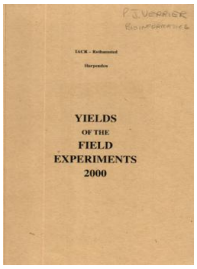
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ROTHAMSTED RESEARCH

Yields of the Field Experiments 2000

Full Table of Content



Default Title

Rothamsted Research

Rothamsted Research (2001) *Default Title ;* Yields Of The Field Experiments 2000, pp 0 - 186 **- DOI: https://doi.org/10.23637/ERADOC-1-55**

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P. J. VERRIER
BIOINFORMATICS

IACR – Rothamsted

Harpenden

YIELDS
OF THE
FIELD
EXPERIMENTS
2000

https://doi.org/10.23637/ERADOC-1-55

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IACR - Rothamsted

Harpenden

YIELDS

OF THE

FIELD

EXPERIMENTS

2000

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 2001

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

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CONVENTIONS 2000

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 nitrogen as ammonium nitrate

46% N means nitrogen as urea

Ashlade Nu Trace	5% magnesium and 1% copper
Epsom salts	$MgSO_4.7H_2O$ 10% magnesium and 13% sulphur
Fishmeal	approximately 6.5% nitrogen
FYM	Farmyard manure (from bullocks)
Gypsum	17.5% sulphur
Kieserite	$MgSO_4H_2O$ 17.7% magnesium and 23.3% sulphur
Manganese sulphate	$Mn_2(SO_4)_3$ 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)
Muriate of potash	60% K_2O
Nitrate of soda	$NaNO_3$ 16% nitrogen and 27% sodium
Phosyn Manganese	150 g/l manganese
Profol 500	500 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)

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Fertilizers (continued)

Resistim	10.9% w/w potassium and 6.3% w/w phosphorus combined with natural betaines
Rhodoman	A seed dressing containing manganese
Silicate of soda	Na_2SiO_3 37% sodium and 23% silica
Sulphan	30% nitrogen and 7.6% sulphur
Sulphur Gold	30% nitrogen and 7.6% sulphur
Sulphate of ammonia	$(NH_4)_2SO_4$ 21% nitrogen 24% sulphur
Sulphate of potash	K_2SO_4 50% K_2O and 18.4% sulphur
Tiger 90	90% sulphur
Thiovit	80% sulphur
Triple superphosphate	47% P_2O_5
Vytel Manganese	6.4% manganese

Compound fertilizers are 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.

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 harrow.
Dutch harrow	Rigid tine harrow
Fiona	Drill with Suffolk coulters 12 cm apart
Flexitine	Heavy spring-tine cultivator.
Hege	Drill with coulters 14 cm apart
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.
Rotaspike	Spiked rotary cultivator
Rotaridger	Rotary spiked cultivator for forming potato ridges
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
Thistlebar	Shallow cultivator used to weed fallows

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Tables of means

The following abbreviations are used in variate headings:

Wheat, barley, oats, beans, lupins etc.
Grain: Grain (at 85% dry matter)
Straw: Straw (at 85% dry matter)

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

Standard errors

NOTES: (1) This report gives standard errors of differences, not of means.
(2) Annotations (e.g. * min rep, max-min, max rep) to S.E.Ds are only explained the first time they occur in any experiment.

