plots during anthesis.
30-Jul-99	B			Combine harvested.

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99/R/WW/4

Previous crops: W. wheat 1997, w. oats 1998.

GRAIN TONNES/HECTARE

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

T / IRRIGATN	D O	H O	H A	H B	H C	Mean
-	8.79	9.11	8.60	7.43	9.16	8.65
I	8.74	8.72	8.30	6.89	7.88	8.21
Mean	8.76	8.91	8.45	7.16	8.52	8.43

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

IRRIGATN	T	IRRIGATN T	
	0.484	0.684	min.rep
0.279	0.419	0.592	max-min
		0.484	max.rep

	IRRIGATN
min.rep	Any of the remainder
max-min	D O v any of the remainder
max.rep	D O

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	24	0.838	9.9

GRAIN MEAN DM% 90.5

PLOT AREA HARVESTED 0.00138

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99/R/WW/5

WINTER WHEAT

SEMIOCHEMICALS AND APHIDS

Object: To test semiochemicals on cereal aphids and their parasitoids - New Zealand.

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

Design: 5 x 5 quasi-complete Latin square.

Whole plot dimensions: 6.0 x 6.0.

Treatments:

SEMICHEM	Semiochemicals:
-	None
A	Methyl salicylate and nepetalactone
B	Methyl salicylate with polygodial applied by electrostatic sprayer in October
C	Camphor
D	AJH/8/158 at 50 g in 200 l applied in October, May and June

NOTE: AJH/8/158 is under commercial development, composition undisclosed.

Experimental diary:

14-Aug-98	B		Ploughed and furrow pressed, started.
15-Aug-98	B		Disced ploughing.
	B		Ploughing continued.
16-Aug-98	B		Ploughing completed.
18-Aug-98	B		Rolled.
11-Sep-98	B		Combination drilled, Consort, untreated, at 380 seeds/m^2 with the Accord drill.
12-Sep-98	B		Hardy at 7.5 kg.
16-Sep-98	B		Hardy at 7.5 kg.
21-Sep-98	**T**	A	Nepetalactone and methyl salicylate, in dispensers, replaced as necessary through season.
	T	B	Methyl salicylate, in dispensers, replaced as necessary through season.
	T	C	2-tridecanone and 6-methyl-5-hepten-2-one, in dispensers replaced through season as necessary.
09-Oct-98	**T**	D	AJH/8/158 at 50 g ai in 200 l, repeated 6-May-99 and 11-Jun-99.
15-Oct-98	**T**	B	Polygodial electrostatically at 50 g ai in 10.41 l.
15-Feb-99	B		tm) Isoguard at 1.0 l in 200 l, started.
	B		tm) Unite A at 0.125 l in 200 l, started.
	B		tm) Unite B at 1.0 l in 200 l, started.
	B		tm) Cropoil at 1.0 l in 200 l, started.
24-Feb-99	B		tm) Isogard at 1.0 l in 200 l, completed.
	B		tm) Unite A at 0.125 l in 200 l, completed.
	B		tm) Unite B at 1.0 l in 200 l, completed.
	B		tm) Cropoil at 1.0 l in 200 l, completed.
16-Mar-99	B		34.5% N at 145 kg.
16-Apr-99	B		34.5% N at 435 kg.
05-May-99	B		Opus at 0.7 l in 200 l.

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99/R/WW/5

Experimental diary:

06-May-99	B		Starane 2 at 1.0 l in 200 l.
27-May-99	B		tm)Opus at 0.75 l in 200 l.
	B		tm)Sipcam UK Rover 500 at 1.0 l in 200 l.
23-Aug-99	P		Combine harvested.

Previous crops: W. wheat 1997, set-aside 1998

GRAIN TONNES/HECTARE

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

SEMICHEM

-	10.46
A	10.49
B	10.88
C	10.20
D	10.43
Mean	10.49

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

SEMICHEM
0.297

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

Stratum	d.f.	s.e.	cv%
ROW.COL	12	0.469	4.5

GRAIN MEAN DM% 87.1

PLOT AREA HARVESTED 0.00138

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99/R/WW/8

WINTER WHEAT

STROBILURINS AND DISEASE

Object: To study the effects of strobilurin fungicides on take-all (*Gaeumannomyces graminis*) - Great Harpenden II.

Sponsors: J.F. Jenkyn, C.G. Peters, G.L. Bateman, K.L. Sykes, R.J. Gutteridge.

Design: 3 randomised blocks of 2 x 2 x 2 x 2.

Whole plot dimensions: 3.0 x 9.0.

Treatments: All combinations of:-

1. **AUTSPRAY** Autumn spray:

   E- None
   ES Applied

2. **SPRSPRAY** Spring spray:

   M- None
   MS Applied

3. **SUMSPRAY** Summer spray:

   L- None
   LS Applied

4. **FUNGCHEM** Fungicide:

   AZ Amistar at 1.0 l in 220 l
   KM Landmark at 1.0 l in 220 l

NOTE: Landmark contains epiconazole, to balance fungicides Opus at 1.0 l in 220 l was applied to AZ, M- and L- plots. Opus was not applied with the autumn application (E-).

Experimental diary:

19-Aug-98	B			Shakerated.
20-Aug-98	B			Ploughed and furrow pressed, started.
21-Aug-98	B			Ploughed and furrow pressed, completed.
29-Sep-98	B			tm) PDQ at 3.0 l in 200 l.
	B			tm) Enhance at 200 ml in 200 l.
13-Oct-98	B			Combination drilled, Hereward, tr. Sibutol, at 380 seeds/m^2 with the Accord drill.
	B			Hardy at 7.5 kg.
07-Jan-99	**T**	ES	AZ	Autumn spray applied
	T	ES	KM	Autumn spray applied
16-Mar-99	B			34.5% N at 145 kg.
	B			tm) Hawk at 2.0 l in 200 l.
	B			tm) Panther at 1.25 l in 200 l.
	B			tm) Cropoil at 1.0 l in 200 l.
14-Apr-99	B			34.5% N at 435 kg.
19-Apr-99	**T**	M-		Opus at 1.0 l in 220 l.
	T	MS	AZ	Spring spray applied.
	T	MS	KM	Spring spray applied.

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Experimental diary:

26-May-99	: **T** :	L-	:	Opus at 1.0 l in 220 l.
	: **T** :	LS AZ	:	Summer spray applied.
	: **T** :	LS KM	:	Summer spray applied.
23-Jul-99	: B :		:	Alpha Glyphogan at 4.0 l in 200 l.
03-Aug-99	: B :		:	Combine harvested.

Previous crops: W. wheat 1997, w. wheat 1998.

GRAIN TONNES/HECTARE

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

AUTSPRAY	E-	ES	Mean
FUNGCHEM			
AZ	7.38	8.46	7.92
KM	7.52	7.55	7.54
Mean	7.45	8.00	7.73

SPRSPRAY	M-	MS	Mean
FUNGCHEM			
AZ	7.70	8.13	7.92
KM	7.53	7.54	7.54
Mean	7.62	7.84	7.73

SPRSPRAY	M-	MS	Mean
AUTSPRAY			
E-	7.22	7.68	7.45
ES	8.02	7.99	8.00
Mean	7.62	7.84	7.73

SUMSPRAY	L-	LS	Mean
FUNGCHEM			
AZ	7.81	8.02	7.92
KM	7.37	7.70	7.54
Mean	7.59	7.86	7.73

SUMSPRAY	L-	LS	Mean
AUTSPRAY			
E-	7.25	7.65	7.45
ES	7.93	8.08	8.00
Mean	7.59	7.86	7.73

SUMSPRAY	L-	LS	Mean
SPRSPRAY			
M-	7.60	7.63	7.62
MS	7.58	8.09	7.84
Mean	7.59	7.86	7.73

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GRAIN TONNES/HECTARE

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

FUNGCHEM	AUTSPRAY SPRSPRAY	E- M-	MS	ES M-	MS
AZ		7.12	7.63	8.28	8.63
KM		7.31	7.73	7.75	7.36

FUNGCHEM	AUTSPRAY SUMSPRAY	E- L-	LS	ES L-	LS
AZ		7.33	7.42	8.29	8.62
KM		7.16	7.87	7.58	7.53

FUNGCHEM	SPRSPRAY SUMSPRAY	M- L-	LS	MS L-	LS
AZ		7.61	7.79	8.01	8.25
KM		7.58	7.48	7.16	7.93

AUTSPRAY	SPRSPRAY SUMSPRAY	M- L-	LS	MS L-	LS
E-		7.42	7.01	7.08	8.28
ES		7.78	8.25	8.09	7.90

FUNGCHEM	AUTSPRAY	SPRSPRAY SUMSPRAY	M- L-	LS	MS L-	LS
AZ	E-		7.54	6.70	7.13	8.14
	ES		7.68	8.88	8.89	8.36
KM	E-		7.29	7.32	7.03	8.43
	ES		7.87	7.63	7.28	7.44

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

FUNGCHEM	AUTSPRAY	SPRSPRAY	SUMSPRAY
0.268	0.268	0.268	0.268

FUNGCHEM AUTSPRAY	FUNGCHEM SPRSPRAY	AUTSPRAY SPRSPRAY	FUNGCHEM SUMSPRAY
0.380	0.380	0.380	0.380

AUTSPRAY SUMSPRAY	SPRSPRAY SUMSPRAY	FUNGCHEM AUTSPRAY SPRSPRAY	FUNGCHEM AUTSPRAY SUMSPRAY
0.380	0.380	0.537	0.537

FUNGCHEM SPRSPRAY SUMSPRAY	AUTSPRAY SPRSPRAY SUMSPRAY	FUNGCHEM AUTSPRAY SPRSPRAY SUMSPRAY
0.537	0.537	0.759

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	30	0.930	12.0

GRAIN MEAN DM% 89.1 PLOT AREA HARVESTED 0.00204

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99/R/WW/9

WINTER WHEAT

SEED TREATMENTS AND TAKE-ALL

Object: To test effects of seed treatment fungicides on w. wheat sown at different seed rates - Great Harpenden II.

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

Design: 2 randomised blocks of 3 x 3 duplicated.

Whole plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. **SEEDRATE** Seed rate:

R1	90 kg
R2	130 kg
R3	170 kg

2. **SEEDTRT** Seed dressing:

S	Sibutol
B	Baytan Flowable
J	Jockey

Experimental diary:

19-Aug-98	B	:	Shakerated.
20-Aug-98	B	:	Ploughed and furrow pressed, started.
21-Aug-98	B	:	Ploughed and furrow pressed, completed.
29-Sep-98	B	:	tm) PDQ at 3.0 l in 200 l.
	B	:	tm) Enhance at 200 ml in 200 l.
13-Oct-98	**T**	:	Combination drilled, Riband, dressed as treatment, with the Accord drill.
	B	:	Hardy at 7.5 kg.
30-Oct-98	B	:	Decoy at 8.0 kg.
16-Mar-99	B	:	34.5% N at 145 kg.
	B	:	tm) Hawk at 2.0 l in 200 l.
	B	:	tm) Panther at 1.25 l in 200 l.
	B	:	tm) Cropoil at 1.0 l in 200 l.
14-Apr-99	B	:	34.5% N at 435 kg.
29-May-99	B	:	tm) Corbel at 1.0 l in 100 l.
	B	:	tm) Folicur at 0.75 l in 100 l.
23-Jul-99	B	:	Alpha Glyphogan at 4.0 l in 200 l.
03-Aug-99	B	:	Combine harvested.

Previous crops: W. wheat 1997, w. wheat 1998.

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99/R/WW/9

GRAIN TONNES/HECTARE

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

SEEDRATE SEEDTRT	R1	R2	R3	Mean
S	7.35	7.83	8.17	7.78
B	8.00	7.64	8.61	8.09
J	8.46	8.27	8.87	8.53
Mean	7.94	7.92	8.55	8.13

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

SEEDTRT	SEEDRATE	SEEDTRT SEEDRATE
0.256	0.256	0.444

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	26	0.628	7.7

GRAIN MEAN DM% 88.7

PLOT AREA HARVESTED 0.00227

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99/R/WW/12

WINTER WHEAT

FUNGICIDAL AND PHYSIOLOGICAL ACTIVITY OF STROBILURINS ON WINTER WHEAT

Object: To compare the effects of two strobilurin fungicides on yield, grain quality, disease control, green area duration and nitrogen translocation - Little Hoos.

Sponsors: C.G. Peters, E. Stockdale, I.F. Shield, J.F. Jenkyn, J.W. Cussans, P.B. Barraclough.

Design: 4 randomised blocks of 6 plots.

Whole plot dimensions: 3.0 x 20.0.

Treatments:

FUNGCIDE	Fungicide applied at growth stage (GS) 32 repeated at GS39:
-	None
OC	Opus and Corbel
E	Ensign
AC	Amistar and Corbel
M	Mantra
AOC	Amistar with Opus and Corbel

Experimental diary:

11-Sep-98	B		Ploughed and furrow pressed, started.
14-Sep-98	B		Ploughed and furrow pressed, completed.
19-Sep-98	B		Rotary harrowed.
22-Sep-98	B		Tiger 90 at 15 kg.
23-Sep-98	B		Combination drilled, Hereward, tr. Beret Gold, at 300 seeds/m^2 with the Accord drill.
25-Sep-98	B		Rolled.
09-Mar-99	B		tm) Isoguard at 1.0 l in 200 l.
	B		tm) Unite A at 0.125 l and Unite B at 1.0 l in 200 l.
	B		tm) Cropoil at 1.0 l in 200 l.
16-Mar-99	B		34.5% N at 145 kg.
14-Apr-99	B		34.5% N at 435 kg.
19-Apr-99	**T**	AC	Amistar at 1.0 l with Corbel at 0.33 l in 220 l.
	T	AOC	Amistar at 1.0 l with Opus at 1.0 l and Corbel at 0.33 l in 220 l.
	T	E	Ensign at 0.83 l in 220 l.
	T	M	Mantra at 1.0 l with Corbel at 0.13 l in 220 l.
	T	OC	Opus at 1.0 l with Corbel at 0.33 l in 220 l.
19-May-99	B		tm) Sypex at 1.5 l in 200 l.
	B		tm) Enhance at 80 ml in 200 l.
27-May-99	**T**	AC	Amistar at 1.0 l with Corbel at 0.33 l in 220 l.
	T	AOC	Amistar at 1.0 l with Opus at 1.0 l and Corbel at 0.33 l in 220 l.
	T	E	Ensign at 0.83 l in 220 l.
	T	M	Mantra at 1.0 l with Corbel at 0.13 l in 220 l.
	T	OC	Opus at 1.0 l with Corbel at 0.33 l in 220 l.
06-Aug-99	B		Combine harvested.

Previous crops: W. rape and turnip rape 1997, w. oats 1998.

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99/R/WW/12

GRAIN TONNES/HECTARE

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

FUNGCIDE	
-	10.70
OC	10.94
E	11.22
AC	11.09
M	11.05
AOC	11.26
Mean	11.04

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

FUNGCIDE
0.200

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	0.283	2.6

GRAIN MEAN DM% 84.8

PLOT AREA HARVESTED 0.00275

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99/R/WW/13

WINTER WHEAT

STROBILURINS AND NITROGEN CURVE

Object: To investigate the effect on yield and nitrogen uptake, of amounts of nitrogen on a crop sprayed with a strobilurin or not - Little Hoos.

Sponsors: C.G. Peters, E. Stockdale, K.L. Sykes.

Design: 3 randomised blocks of 2 x 6 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. NITROGEN Kg N:

N0	None
N1	60
N2	120 (50 early + 70 later)
N3	180 (50 early + 130 later)
N4	240 (50 early + 190 later)
N5	300 (50 early + 250 later)

2. FUNGCIDE Fungicides:

S	Strobilurin; epoxiconazole and kresoxim-methyl
C	Conventional; epoxiconazole

Experimental diary:

11-Sep-98	B			Ploughed and furrow pressed, started.
14-Sep-98	B			Ploughed and furrow pressed, completed.
19-Sep-98	B			Rotary harrowed.
22-Sep-98	B			Tiger 90 at 15 kg.
23-Sep-98	B			Combination drilled, Hereward, tr. Beret Gold, at 300 seeds/m^2 with the Accord drill.
25-Sep-98	B			Rolled.
09-Mar-99	B			tm) Isoguard at 1.0 l in 200 l.
	B			tm) Unite A at 0.125 l in 200 l.
	B			tm) Unite B at 1.0 in 200 l.
	B			tm) Cropoil at 1.0 l in 200 l.
16-Mar-99	**T**	N2,N3,N4,N5	34.5% N at 145 kg.	
14-Apr-99	**T**	N1,N2,N3,N4,N5	34.5% N at 174, 203, 377, 551 or 725 kg respectively.	
19-Apr-99	**T**	C	Opus at 1.0 l in 220 l.	
	T	S	Landmark at 1.0 l in 220 l.	
	B		tm) Sypex at 1.5 l in 200 l.	
	B		tm) Enhance at 80 ml in 200 l.	
26-May-99	**T**	C	Opus at 1.0 l in 220 l.	
	T	S	Landmark at 1.0 l in 220 l.	
06-Aug-99	B		Combine harvested.	

Previous crops: W. rape and turnip rape 1997, w. oats 1998.

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99/R/WW/13

GRAIN TONNES/HECTARE

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

NITROGEN / FUNGCIDE	N0	N1	N2	N3	N4	N5	Mean
S	3.90	6.49	9.11	10.54	11.09	11.39	8.76
C	3.58	6.63	8.62	10.35	11.20	11.16	8.59
Mean	3.74	6.56	8.86	10.44	11.15	11.27	8.67

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

FUNGCIDE	NITROGEN	FUNGCIDE NITROGEN
0.091	0.158	0.223

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	22	0.273	3.1

GRAIN MEAN DM% 83.8

STRAW TONNES/HECTARE

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

NITROGEN / FUNGCIDE	N0	N1	N2	N3	N4	N5	Mean
S	1.38	3.07	5.27	5.67	6.39	6.70	4.75
C	1.48	3.27	4.93	5.91	6.68	6.44	4.78
Mean	1.43	3.17	5.10	5.79	6.53	6.57	4.77

STRAW MEAN DM% 63.2

PLOT AREA HARVESTED 0.00230

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99/R/RAW/1

WINTER OILSEED RAPE

GROWTH OF WEEDS AND RAPE

Object: To measure the competitive effects of combinations of chickweed and barley on the growth and yield of oilseed rape - Appletree.

Sponsors: P.J.W. Lutman.

Design: 48 plots single replicate.

Whole plot dimensions: 4.0 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: Combination B0 C0 was quadruplicated.

Experimental diary:

29-Jul-98 : B :	:	Subsoiled started
30-Jul-98 : B :	:	Subsoiled completed
12-Aug-98 : B :	:	Ploughed and furrow pressed, started.
13-Aug-98 : B :	:	Ploughed and furrow pressed, completed.