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PESTICIDES USED

The following list of pesticides is based on The UK Pesticides Guide, 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
Alpha Trifluralin 48 EC	H	480 g/l trifluralin
Amistar	F	250 g/l azoxystrobin
Aphox	I	50% w/w pirimicarb
Avadex Excel 15G	H	15% w/w tri-allate
Avenge 2	H	150 g/l difenzoquat
Azatin	F	30 g/l azadirachtin
Azural	H	360 g/l glyphosate
Barclay Mutiny	H	250 g/l bromoxynil
Basagran SG	H	87% w/w bentazone
BASF 3C Chlormequat 720	GR	720 g/l chlormequat
BASF Dimethoate 40	A,I	400 g/l dimethoate
BASF MCPA Amine 50	H	500 g/l MCPA
Bavistin DF	F	50% w/w carbendazim
Bavistin FL	F	500 g/l carbendazim
Baytan Flowable	F	22.5:187.5 g/l fuberidazole + triadimenol
Benlate Fungicide	F	50% benomyl
Boxer	H	50 g/l DE 570
Bravo 500	F	500 g/l chlorothalonil
Carbetamex	H	70% w/w carbetamide
Cheetah Super	H	55 g/l fenoxaprop-P-ethyl
Compass	F	167:167 g/l iprodione + thiophanate-methyl
Cropoil	Ad	99% highly refined mineral oil
Cyperkill 10	I	100 g/l cypermethrin
Decis	I	25 g/l deltamethrin
Dow Shield	H	200 g/l clopyralid
Duplosan	H	600 g/l mecoprop-P
Dursban 4	A,I	480 g/l chlorpyrifos
Eagle	H	75% w/w amidosulfron
Enhance Low Foam	Ad	900 g/l alkyl phenol ethylene oxide condensate with silicone anti-foaming agent
Falcon	H	100 g/l propaquizafop
Flamenco	F	100 g/l fluquinconazole
Folicur	F	250 g/l tebuconazole
Fungazil 100 SL	F	100 g/l imazalil
Galtak 50 SC	H	500 g/l benazolin
Genesis	I,M	4% w/w thiocarb
Germipro	F	175:350 g/l carbendazim + iprodione
Gesaprim	H	500 g/l atrazine
Glyfos	H	360 g/l glyphosate
Hallmark	I	50 g/l lamda-cyhalothrin

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TRADE NAME	FUNCTION	ACTIVE INGREDIENT
Hallmark with Zeon Technology	I	100 g/l lamda-cyhalothrin
Harmony M	H	7.68% w/w metsulfuron-methyl + thifensulfuron-methyl
Hawk	H	12:383 g/l clodinafop-propargyl + trifluralin
Hydraguard	F,I	533:200 g/l gamma-HCH + 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
Keytin	F	532 g/l fentin hydroxide
Jockey	F	167:31.2 g/l fluquinconazole + prochloraz
Jockey Flexi	F	fluquinconazole seed treatment
Landmark	F	125:125 g/l epoxiconazole + kersoxim-methyl
Laser	H	200 g/l cycloxydim
Legumex Extra	H	27:237:42.8 g/l benazolin + 2,4-DB + MCPA
Lexus 50 DF	H	50% w/w flupyrsulfuron-methyl
Lexus Class WSB	H	33.3:16.7% w/w carfentrazone-ethyl + flupyrsulfuron-methyl
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
Mesurol	M,I	methiocarb seed treatment
Moddus	GR	250 g/l trinexapac-ethyl
Mon 37500	H	experimental herbicide containing sulfosulfuron
New 5C Cycocel	GR	645:- g/l chlormequat + choline chloride
Opus	F	125 g/l epoxiconazole
Orka	F	250:66.7 g/l fenpropimorph + quinoxyfen
Output	Ad	60% mineral oil and 40% surfactants
Panther	H	50:500 g/l diflufenican + isoproturon
PBI Slug Pellets	M	6% w/w metaldehyde
PDQ	H	80:120 g/l diquat + paraquat
Plantvax 20	F	200 g/l oxycarboxin
Platform S	H	1.5: 60% w/w carfentrazone-ethyl + mecoprop-P
Plenum	I	25% w/w pymetrozine
Plover 250 EC	F	250 g/l difenoconazole
Pointer	F	125 g/l flutriafol
Prebane	H	490 g/l terbutryn
Prelude 20 LF	F	200 g/l prochloraz
Promet	I	furathiocarb seed dressing
Punch C	F	125:250 g/l carbendazim + flusilazole
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 iprodine
Rovral Liquid FS	F	500 g/l iprodine