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99/R/RAW/1

Experimental diary:

27-Aug-98	: **T** :	:	Barley and chickweed seed broadcast as treatment.
	: B :	:	Rotary harrowed, Apex, tr. Lindex-Plus FS Seed Treatment, drilled at 120 seeds/m^2 with the Accord drill.
28-Aug-98	: B :	:	Rolled.
29-Aug-98	: B :	:	Hardy at 7.5 kg.
17-Sep-98	: B :	:	Decis at 250 ml in 200 l.
24-Sep-98	: B :	:	34.5% N at 120 kg.
28-Sep-98	: **T** :	:	Butisan S at 1.5 l in 220 l, control and barley only plots.
	: **T** :	:	tm) Laser at 0.7 l in 220 l, control and chickweed only plots.
	: **T** :	:	tm) Cropoil at 2.0 l in 220 l, control and chickweed only plots.
16-Nov-98	: B :	:	tm) Punch C at 0.4 l in 200 l.
	: B :	:	tm) Stefes Cypermethrin 2 at 250 ml in 200 l.
08-Feb-99	: B :	:	34.5% N at 300 kg.
25-Feb-99	: B :	:	Punch C at 0.4 l in 200 l.
05-Mar-99	: B :	:	34.5% N at 300 kg.
30-Apr-99	: B :	:	tm) Bavistin DF at 1.0 l in 200 l.
	: B :	:	tm) Ronilan FL at 0.5 l in 200 l.
	: B :	:	tm) Hallmark at 100 ml in 200 l.
09-Jul-99	: B :	:	tm) Reglone at 3.0 l in 400 l.
	: B :	:	tm) Enhance at 400 ml in 400 l.
18-Jul-99	: B :	:	Combine harvested.

Previous crops: Linseed 1997, w. barley 1998.

GRAIN TONNES/HECTARE (FROM COMBINE HARVESTER)

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

CHCKWEED / **BARLEY**	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
B0	4.68	4.24	4.75	4.89	4.16	4.04	4.60	3.19	4.42	4.48	4.46	5.00	4.31
B1	5.21			4.85		4.67		4.34			4.68		
B2	4.48			4.55		2.87		4.05			4.21		
B3	4.83												
B4	4.37			4.43		4.45		4.58			4.24		
B5	5.11												
B6	4.38			5.35		4.07		4.57			4.41		
B7	5.06												
B8	4.41			4.42		4.06		4.13			4.82		
B9	4.50												
B10	4.62												
B11	4.48												
B12	4.55												

GRAIN MEAN DM% 89.0

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99/R/RAW/1

CLEAN GRAIN TONNES/HECTARE (AFTER REMOVING WEED SEEDS)

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

CHCKWEED / BARLEY	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
B0	4.57	4.06	4.62	4.69	4.07	3.89	4.52	3.07	4.38	4.32	4.36	4.90	4.22
B1	5.02			4.65		4.50		4.20			4.57		
B2	4.37			4.46		2.78		3.96			4.04		
B3	4.76												
B4	4.17			4.34		4.26		4.46			4.14		
B5	5.08												
B6	4.27			5.26		3.91		4.51			4.27		
B7	4.92												
B8	4.24			4.33		3.92		4.06			4.73		
B9	4.39												
B10	4.47												
B11	4.35												
B12	4.47												

PLOT AREA HARVESTED 0.00310

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99/R/RAW/3

WINTER OILSEED RAPE

VARIETIES, FUNGICIDE AND DISEASE

Object: To investigate development of light leaf spot (*Pyrenopeziza brassicae*) and stem canker (*Leptosphaeria maculans*) epidemics and yield with different fungicide regimes - Appletree.

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

Design: 3 blocks of 10 plots split into 2 sub-plots.

Whole plot dimensions: 6.0 x 15.0.
Sub-plot dimensions: 3.0 x 15.0.

Treatments: All combinations of:-

Whole plots

1. **FUNGCIDE** Fungicide rate 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:

29-Jul-98	B		Subsoiling started.
30-Jul-98	B		Subsoiling completed.
12-Aug-98	B		Ploughed and furrow pressed, started.
13-Aug-98	B		Ploughed and furrow pressed, completed.
28-Aug-98	B		Rolled.
	T	B	Combination drilled, Bristol, tr. Lindex-Plus FS Seed Treatment, at 200 seeds/m^2 with the Accord drill.
	T	C	Combination drilled, Capitol, tr. Lindex-Plus FS Seed Treatment, at 100 seeds/m^2 with the Accord drill.
29-Aug-98	B		Hardy at 7.5 kg.
11-Sep-98	B		Katamaran at 2.0 l in 200 l.
	B		Decis at 250 ml in 200 l.
24-Sep-98	B		34.5% N at 120 kg.
03-Nov-98	B		Rape straw applied at 1/4 bale per plot.
04-Nov-98	**T**	O	Folicur at 1.0 l in 220 l.

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99/R/RAW/3

Experimental diary:

04-Nov-98	: **T** :	OS	:	Folicur at 0.5 l in 220 l.
	: **T** :	R	:	Folicur at 0.5 l in 220 l.
06-Nov-98	: B :		:	tm)Laser at 0.5 l in 200 l.
	: B :		:	tm)Cropoil at 2.0 l in 200 l.
16-Nov-98	: B :		:	Stefes Cypermethrin 2 at 250 ml in 200 l.
17-Nov-98	: **T** :	N	:	Folicur at 1.0 l in 220 l.
	: **T** :	NS	:	Folicur at 0.5 l in 220 l.
	: **T** :	R	:	Folicur at 0.5 l in 220 l.
16-Dec-98	: **T** :	D	:	Folicur at 1.0 l in 220 l.
	: **T** :	DS	:	Folicur at 0.5 l in 220 l.
	: **T** :	R	:	Folicur at 0.5 l in 220 l.
13-Jan-99	: **T** :	R	:	Folicur at 0.5 l in 220 l.
08-Feb-99	: B :		:	34.5% N at 300 kg.
25-Feb-99	: **T** :	R	:	Folicur at 0.5 l in 220 l.
05-Mar-99	: B :		:	34.5% N at 300 kg.
25-Mar-99	: **T** :	DS	:	Folicur at 0.5 l in 220 l.
	: **T** :	NS	:	Folicur at 0.5 l in 220 l.
	: **T** :	OS	:	Folicur at 0.5 l in 220 l.
	: **T** :	R	:	Folicur at 0.5 l in 220 l.
	: **T** :	SF	:	Folicur at 1.0 l in 220 l.
30-Apr-99	: **T** :	FF	:	Folicur at 1.0 l in 200 l.
	: **T** :	R	:	Folicur at 0.5 l in 200 l.
	: B :		:	Hallmark at 100 ml in 200 l.
09-Jul-99	: B :		:	tm)Reglone at 3.0 l in 400 l.
	: B :		:	tm)Enhance at 400 ml in 400 l.
18-Jul-99	: B :		:	Combine harvested.

Previous crops: Linseed 1997, w. barley 1998.

GRAIN TONNES/HECTARE

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

CULTIVAR	B	C	Mean
FUNGCIDE			
-	3.37	4.25	3.81
R	5.23	5.47	5.35
O	3.66	4.27	3.96
N	3.58	4.57	4.07
D	3.53	4.50	4.01
OS	4.56	5.22	4.89
NS	4.59	4.72	4.65
DS	4.44	5.10	4.77
SF	4.88	5.25	5.06
FF	4.45	4.59	4.52
Mean	4.23	4.79	4.51

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

	FUNGCIDE	**CULTIVAR**	**FUNGCIDE CULTIVAR**
	0.220	0.092	0.302
Except when comparing means with the same level(s) of **FUNGCIDE**			0.292

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	18	0.270	6.0
BLOCK.WP.SP	20	0.358	7.9

GRAIN MEAN DM% 90.5 SUB-PLOT AREA HARVESTED 0.00276

https://doi.org/10.23637/ERADOC-1-34 *pp 139*

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99/R/RAW/4

WINTER OILSEED RAPE

CONTROL OF STEM CANKER

Object: To test fungicides to control stem canker (*Leptosphaeria maculans*) - Great Knott I.

Sponsors: B.D.L. Fitt, J. Biddulph, J.S. West, S.J. Welham.

Design: 3 randomised blocks of 21 plots.

Whole plot dimensions: 3.0 x 20.0.

Treatments:

FUNGCIDE	Fungicide timing, Difenoconazole at 0.0625 kg with carbendazim at 0.125 kg in 220 l as Plover 250 EC and Bavistin DF:
-	None (duplicated)
A	Disease onset (06-Nov-98)
B	4-6 weeks after A (16-Dec-98)
C	4-6 weeks after B (21-Jan-99)
D	4-6 weeks after C (25-Feb-99)
E	As A and B
F	As A and C
G	As A and D
H	As A, B and C
I	As A, B and D
J	As A, C and D
K	As A, B, C and D
L	As B and C
M	As B and D
N	As B, C and D
O	As C and D
W	2 weeks after A (19-Nov-98) then as B, C and D
X	4 weeks after A (03-Dec-98) then as B, C and D
Y	As A, B and C then 2 weeks after D (10-Mar-99)
Z	As A, B and C then 4 weeks after D (25-Mar-99)

Experimental diary:

13-Aug-98	B		Ploughed and furrow pressed, started.
14-Aug-98	B		Ploughed and furrow pressed, completed.
21-Aug-98	B		Rolled.
25-Aug-98	B		Combination drilled, Apex, tr. Lindex-Plus FS Seed Treatment, at 120 seeds/m^2 with the Accord drill.
	B		Rolled.
29-Aug-98	B		Doff Agricultural Slug Killer with Animal Repellent at 7.5 kg.
16-Sep-98	B		Hardy at 7.5 kg.
17-Sep-98	B		tm)Katamaran at 2.0 l in 200 l.
	B		tm)Decis at 250 ml in 200 l.
24-Sep-98	B		34.5% N at 120 kg.
06-Nov-98	B		tm)Laser at 0.5 l in 200 l.
	B		tm)Cropoil at 2.0 l in 200 l.
	B		Infected straw broadcast.
	T	A,E,F,G,H,I,J,K,Y,Z	Treatment applied.
13-Nov-98	B		Stefes Cypermethrin 2 at 250 ml in 200 l.
19-Nov-98	**T**	W	Treatment applied.
03-Dec-98	**T**	X	Treatment applied.

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99/R/RAW/4

Experimental diary:

```
   16-Dec-98 : T : B,E,H,I,K,L,M,N,W,X,Y,Z : Treatment applied
             : B :      : Draza at 5.5 kg.
   21-Jan-99 : T : C,F,H,J,K,L,N,O,W,X,Y,Z : Treatment applied.
   08-Feb-99 : B :      : 34.5% N at 300 kg.
   25-Feb-99 : T : D,G,I,J,K,M,N,O,W,X     : Treatment applied.
   05-Mar-99 : B :      : 34.5% N at 300 kg.
   10-Mar-99 : T : Y    : Treatment applied.
   25-Mar-99 : T : Z    : Treatment applied.
   30-Apr-99 : B :      : Hallmark at 100 ml in 200 l.
   09-Jul-99 : B :      : tm)Reglone at 3.0 l in 400 l.
             : B :      : tm)Enhance at 400 ml in 400 l.
   17-Jul-99 : B :      : Combine harvested.
```

Previous crops: W. oats 1997, s. barley 1998.

GRAIN TONNES/HECTARE

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

FUNGCIDE	
-	4.64
A	4.97
B	5.27
C	4.88
D	4.97
E	4.84
F	5.05
G	5.34
H	4.96
I	5.14
J	5.18
K	5.35
L	5.05
M	4.82
N	5.23
O	5.23
W	5.16
X	5.04
Y	4.87
Z	5.37
Mean	5.05

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

FUNGCIDE	
0.281	min.rep
0.244	max-min

	FUNGCIDE
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	41	0.344	6.8

GRAIN MEAN DM% 92.3

PLOT AREA HARVESTED 0.00391

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99/R/RAW/5

WINTER OILSEED RAPE

STEM CANKER STUDY

Object: To test fungicidal programmes on two varieties of oilseed rape - Great Knott I.

Sponsors: J.S. West, B.D.L. Fitt, J.E. Biddulph.

Design: 4 blocks of 5 plots split into 2 sub-plots.

Whole plot dimensions: 6.0 x 15.0.
Sub plot dimensions: 3.0 x 15.0.

Treatments: All combinations of:-

1. **FUNGCIDE** Difenoconazole and carbendazim (as Plover 250 EC and Stefes C-Flo 2):

-	None
S-F	Applied on five occasions
O-F	Applied on three occasions
O-J	Applied on two occasions
A	Applied on one occasion

2. **CULTIVAR**

C	Capitol
L	Lipton

Experimental diary:

13-Aug-98	B		Ploughed and furrow pressed, started.
14-Aug-98	B		Ploughed and furrow pressed, completed.
21-Aug-98	B		Rolled.
27-Aug-98	**T**	C	Combination drilled, Capitol, tr. Lindex-Plus FS Seed Treatment, at 80 seeds/m^2 with the Accord drill.
	T	L	Combination drilled, Lipton, tr. Lindex-Plus FS Seed Treatment, at 80 seeds/m^2 with the Accord drill.
28-Aug-98	B		Rolled.
29-Aug-98	B		Doff Agricultural Slug Killer with Animal Repellent at 7.5 kg.
16-Sep-98	B		Hardy at 7.5 kg.
17-Sep-98	B		tm) Katamaran at 2.0 l in 200 l.
	B		tm) Decis at 250 ml in 200 l.
24-Sep-98	B		34.5% N at 120 kg.
28-Sep-98	**T**	S-F	Plover 250 EC at 0.5 l with Stefes C-Flo 2 at 0.5 l in 220 l.
15-Oct-98	**T**	A	Plover 250 EC at 0.25 l with Stefes C-Flo 2 at 0.5 l in 220 l
19-Oct-98	**T**	O-F	Plover 250 EC at 0.25 l with Stefes C-Flo 2 at 0.5 l in 220 l.
	T	O-J	Plover 250 EC at 0.25 l with Stefes C-Flo 2 at 0.5 l in 220 l.
	T	S-F	Plover 250 EC at 0.25 l with Stefes C-Flo 2 at 0.5 l in 220 l.
06-Nov-98	B		tm) Laser at 0.5 l in 200 l.

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99/R/RAW/5

Experimental diary:

```
   06-Nov-98 : B :      : tm)Cropoil at 2.0 l in 200 l.
   13-Nov-98 : B :      : Stefes Cypermethrin 2 at 250 ml in 200 l.
   23-Nov-98 : T : O-F  : Plover 250 EC at 0.25 l with Stefes C-Flo 2 at 0.25 l
                          in 220 l.
             : T : O-J  : Plover 250 EC at 0.25 l with Stefes C-Flo 2 at 0.25 l
                          in 220 l
             : T : S-F  : Plover 250 EC at 0.25 l with Stefes C-Flo 2 at 0.25 l
                          in 220 l
   16-Dec-98 : B :      : Draza at 5.5 kg.
   13-Jan-99 : T : O-F  : Plover 250 EC at 0.25 l with Stefes C-Flo 2 at 0.25 l
                          in 220 l.
             : T : S-F  : Plover 250 EC at 0.25 l with Stefes C-Flo 2 at 0.25 l
                          in 220 l.
   08-Feb-99 : B :      : 34.5% N at 300 kg.
   04-Mar-99 : T : S-F  : Plover 250 EC at 0.25 l with Stefes C-Flo 2 at 0.25 l
                          in 220 l.
   05-Mar-99 : B :      : 34.5% N at 300 kg.
   30-Apr-99 : B :      : Hallmark at 100 ml in 200 l.
   09-Jul-99 : B :      : tm)Reglone at 3.0 l in 400 l.
             : B :      : tm)Enhance at  400 ml  in 400 l.
   17-Jul-99 : B :      : Combine harvested.
```

Previous crops: W. oats 1997, s. barley 1998.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

CULTIVAR	C	L	Mean
FUNGICIDE			
-	4.74	5.64	5.19
S-F	4.75	5.95	5.35
O-F	4.36	5.51	4.94
O-J	4.77	5.77	5.27
A	4.59	5.69	5.14
Mean	4.64	5.71	5.18

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

FUNGICIDE	**CULTIVAR**	**FUNGICIDE CULTIVAR**
0.127	0.118	0.226

Except when comparing means with the same level(s) of
FUNGICIDE 0.264

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.180	3.5
BLOCK.WP.SP	15	0.374	7.2

GRAIN MEAN DM% 91.1

SUB-PLOT AREA HARVESTED 0.00276

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99/R/RAW/9

WINTER OILSEED RAPE

FUNGICIDES AND STEM CANKER

Object: To study the epidemiology of stem canker (*leptosphaeria maculans*) under a one- and two-spray regime - Great Knott I.

Sponsors: J.S. West.

Design: 4 blocks of 2 plots.

Whole plot dimensions: 3.0 x 15.0.

Treatments:

FUNGICIDE

J	Applied twice, autumn and late winter
N	Applied once in autumn

Experimental diary:

13-Aug-98	B		Ploughed and furrow pressed, started.
14-Aug-98	B		Ploughed and furrow pressed, completed.
21-Aug-98			Rolled.
27-Aug-98	B		Combination drilled, Capitol, tr. Lindex-Plus FS Seed Treatment, at 120 seeds/m^2 with the Accord drill.
28-Aug-98	B		Rolled.
29-Aug-98	B		Doff Agricultural Slug Killer with Animal Repellent at 7.5 kg.
11-Sep-98	B		tm) Katamaran at 2.0 l in 200 l, started.
	B		tm) Decis at 0.25 l in 200 l, started.
16-Sep-98	B		Hardy at 7.5 kg.
17-Sep-98	B		tm) Katamaran at 2.0 l in 200 l, completed.
	B		tm) Decis at 0.25 l in 200 l, completed.
24-Sep-98	B		34.5% N at 120 kg.
06-Nov-98	B		tm) Laser at 0.5 l in 200 l.
	B		tm) Cropoil at 2.0 l in 200 l.
13-Nov-98	B		tm) Punch C at 0.4 l in 200 l.
	B		tm) Stefes Cypermethrin 2 at 250 ml in 200 l.
16-Dec-98	B		Draza at 5.5 kg.
08-Feb-99	B		34.5% N at 300 kg.
25-Feb-99	**T**	J	Punch C at 0.4 l in 220 l.
05-Mar-99	B		34.5% N at 300 kg.
30-Apr-99	B		Hallmark at 100 ml in 200 l.
09-Jul-99	B		tm) Reglone at 3.0 l in 400 l.
	B		tm) Enhance at 400 ml in 400 l.
17-Jul-99	B		Combine harvested.

Previous crops: W. oats 1997, s. barley 1998.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

FUNGICIDE	
J	4.88
N	4.66
Mean	4.77

GRAIN MEAN DM% 88.9 PLOT AREA HARVESTED 0.00345

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99/R/LNW/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 - Webbs.