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TRADE NAME	FUNCTION	ACTIVE INGREDIENT
Scythe	H	200 g/l paraquat
Shirlan	F	500 g/l fluazinam
Sibutol	F	375:23 g/l biteranol + fuberidazole
Sipcam UK Rover 500	F	500 g/l chlorothalonil
Spannit	A,I	480 g/l chlorpyrifos
Starane 2	H	200 g/l fluroxypyr
Stefes Cypermethrin 2	I	100 g/l cypermethrin
Sting CT	H	120 g/l glyphosate
Sting ECO	H	120 g/l glyphosate
Stomp 400 SC	H	400 g/l pendimethalin
Sypex	GR	305:155 g/l chlormequat + 2-chloroethylphosphonic acid
Titus	H	25% w/w rimsulfuron
Tolkan Liquid	H	500 g/l isoproturon
Tolkan Turbo	H	20:500 g/l diflufenican + isoproturon
Toil	Ad	95% w/w methylated vegetable oil
Topik	H	240 g/l clodinafop-propargyl
Toppel 10	I	100 g/l cypermethrin
Unix	F	75% w/w cyprodinil
Upgrade	GR	360:180 g/l chlormequat + 2-chloroethylphosphonic acid
Vindex	H	240:50 g/l bromoxynil + clopyralid
Wakil	F	16.7:6.7:16.7:33.4% w/w carbendazim + cymoxanil + oxyquinoleate of copper + thiram

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00/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 was 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 157th 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 74-99/R/BK/1.

Areas harvested:

	Section	
Wheat:	0	0.00366
	1	0.00673
	2,3,6 and 7	0.00556
	8 and 9	0.00585
Oats:	5	0.00556
Maize:	4	0.00162

Treatments:

Whole plots

PLOT		Fertilizers and organic manures:-		
	Plot	Treatments until 1967	Treatments from 1968	Treatments from 1985
01DN4PK	01	-	D N2 P K	D N4 P K
21DN2	21	D	D N2	D N2
22D	22	D	D	D
030	03	None	None	None
05F	05	P K Na Mg	P K (Na) Mg	PK Mg
06N1F	06	N1 P K Na Mg	N1 P K (Na) Mg	N1 P K Mg
07N2F	07	N2 P K Na Mg	N2 P K (Na) Mg	N2 P K Mg
08N3F	08	N3 P K Na Mg	N3 P K (Na) Mg	N3 P K Mg
09N4F	09	N*1 P K Na Mg	N4 P K (Na) Mg	N4 P K Mg
10N2	10	N2	N2	N2
11N2P	11	N2 P	N2 P	N2 P
12N2PNA	12	N2 P Na	N2 P Na	N2 P Na
13N2PK	13	N2 P K	N2 P K	N2 P K
14N2PKMG	14	N2 P Mg	N2 P K Mg	N2 P K Mg
15N5F	15	N2 P K Na Mg	N3 P K (Na) Mg	N5 P K Mg
16N6F	16	N*2 P K Na Mg	N2 P K (Na) Mg	N6 P K Mg
17N1+3FH	17	N2(A)	N2 2(P K (Na) Mg)	N1+3 2(PK Mg) (A)+
18N0+3FH	18	P K Na Mg(A)	N2 2(P K (Na) Mg)	N0+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 1967, except N* which was nitrate of soda. All as 'Nitro-Chalk' in spring from 1968 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 (applied at 26 kg 1990 to 2000), 35 kg Mg every third year to other plots since 1974 (applied at 30 kg in 1991, 1994, 1997 and 2000 and at 15 kg on half rate treatments). 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/W34	9/W42	0/W49	8/W6	6/W23	5/O	3/W3	7/W1	4/M	2/W2
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

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00/R/BK/1

SECTION

Section	1	9	0*	8+	6**	5	3	7	4	2
Year										
1989	W	W	W	W	W	W	W	P	F	W
1990	W	W	W	W	W	F	W	W	P	W
1991	W	W	W	W	W	P	F	W	W	W
1992	W	W	W	W	W	W	P	W	W	F
1993	W	W	W	W	W	W	W	F	W	P
1994	W	W	W	F	W	W	W	P	F	W
1995	W	W	W	W	W	F	W	W	P	W
1996	W	W	W	W	W	P	O	W	W	W
1997	W	W	W	W	W	W	M	W	W	O
1998	W	W	W	W	W	W	W	O	W	M
1999	W	W	W	W	W	W	W	M	O	W
2000	W	W	W	W	W	O	W	W	M	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:
- 23-Sep-99 : **T** : PK and Mg applied
- 24-Sep-99 : **T** : Na applied.
- 25-Sep-99 : B : Ploughed.
- 27-Sep-99 : B : Ploughing completed.
- 05-Oct-99 : B : Rolled.
- 12-Jul-00 : B : Hand rogued wild oats.