Sponsors: B.D.L. Fitt, S.A.M Perryman.

Design: 3 blocks of 10 plots.

Plot dimensions: 3.0 x 15.0.

Treatments:

DIS CONT	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
PM	Benomyl pre-flowering and mid-flowering
APM	Tebuconazole with Benomyl pre-flowering and mid-flowering

Experimental diary:

17-Sep-98	B		Farmyard manure at 4.0 t.
23-Sep-98	B		Ploughed and furrow pressed.
24-Sep-98	B		Ploughed, completed.
09-Oct-98	B		Combination drilled, Oliver, tr. Prelude 20 LF, at 950 seeds/m^2 with the Nordsten drill.
13-Oct-98	B		Hardy at 10.0 kg.
09-Dec-98	**T**	AF,APM	Folicur at 0.5 l in 220 l.
24-Mar-99	B		34.5% N at 348 kg.
25-Mar-99	B		tm)Laser at 1.0 l in 200 l.
	B		tm)Cropoil at 2.0 l in 200 l.
08-Apr-99	B		Eagle at 40 g in 200 l.
14-May-99	**T**	APM,PM	Benlate Fungicide at 1.1 kg in 220 l.
07-Jun-99	**T**	AM,AMC	Rovral Flo at 2.0 l in 220 l.
	T	BM,BMC	Benlate Fungicide at 1.1 kg in 220 l.
	T	CM,CMC	Compass at 3.0 l in 220 l.
	T	APM,PM	Benlate Fungicide at 1.1 kg in 220 l.
23-Jun-99	**T**	AMC	Rovral Flo at 2.0 l in 220 l.
	T	BMC	Benlate Fungicide at 1.1 kg in 220 l.
	T	CMC	Compass at 3.0 l in 220 l.
09-Jul-99	B		tm)Reglone at 3.0 l in 400 l.
	B		tm)Enhance at 400 ml in 400 l.
24-Jul-99	B		Combine harvested.

Previous crops: Maize 1997, w. barley 1998.

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99/R/LNW/1

GRAIN TONNES/HECTARE

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

DIS CONT

-	2.40
AF	2.23
BM	2.41
BMC	2.34
AM	2.25
AMC	2.07
CM	2.62
CMC	2.32
PM	2.20
APM	2.45
Mean	2.33

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

DIS CONT
0.221

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	18	0.271	11.7

GRAIN MEAN DM% 91.9

PLOT AREA HARVESTED 0.00276

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99/R/LNW/2

LINSEED

WEEDS IN WINTER LINSEED

Object: To study the competitive effects of two broad-leaved weeds on the growth and yield of autumn-sown linseed - Webbs.

Sponsor: P.J.W. Lutman.

Design: 3 randomised blocks of 2 x 4 x 2 + 2.

Plot dimensions: 4.0 x 13.0.

Treatments: All combinations of:-

1. TIMEWEED Timing of weed removal:

-	None
SP	Spring

2. WEEDENS Weed density:

L	Low
M	Medium
H	High
VH	Very high

3. WEEDSPEC Weed species:

CH	Chickweed (*Stellaria media*)
CL	Cleavers (*Galium aparine*)

EXTRA

N0	Control (no weeds planted) duplicated

Experimental diary:

17-Sep-98	B		Farmyard manure at 4.0 t.
23-Sep-98	B		Ploughed and furrow pressed started.
24-Sep-98	B		Ploughed, completed.
12-Oct-98	B		Spring-tined.
	T	CH,CL	Weed seed broadcast as treatment.
	B		Combination drilled, Oliver, tr. Prelude 20 LF, at 950 seeds/m^2 with the Accord drill.
13-Oct-98	B		Hardy at 10.0 kg.
24-Mar-99	B		34.5% N at 348 kg.
25-Mar-99	B		tm) Laser at 1.0 l in 200 l.
	B		tm) Cropoil at 2.0 l in 200 l.
08-Apr-99	**T**	SP	Eagle at 40 g in 200 l.
30-Apr-99	**T**	NO	Eagle at 30 g in 220 l.
11-Jun-99	B		tm) Bavistin DF at 0.5 l in 200 l.
	B		tm) Sipcam UK Rover 500 at 1.0 l in 200 l.
09-Jul-99	B		tm) Reglone at 3.0 l in 400 l.
	B		tm) Enhance at 400 ml in 400 l.
23-Jul-99	B		Combine harvested.

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99/R/LNW/2

Previous crops: Maize 1997, w. barley 1998.

GRAIN TONNES/HECTARE (FROM COMBINE HARVESTER)

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

TIMEWEED	-	SP	Mean
WEEDDENS			
L	2.43	2.27	2.35
M	2.28	2.28	2.28
H	2.53	2.23	2.38
VH	2.36	2.37	2.36
Mean	2.40	2.29	2.34

WEEDSPEC	CH	CL	Mean
WEEDDENS			
L	2.34	2.36	2.35
M	2.29	2.27	2.28
H	2.31	2.45	2.38
VH	2.37	2.36	2.36
Mean	2.33	2.36	2.34

WEEDSPEC	CH	CL	Mean
TIMEWEED			
-	2.40	2.40	2.40
SP	2.26	2.32	2.29
Mean	2.33	2.36	2.34

TIMEWEED	-		SP	
WEEDSPEC	CH	CL	CH	CL
WEEDDENS				
L	2.49	2.37	2.19	2.36
M	2.37	2.19	2.21	2.35
H	2.48	2.58	2.13	2.32
VH	2.24	2.48	2.51	2.24

EXTRA NO 2.58

Grand mean 2.37

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

WEEDSPEC	**WEEDDENS**	**TIMEWEED**	**WEEDSPEC WEEDDENS**
0.081	0.115	0.081	0.162

WEEDSPEC TIMEWEED	**WEEDDENS TIMEWEED**	**WEEDSPEC WEEDDENS TIMEWEED**
0.115	0.162	0.229

S.e.d. for comparing NO with any item in the **WEEDSPEC.WEEDDENS.TIMEWEED** table is 0.199

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99/R/LNW/2

GRAIN TONNES/HECTARE (FROM COMBINE HARVESTER)

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	35	0.281	11.9

GRAIN MEAN DM% 92.9 PLOT AREA HARVESTED 0.00230

CLEAN GRAIN TONNES/HECTARE (WEED SEED REMOVED)

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

TIMEWEED	-	SP	Mean
WEEDDENS			
L	2.31	2.25	2.28
M	2.11	2.26	2.19
H	2.34	2.21	2.28
VH	2.18	2.35	2.26
Mean	2.24	2.27	2.25

WEEDSPEC	CH	CL	Mean
WEEDDENS			
L	2.31	2.25	2.28
M	2.25	2.12	2.19
H	2.26	2.29	2.28
VH	2.35	2.18	2.26
Mean	2.29	2.21	2.25

WEEDSPEC	CH	CL	Mean
TIMEWEED			
-	2.35	2.12	2.24
SP	2.23	2.30	2.27
Mean	2.29	2.21	2.25

TIMEWEED	-		SP	
WEEDSPEC	CH	CL	CH	CL
WEEDDENS				
L	2.45	2.17	2.17	2.34
M	2.33	1.90	2.18	2.34
H	2.41	2.27	2.11	2.31
VH	2.22	2.13	2.48	2.22

EXTRA NO 2.56

Grand mean 2.29

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99/R/LNW/2

CLEAN GRAIN TONNES/HECTARE (WEED SEED REMOVED)

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

WEEDSPEC	WEEDDENS	TIMEWEED	WEEDSPEC WEEDDENS
0.082	0.116	0.082	0.164

WEEDSPEC TIMEWEED	WEEDDENS TIMEWEED	WEEDSPEC WEEDDENS TIMEWEED
0.116	0.164	0.231

S.e.d. for comparing NO with any item in the **WEEDSPEC.WEEDDENS.TIMEWEED** table is 0.200

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	35	0.283	12.4

PLOT AREA HARVESTED 0.00230

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99/R/LNS/1

LINSEED

FUNGICIDES AND SPRING LINSEED

Object: To test fungicidal spray programmes on spring linseed - Sawyers I.

Sponsors: B.D.L. Fitt, S.A.M. Perryman.

Design: 2 blocks of 2 plots randomly split into 3 x 4 + 2.

Plot dimensions: 3.0 x 12.0.

Treatments: All combinations of:-

Whole plots: All combinations of:-

1. **VARIETY**

A	Antares
J	Jupiter

Sub-plots

2. **FUNGCIDE** Target organism and fungicides used:

AL	*Alternaria* (Rovral Flo at 2.0 l in 220 l)
BO	*Botrytis* (Benlate Fungicide at 1.1 kg in 220 l)
A+B	*Alternaria* and *Botrytis* (Compass at 3.0 l in 220 l)

3. **TIMING** Fungicide timing:

P+M	Pre-flowering
MF	Mid-flowering
CD	Capsule development
M+C	Mid-flowering and capsule development

Plus two extra treatments:

EXTRA

A	Antares with no fungicide (duplicated)
J	Jupiter with no fungicide (duplicated)

Experimental diary:

03-Dec-98	B		Ploughed, started.
04-Dec-98	B		Ploughed, completed.
11-Feb-99	B		PK as (0:20:32) at 1000 kg.
29-Mar-99	B		Spring-tined.
29-Mar-99	**T**	A	Combination drilled, Antares, tr. Vitavax RS, at 700 seeds/m^2 with the Accord drill.
29-Mar-99	**T**	J	Combination drilled, Jupiter, tr. Hydraguard and Prelude 20 LF, at 700 seeds/m^2 with the Accord drill.
28-Apr-99	B		34.5% N at 174 kg.

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99/R/LNS/1

Experimental diary:

14-May-99	B		Ally at 30 g in 200 l.
09-Jun-99	T	P+M	Fungicides applied.
25-Jun-99	T	M+C,MF,P+M	Fungicides applied.
13-Jul-99	T	CD,M+C	Fungicides applied.
29-Jul-99	B		tm)Enhance at 400 ml in 400 l.
	B		tm)Reglone at 3.0 l in 400 l.
01-Sep-99	B		Combine harvested.

Previous crops: S. barley 1997, w. wheat 1998.

GRAIN TONNES/HECTARE

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

FUNGCIDE / **TIMING**	AL	BO	A+B	Mean
P+M	2.17	2.31	2.28	2.26
MF	2.14	2.16	2.32	2.21
CD	1.98	2.13	2.03	2.05
M+C	2.12	2.06	2.30	2.16
Mean	2.10	2.17	2.24	2.17

VARIETY / **TIMING**	A	J	Mean
P+M	2.26	2.26	2.26
MF	2.20	2.22	2.21
CD	1.97	2.12	2.05
M+C	2.15	2.17	2.16
Mean	2.14	2.19	2.17

VARIETY / **FUNGCIDE**	A	J	Mean
AL	2.06	2.15	2.10
BO	2.18	2.15	2.17
A+B	2.20	2.27	2.24
Mean	2.14	2.19	2.17

FUNGCIDE	AL		BO		A+B	
VARIETY	A	J	A	J	A	J
TIMING						
P+M	2.15	2.19	2.28	2.35	2.33	2.24
MF	2.06	2.22	2.22	2.11	2.31	2.33
CD	1.92	2.04	2.06	2.20	1.94	2.12
M+C	2.08	2.15	2.17	1.95	2.21	2.40

EXTRA	A	J	Mean
	1.96	2.11	2.03

Grand mean 2.15

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99/R/LNS/1

GRAIN TONNES/HECTARE

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

FUNGCIDE	TIMING	VARIETY* FUNGCIDE
0.037	0.043	0.052

VARIETY* TIMING	FUNGCIDE TIMING	VARIETY* FUNGCIDE TIMING
0.061	0.074	0.105

* Within the same level of **VARIETY** only

SED for comparing **EXTRA** A or J with any item in **VARIETY.FUNGCIDE.TIMING** table is 0.091 within the same level of **VARIETY** only

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP.SP	28	0.105	4.9

GRAIN MEAN DM% 92.7

PLOT AREA HARVESTED 0.00230

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99/R/SU/1

SUNFLOWERS

HYBRID SUNFLOWERS

Object: To compare the performance of two hybrid sunflower varieties at three different seed rates - Long Hoos IV 5.

Sponsors: A. Heran, H.A. McCartney.

Design: 2 randomised blocks of 2 x 3.

Whole plot dimensions: 5.0 x 20.0.

Treatments:

1. **VARIETY**

A	Antonil
S	Sanluca

2. **SEEDRATE** Seeds/ha:

S1 95,000
S2 110,000
S3 125,000

Experimental diary:

18-Nov-98	:	:	Roundup at 2.0 l in 200 l.
04-Dec-98	:	:	Ploughed.
06-Apr-99	:	:	Spring-tined.
18-May-99	: B :	:	Rotary harrowed.
	: **T** :	:	Varieties drilled as treatment with Nodet Gougis drill.
19-May-99	: B :	:	34.5% N at 290 kg.
20-May-99	: B :	:	Stomp 400 SC at 5.0 l in 200 l.
18-Oct-99	: B :	:	Combine harvested. Chopped straw.

Previous crops: S. wheat 1997, s. beans 1998.

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99/R/SU/1

GRAIN TONNES/HECTARE

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

SEEDRATE / VARIETY	S1	S2	S3	Mean
A	1.81	1.48	1.64	1.65
S	2.27	2.32	2.72	2.44
Mean	2.04	1.90	2.18	2.04

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

VARIETY	SEEDRATE	VARIETY SEEDRATE
0.105	0.128	0.182

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	5	0.182	8.9

GRAIN MEAN DM% 81.7

PLOT AREA HARVESTED 0.00500

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99/R/BES/2

SPRING BEANS

WEEDS AND WATER IN SPRING BEANS

Object: To test the effects of moisture level and relative time of emergence on the competitive effects of weeds in beans - Pastures.

Sponsor: P.J.W. Lutman.

Design: 3 replicates of 2 plots split into 7 sub-plots.

Whole plot dimensions: 24.0 x 10.0.
Sub-plot dimensions: 3.0 x 10.0.

Treatments:

Whole plots

1. **IRRIGATN** Irrigation:

U	None
I	Irrigated

Sub-plots

2. **WEEDS**

-	None
M1	Mustard, low density
M2	Mustard, high density
O1	Oats, low density
O2	Oats, high density
M1L	Mustard, low density - sown late 07-Apr-99
M2L	Mustard, high density - sown late 07-Apr-99

Experimental diary:

17-Nov-98			Alpha Glyphogan at 2.0 l in 200 l.
02-Dec-98			Ploughed, started.
03-Dec-98			Ploughed, completed.
16-Mar-99	B		Muriate of potash at 600 kg.
17-Mar-99	B		Triple superphosphate at 150 kg.
25-Mar-99	B		Rotary harrowed.
	B		Combination drilled, Alfred, homesaved, at 40 seeds/m^2 with the Fiona drill.
	T	M1,M2	Mustard broadcast at 40 or 160 seeds/m^2 respectively.
	T	O1,O2	Oats broadcast at 40 or 160 seeds/m^2 respectively.
26-Mar-99	B		Cambridge rolled.
07-Apr-99	**T**	M1L,M2L	Mustard broadcast at 40 or 160 seeds/m^2 respectively.
16-Apr-99	B		Hallmark at 150 ml in 200 l.
30-Apr-99	**T**	O1,O2	Basagran SG at 1.1 kg in 220 l.
05-May-99	B		Resistim at 2.5 l in 200 l.
15-May-99	B		Folio 575 SC at 2.0 l in 200 l.
19-May-99	B		Hallmark at 150 ml in 200 l.
22-Jun-99	B		tm) Bavistin DF at 1.0 kg in 200 l.

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99/R/BES/2

Experimental diary:

22-Jun-99	: B :		: tm) Folio 575 SC at 2.0 l in 200 l.
	: B :		: tm) Hallmark at 150 ml in 200 l.
23-Jun-99	: **T** :	I	: Irrigated, 22 mm.
13-Jul-99	: **T** :	I	: Irrigated, 17 mm.
02-Aug-99	: **T** :	I	: Irrigated, 15 mm.
23-Aug-99	: B :		: Hand harvested.

Previous crops: S. beans and w. beans 1997, w. wheat 1998.

NOTE: The yield of one plot **IRRIGATN** U **WEEDS** - was treated as missing, due to heavy charlock infestation and poor development of crop. An estimated value was used in the analysis.

GRAIN TONNES/HECTARE

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

WEEDS / **IRRIGATN**	-	M1	M2	O1	O2	M1L	M2L	Mean
U	5.21	1.55	1.41	2.32	1.50	2.81	3.85	2.66
I	6.22	3.44	1.64	3.40	2.36	4.75	3.26	3.58
Mean	5.72	2.50	1.52	2.86	1.93	3.78	3.55	3.12

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

IRRIGATN	**WEEDS**	**IRRIGATN WEEDS**
0.268	0.501	0.708

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	25	0.867	27.8

GRAIN MEAN DM% *

PLOT AREA HARVESTED 0.00010

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99/R/LP/1

LUPINS

LUPIN GENOTYPES

Object: To assess the overwinter survival, crop structure, yield potential and maturity date of forty six lines of winter lupins.- Bones Close.

Sponsors: I.F. Shield, H.J. Stevenson.

Design: 3 blocks of 54 plots in an alpha design.

Whole plot dimensions: 2.0 x 5.0.

Treatments:

GENOTYPE

1 to 44	44 different genotypes
AG	Agena
LU	Lucyane (tr. Germipro)

Experimental diary:

29-Aug-98	B		Ploughed and furrow pressed, started.
30-Aug-98	B		Ploughed and furrow pressed, completed.
25-Sep-98	**T**		Rotary harrowed. All genotypes drilled at 40 seeds/m^2 with the Oyjord drill.
	B		Spannit at 1.5 l in 200 l.
29-Jan-99	B		tm) Carbetamex at 3.0 kg in 200 l.
	B		tm) Stomp 400 SC at 5.0 l in 200 l.
16-Mar-99	B		Alpha Simazine 50 SC at 2.3 l in 200 l.
17-Mar-99	B		tm) Folicur at 0.5 l in 200 l.
	B		tm) Rovral Flo at 1.0 l in 200 l.
15-Apr-99	B		Lo-Gran 20 WG at 18.75 g in 200 l.
18-Jun-99	B		Alto 240 EC at 0.33 l in 200 l.
	B		tm) Aphox at 280 g in 200 l.
	B		tm) Enhance at 50 ml in 200 l.
23-Aug-99	B		Hand harvested genotypes; 3, 9, 12, 19, 20, 21, 35, 41, 43, AG, LU.
31-Aug-99	B		Hand harvested genotypes: 1, 5, 6, 13, 14, 15, 25, 26, 30, 34, 40, 42, 44.
09-Sep-99	B		Hand harvested genotypes: 2, 4, 7, 8, 10, 11, 16, 17, 18, 22, 23, 24, 27, 28, 29, 31, 32, 33, 36, 37, 38, 39.