Cropped sections:

W. wheat:
- 17-Aug-99 : **T** : Straw baled (sections 1, 2, 3, 4, 5, 6, 8 and 9).
- 20-Aug-99 : **T** : Straw chopped (section 0).
- 23-Sep-99 : **T** : Autumn N applied.
- 24-Sep-99 : **T** : Farmyard manure applied.
- 07-Oct-99 : **T** : Rotary harrowed, Hereward, tr. Sibutol, drilled at 380 seeds/m^2 with the Accord drill.
- 13-Mar-00 : **T** : Hawk at 2.5 l with Tolkan Turbo at 2.0 l, and Cropoil at 1.0 l in 200 l (except section 8).
- 28-Apr-00 : **T** : Spring N treatments applied.
- 09-May-00 : **T** : Opus at 0.5 l with Unix at 0.5 kg in 100 l (except section 6).
- 12-May-00 : **T** : Ally at 30 g with Starane 2 at 0.5 l in 200 l (except section 8).
- 22-May-00 : **T** : Folicur at 0.75 l in 100 l (except section 6).
- 12-Aug-00 : **T** : Combine harvested.

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00/R/BK/1

Experimental diary:
W. oats
07-Oct-99 : **T** : Rotary harrowed, Image, tr. Sibutol, drilled at 350 seeds/m² with the Accord drill.
15-Nov-99 : **T** : Lexus 50 DF at 20 g with Toppel 10 at 250 ml in 200 l
11-Mar-00 : **T** : Orka at 0.5 l in 200 l.
05-Aug-99 : **T** : Combine harvested.
Forage maize:
24-Sep-99 : **T** : Farmyard manure applied.
07-May-00 : **T** : Sting ECO at 4.0 l in 200 l.
01-May-00 : **T** : Sting CT at 4.0 l in 200 l.
16-May-00 : **T** : N treatments applied. Flexitined twice, rotary harrowed, Hudson, tr. Mesurol, drilled at 10.2 seeds/m² with the Nodet Gougis drill.
17-May-00 : **T** : Rolled.
26-Jun-00 : **T** : Barclay Mutiny at 2.4 l in 200 l.
14-Sep-00 : **T** : Hand harvested.

NOTE: Samples of wheat and oat, grain and straw, and forage maize were taken for chemical analysis. Unground grain, straw and maize samples from selected treatments were archived. Post-harvest top soil was sampled on all plots for chemical analysis and bulk density, selected plots were sampled to 90 cm for chemical analysis. Soil samples were also archived.

W. WHEAT

GRAIN TONNES/HECTARE

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

SECTION / PLOT	7/W1	2/W2	3/W3	8/W6	6/W23	1/W34	9/W42	0/W49
01DN4PK	8.84	9.05	6.79	*	7.66	*	*	*
21DN2	8.16	8.07	5.96	1.38	7.25	8.13	7.35	6.55
22D	5.75	5.65	5.86	1.26	5.39	6.56	5.54	4.94
030	1.12	0.91	0.91	0.28	0.64	0.87	0.73	0.48
05F	1.51	1.01	0.60	0.46	0.48	0.95	0.92	0.53
06N1F	3.56	3.23	1.92	0.67	2.14	3.12	2.82	2.65
07N2F	5.81	4.62	2.65	0.65	3.87	4.84	4.66	3.84
08N3F	7.69	6.91	3.85	1.12	5.27	5.66	4.96	4.88
09N4F	9.14	7.73	2.99	0.84	5.78	6.61	6.51	6.25
10N2	5.00	3.52	1.71	0.74	2.07	2.26	2.13	2.17
11N2P	5.74	5.15	1.85	0.61	2.70	3.28	2.26	3.18
12N2PNA	5.78	5.12	2.28	0.82	3.44	3.70	3.61	3.99
13N2PK	5.58	4.80	2.03	0.98	3.26	4.36	5.52	3.76
14N2PKMG	5.58	4.68	2.21	1.37	3.31	4.65	4.92	4.14
15N5F	9.01	8.35	3.20	1.94	5.75	6.21	7.29	5.76
16N6F	8.46	8.82	5.02	1.18	6.75	6.99	7.79	6.89
17N1+3FH	8.25	7.36	3.46	1.25	5.89	6.42	7.33	6.28
18N0+3FH	7.73	6.93	2.77	0.95	5.97	5.67	7.14	5.09
19(C)	1.47	1.28	1.12	0.60	1.10	1.66	2.12	1.34
20NKMG	*	*	*	*	*	2.06	*	1.90