Previous crops: W. rape 1997, w. rye, s. wheat and w. wheat 1998.

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99/R/LP/1

GRAIN TONNES/HECTARE

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

GENOTYPE	
1	4.09
2	4.85
3	3.71
4	5.38
5	4.26
6	4.44
7	4.04
8	3.57
9	1.72
10	4.31
11	3.34
12	2.67
13	4.33
14	3.19
15	1.57
16	2.85
17	3.13
18	2.73
19	1.54
20	3.36
21	2.49
22	4.41
23	3.13
24	2.75
25	2.78
26	2.06
27	4.55
28	3.36
29	4.15
30	1.99
31	4.32
32	4.01
33	4.43
34	2.13
35	3.48
36	4.53
37	3.80
38	2.42
39	3.25
40	3.46
41	4.40
42	4.83
43	3.37
44	5.45
AG	3.26
LU	2.89
Mean	3.41

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99/R/LP/1

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

	GENOTYPE
	0.851 min.rep
	0.634 max-min

	GENOTYPE
min.rep	Any of the remainder
max-min	LU v any of the remainder

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	114	1.042	30.6

GRAIN MEAN DM% *

PLOT AREA HARVESTED 0.00010

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99/W/LP/1

LUPINS

PLANT DENSITY

Object: To test a range of plant densities of DTN 20 - Woburn, Horsepool Field.

Sponsors: I.F. Shield, H.J. Stevenson, J.E. Leach, T. Scott.

Design: 3 blocks of 4 plots.

Whole plot dimensions: 4.0 x 9.0.

Treatments:

DENSITY	Seeds/m^2:
30	
50	
70	
90	

Experimental diary:

25-Aug-98	B	:	Subsoiled.
08-Sep-98	B	:	Ploughed.
14-Sep-98	B	:	Cambridge rolled.
15-Sep-98	**T**	:	Rotary harrowed. Drilled, DTN 20, as treatment with the Accord drill.
	B	:	Spannit at 1.5 l in 200 l.
06-Oct-98	B	:	Draza at 5.5 kg.
19-Oct-98	B	:	Stomp 400 SC at 3.3 l in 200 l.
	B	:	Decis at 300 ml.
23-Nov-98	B	:	Carbetamex at 3.0 kg in 220 l.
01-Apr-99	B	:	Lo-Gran 20 WG at 18.75 g in 220 l.
	B	:	tm)Rovral Flo at 1.0 l in 220 l.
	B	:	tm)Folicur at 0.5 l in 220 l.
06-May-99	B	:	tm)Laser at 1.5 l in 200 l.
	B	:	tm)Cropoil at 2.0 l in 200 l.
18-Jun-99	B	:	tm)Aphox at 280 g in 200 l.
	B	:	tm)Enhance at 50 ml in 200 l.
13-Jul-99	B	:	Folicur at 0.5 l in 200 l.
06-Sep-99	B	:	Combine harvested, straw chopped.

Previous crops: W. wheat 1998, fallow 1997.

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99/W/LP/1

GRAIN TONNES/HECTARE

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

DENSITY	
30	1.94
50	1.69
70	1.56
90	1.34
Mean	1.63

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

DENSITY
0.184

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

Stratum	d.f.	s.e.	cv%
WP	8	0.226	13.8

GRAIN MEAN DM% 83.7

PLOT AREA HARVESTED 0.00207

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99/R/LP/3

LUPINS

POD DEVELOPMENT AND YIELD

Object: To define the role of nitrogen in pod abortion, development and seed yield. To determine the relationships between leaves and pods in supplying carbohydrate to the developing seeds - Bones Close.

Sponsors: I.F. Shield, J.E. Leach.

Design: 2 blocks of 2 x 6 plots systematically arranged for irrigation.

Sub plot dimensions: 8.0 x 9.0 and 4.0 x 9.0 (HR + AR).

Treatments:

Whole plots:

1.	**IRRIGATN**	Irrigation:
	O	None
	I	Irrigated

Sub-plots:

2.	**N STRUCT**	Nitrogen or fungicide:
	-	None
	SN	Spring nitrogen
	FN	Foliar nitrogen
	E	Epoxiconazole with fenpropimorph and kresoxim-methyl

NOTE: Two treatments HR + AR were abandoned, no yields.
HR Half leaves removed
AR All leaves removed.

Experimental diary:

29-Aug-98	B		Ploughed and furrow pressed, started.
30-Aug-98	B		Ploughed and furrow pressed, completed.
07-Sep-98	B		Flat rolled.
	B		Combination drilled, DTN 20, untreated, at 50 seeds/m^2 with the Accord drill.
	B		Rolled.
	B		Spannit at 1.5 l in 200 l.
11-Sep-98	B		Hardy at 7.5 kg.
16-Oct-98	B		tm) Stomp 400 SC at 5.0 l in 200 l.
	B		tm) Decis at 300 ml in 200 l.
29-Jan-99	B		Carbetamex at 3.0 kg in 200 l.
16-Mar-99	B		Alpha Simazine 50 SC at 2.3 l in 200 l.
17-Mar-99	B		tm) Folicur at 0.5 l in 200 l.
	B		tm) Rovral Flo at 1.0 l in 200 l.
08-Apr-99	**T**	SN	46% N at 240 kg.
15-Apr-99	B		Lo-Gran 20 WG at 18.75 g in 200 l.
16-Apr-99	**T**		tm) Corbel at 0.2 l in 220 l, all except E plots.
	T		tm) Opus at 1.0 l in 220 l, all except E plots.
	T	E	Mantra at 1.0 l in 220 l.
27-Apr-99	**T**	SN	46% N at 240 kg.
14-May-99	**T**	SN	46% N at 240 kg.

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99/R/LP/3

Experimental diary:

18-Jun-99	: B :		: tm)	Aphox at 280 g in 200 l.
	: B :		: tm)	Enhance at 50 ml in 200 l.
23-Jun-99	: T :	I	:	Irrigated 24 mm, one half block (plots 19-24) flooded due to burst pipe.
30-Jun-99	: T :		: tm)	Corbel at 0.2 l in 220 l, all except E plots.
	: T :		: tm)	Opus at 1.0 l in 220 l, all except E plots.
	: T :	E	:	Mantra at 1.0 l in 220 l.
02-Jul-99	: T :	FN	:	46% N at 240 kg.
13-Jul-99	: T :	I	:	Irrigated 15 mm.
16-Jul-99	: T :	I	:	Irrigated 25 mm.
19-Jul-99	: T :	I	:	Irrigated 8 mm.
26-Aug-99	: B :		:	Combine harvested.

Previous crops: W. rape 1997, w. rye, s. wheat and w. wheat 1998.

GRAIN TONNES/HECTARE

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

N STRUCT / **IRRIGATN**	-	SN	FN	E	Mean
O	2.39	2.79	2.92	2.99	2.64
I	2.36	2.68	2.46	2.64	2.48
Mean	2.38	2.73	2.69	2.82	2.56

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

N STRUCT	**IRRIGATN*** **N STRUCT**	
0.182	0.257	min.rep
0.148	0.210	max-min

* Within the same level of **IRRIGATN** only

	N STRUCT
min.rep	-
max-min	- v any of the remainder

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	14	0.257	10.0

GRAIN MEAN DM% 64.6

PLOT AREA HARVESTED 0.00207

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99/R/LP/4

LUPINS

GENOTYPE EVALUATION

Object: To test further the best new dwarf determinate genotypes - Bones Close.

Sponsors: I.F. Shield, H.J. Stevenson, J.E. Leach, T. Scott.

Design: 3 blocks of 14 plots.

Whole plot dimensions: 2.0 x 5.5.

Treatments:

GENOTYPE

01	DTN108
02	DTN19A
03	DTN19B
04	DTN78
05	DTN01
06	DTN11
07	DTN31
08	DTN84
09	DTN10
10	DTN04
11	CH304-73
12	DTN12
13	DTN20
14	CH304-70

Experimental diary:

29-Aug-98	B	:	Ploughed and pressed.
17-Sep-98	B	:	Rotary harrowed.
	T	:	Genotypes drilled at 40 seeds/m^2 with the Oyjord drill.
	B	:	Spannit at 1.5 l in 200 l.
29-Jan-99	B	:	tm)Carbetamex at 3.0 kg in 200 l.
	B	:	tm)Stomp 400 SC at 5.0 l in 200 l.
16-Mar-99	B	:	Aplha Simazine 50 SC at 2.3 l in 200 l.
17-Mar-99	B	:	tm)Folicur at 0.5 l in 200 l.
	B	:	tm)Rovral Flo at 1.0 l in 200 l.
15-Apr-99	B	:	Lo-Gran 20 WG at 18.75 g in 200 l.
18-Jun-99	B	:	Alto 240 EC at 0.33 l in 200 l.
	B	:	tm)Aphox at 280 g in 200 l.
	B	:	tm)Enhance at 50 ml in 200 l.
26-Aug-99	**T**	:	Combine harvested, genotypes 6, 11 & 14. Chopped straw.
27-Aug-99	**T**	:	Combine harvested all remaining genotypes. Chopped straw

Previous crops: W. rape 1997, w. rye, s. wheat and w. wheat 1998.

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99/R/LP/4

GRAIN TONNES/HECTARE

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

GENOTYPE	
01	6.15
02	2.68
03	3.98
04	4.76
05	4.23
06	3.82
07	2.52
08	4.73
09	3.74
10	3.13
11	3.58
12	3.95
13	4.18
14	2.62
Mean	3.86

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

GENOTYPE
0.576

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	26	0.705	18.3

GRAIN MEAN DM% 72.7

PLOT AREA HARVESTED 0.00110

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99/R/LP/6

LUPINS

SEED RATES AND SOWING DATES

Object: To test a range of plant densities and sowing dates of DTN 20 - Meadow.

Sponsors: I.F. Shield, H.J. Stevenson, J.E. Leach, T. Scott.

Design: 4 randomised blocks of 2 x 4.

Plot dimensions: 9.0 x 9.0.

Treatments: All combinations of:-

1. **SOW DATE**

SE	Sown early
SL	Sown late

2. **SOW RATE** Seeds per m^2:

R1	30
R2	50
R3	70
R4	90

Experimental diary:

28-Aug-98	B		Ploughed
04-Sep-98	B		Flat rolled.
	T	SE	Combination drilled, DTN 20, untreated, with the Accord drill.
	T	SE	Rolled.
	T	SE	Spannit at 1.5 l in 200 l.
14-Sep-98	**T**	SL	Combination drilled, DTN 20, untreated, with the Accord drill.
	T	SL	Spannit at 1.5 l in 220 l.
18-Sep-98	B		Hardy at 7.5 kg.
09-Oct-98	B		tm) Laser at 0.5 l in 200 l.
	B		tm) Cropoil at 2.0 l in 200 l.
16-Oct-98	B		tm) Stomp 400 SC at 5.0 l in 200 l.
	B		tm) Decis at 300 ml in 200 l.
	B		Hardy at 7.5 kg.
27-Jan-99	B		Carbetamex at 3.0 kg in 200 l.
16-Mar-99	B		Alpha Simazine 50 SC at 2.3 l in 200 l.
17-Mar-99	B		tm) Folicur at 0.5 l in 200 l.
	B		tm) Rovral Flo at 1.0 l in 200 l.
15-Apr-99	B		Lo-Gran 20 WG at 18.75 g in 200 l.
18-Jun-99	B		Alto 240 EC at 0.33 l in 200 l.
	B		tm) Aphox at 280 g in 200 l.
	B		tm) Enhance at 50 ml in 200 l.
27-Aug-99	B		Combine harvested.

Previous crops: Linseed 1997, w. barley 1998.

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99/R/LP/6

GRAIN TONNES/HECTARE

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

SOW RATE / SOW DATE	R1	R2	R3	R4	Mean
SE	2.83	2.15	1.97	1.78	2.18
SL	3.58	3.03	2.63	2.43	2.92
Mean	3.20	2.59	2.30	2.11	2.55

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

SOW DATE	SOW RATE	SOW DATE SOW RATE
0.076	0.108	0.152

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	21	0.216	8.5

GRAIN MEAN DM% 73.5

PLOT AREA HARVESTED 0.00207

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99/R/LP/7

LUPINS

YELLOW LUPINS

Object: To study the effects of sowing date and seed rate upon maturity date and seed yield of yellow lupin - Bones Close.

Sponsors: I.F. Shield, H.J. Stevenson, J.E. Leach, T. Scott.

Design: 3 randomised blocks of 3 x 3 plots.

Whole plot dimensions: 3.0 x 9.0.

Treatments: All combinations of:-

1. **SOW DATE**

E	Sown early
M	Sown middle
L	Sown late

2. **SEED RATE** Seeds per m^2:

S1	70
S2	90
S3	110

Experimental diary:

29-Aug-98			Ploughed and furrow pressed, started.
30-Aug-98			Ploughed and furrow pressed, completed.
12-Mar-99	B		tm) PDQ at 3.0 l in 200 l.
	B		tm) Sprayprover at 3.0 l in 200 l.
19-Mar-99	B		Rotary harrowed twice.
	T	E	Combination drilled, Wodjil, undressed, with the Accord drill.
07-Apr-99	**T**	M	Combination drilled, Wodjil, undressed, with the Accord drill.
23-Apr-99	**T**	M	Alpha Simazine 50 SC at 2.0 l in 220 l.
27-Apr-99	**T**	L	Combination drilled, Wodjil, undressed, with the Accord drill.
14-Jun-99	B		Unite A at 0.2 l in 220 l.
18-Jun-99	B		Aphox at 280 g in 220 l.
06-Aug-99	**T**	E	tm) Reglone at 3.0 l in 400 l.
	T	E	tm) Enhance at 400 ml in 400 l.
16-Aug-99	**T**	M	tm) Enhance at 400 ml in 400 l.
	T	M	tm) Reglone at 3.0 l in 400 l.
26-Aug-99	**T**	E,M	Combine harvested.
31-Aug-99	**T**	L	tm) Enhance at 400 ml in 400 l.
	T	L	tm) Reglone at 3.0 l in 400 l.
13-Sep-99	**T**	L	Combine harvested.

Previous crops: W. rape 1997, w. rye, s. wheat and w. wheat 1998.

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99/R/LP/7

GRAIN TONNES/HECTARE

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

SOW DATE / SEED RAT	E	M	L	Mean
S1	2.08	2.10	1.38	1.86
S2	2.17	2.24	1.90	2.10
S3	2.51	2.30	1.88	2.23
Mean	2.25	2.21	1.72	2.06

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

SEED RAT	SOW DATE	SEED RAT SOW DATE
0.148	0.148	0.256

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	16	0.313	15.2

GRAIN MEAN DM% 77.1

PLOT AREA HARVESTED 0.00184

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99/W/PE/1

SPRING PEAS

SULPHUR AND SPRING PEAS

Object: To test sulphur fertilizer on spring peas - Woburn, Butt Close II.

Sponsors: F.J. Zhao.

Design: 3 randomised blocks of 5 plots.

Whole plot dimensions: 3.0 x 12.0.

Treatments:

SULPHUR	Sulphur as gypsum (17.5% S) or Thiovit (80% S) kg S:
S0	None
S1	10 as gypsum
S2	20 as gypsum
S4	40 as gypsum
S2T	20 as Thiovit

Experimental diary:

31-Mar-99	B		Combination drilled, Eiffel, tr. Thiram, at 80 seeds/m^2 with the Nordsten drill.
01-Apr-99	B		Rolled.
02-Apr-99	**T**	S1,S2,S4	Gypsum applied at 57, 114 and 229 kg respectively.
	T	S2T	Thiovit at 25 kg.
07-Apr-99	B		Bullet at 5.0 l in 200 l.
20-May-99	B		tm) Fusilade 250 EW 0.75 l in 200 l.
	B		tm) Enhance at 200 ml in 200 l.
25-May-99	B		tm) Ronilan FL at 0.5 l in 200 l.
	B		tm) Sipcam Rover 500 at 2.0 l in 200 l.
	B		tm) Hallmark at 150 ml in 200 l.
	B		tm) Vytel Manganese at 2.0 l in 200 l.
09-Jun-99	B		tm) Ronilan FL at 0.5 l in 200 l.
	B		tm) Sipcam Rover 500 at 2.0 l in 200 l.
	B		tm) Aphox at 100 g in 200 l.
	B		tm) Hallmark at 100 ml in 200 l.
	B		tm) Vytel Manganese at 3.0 l in 200 l.
30-Jun-99	B		tm) Hallmark at 70 ml in 200 l.
	B		tm) Aphox at 140 g in 200 l.
28-Jul-99	B		Combine harvested.

Previous crops: W. wheat 1998, fallow 1997.

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99/W/PE/1

GRAIN TONNES/HECTARE

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

SULPHUR	
S0	4.27
S1	4.40
S2	4.34
S4	4.70
S2T	5.60
Mean	4.66

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

SULPHUR
0.287

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.406	8.7

GRAIN MEAN DM% 86.7

PLOT AREA HARVESTED 0.00220

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METEOROLOGICAL RECORDS 1999 - 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	59	(+7)	5.2	(+2.2)	3.4	5.7	7.0
FEB	91	(+26)	4.7	(+1.5)	2.2	5.1	6.3
MAR	114	(+8)	7.2	(+2.0)	4.8	7.1	6.9
APR	158	(+20)	9.4	(+1.8)	6.3	9.9	8.8
MAY	183	(-4)	13.0	(+2.0)	8.7	13.2	11.1
JUN	220	(+29)	13.8	(-0.1)	10.0	15.4	13.2
JUL	252	(+63)	17.7	(+1.8)	14.2	17.6	15.2
AUG	168	(-11)	16.5	(+0.6)	12.6	17.2	15.9
SEP	162	(+22)	16.0	(+2.4)	13.2	16.4	15.7
OCT	146	(+43)	10.6	(+0.2)	8.1	12.6	13.8
NOV	79	(+14)	7.4	(+1.4)	5.3	9.6	11.4
DEC	66	(+19)	4.4	(+0.4)	2.3	6.1	8.7
YEAR*	1698	(+236)	10.5	(+1.4)	7.6	11.3	11.2

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	16	111	(+46)	22	96	9.0
FEB	15	24	(-24)	14	2	10.2
MAR	13	38	(-19)	14	23	6.4
APR	9	49	(-4)	15	16	6.8
MAY	1	19	(-34)	12	0	5.6
JUN	0	83	(+26)	12	28	4.1
JUL	0	23	(-24)	5	10	6.6
AUG	0	119	(+65)	13	51	5.0
SEP	0	70	(+16)	16	29	5.8
OCT	7	47	(-19)	12	24	7.9
NOV	11	36	(-29)	19	14	9.6
DEC	18	96	(+27)	23	79	11.8
YEAR*	90	715	(+27)	177	372	7.4

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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