GRAIN MEAN DM% 84.7

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00/R/BK/1 W. WHEAT

STRAW TONNES/HECTARE

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

SECTION / PLOT	7/W1	6/W23	1/W34	9/W42
01DN4PK	5.40	*	*	*
21DN2	5.10	4.45	5.96	4.74
22D	4.10	4.42	4.93	4.13
030	0.56	0.28	0.80	0.50
05F	0.87	0.26	0.61	0.59
06N1F	1.74	1.14	1.91	1.75
07N2F	2.50	1.75	2.74	2.62
08N3F	3.10	2.17	3.11	2.55
09N4F	3.87	2.84	3.57	3.22
10N2	1.51	*	1.75	*
11N2P	2.19	*	2.20	*
12N2PNA	1.90	*	2.19	*
13N2PK	2.42	*	2.33	*
14N2PKMG	2.49	*	2.54	*
15N5F	4.20	3.00	3.75	3.94
16N6F	4.42	3.27	3.94	4.29
17N1+3FH	3.42	*	3.46	*
18N0+3FH	3.12	*	2.66	*
19(C)	0.63	*	0.81	*
20NKMG	*	*	1.21	*

STRAW MEAN DM% 77.1

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00/R/BK/1 W. OATS

GRAIN TONNES/HECTARE

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

PLOT	GRAIN	STRAW
01(D)(N4)PK	6.64	7.12
21(D)(N2)	6.14	4.80
22(D)	6.10	5.49
030	1.67	0.78
05F	1.56	0.58
06(N1)F	1.95	0.84
07(N2)F	2.42	1.15
08(N3)F	2.43	1.03
09(N4)F	3.48	2.08
10(N2)	3.34	1.64
11(N2)P	3.07	1.46
12(N2)PNA	2.93	1.25
13(N2)PK	2.28	0.98
14(N2)PKMG	2.17	0.92
15(N5)F	3.53	2.39
16(N6)F	4.70	4.09
17(N1)+3FH	3.02	1.42
18N0+3FH	3.58	2.16
19(C)	2.37	1.07

GRAIN MEAN DM% 86.6

STRAW MEAN DM% 83.1

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

MAIZE

WHOLE CROP (100% DM) TONNES/HECTARE

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

PLOT	WHOLE CROP
01DN4PK	12.80
21DN2	10.34
22D	9.70
030	1.98
05F	2.40
06N1F	6.05
07N2F	9.55
08N3F	10.78
09N4F	10.77
10N2	3.99
11N2P	5.83
12N2PNA	6.34
13N2PK	9.27
14N2PKMG	10.63
15N5F	11.76
16N6F	13.75
17N3FH	10.89
18N3FH	10.59
19(C)	2.97

CROP MEAN DM% 23.7

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00/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 149th year, s. barley.

For previous years see 'Details' 1967 and 1973, Station Report for 1966 and 74-99/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 (applied at 30 kg in 1992, 1995 and 1998)(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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00/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 (30 in 1992, 1995 and 1998)

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

Experimental diary:

08-Dec-99 : **T** : P and K applied.
14-Dec-99 : **T** : Si applied.
15-Dec-99 : **T** : Farmyard manure applied.
17-Dec-99 : B : Ploughed.
06-Mar-00 : B : Combination drilled, Optic, tr. Raxil S, at 350 seeds/m^2 with the Accord drill.
07-Mar-00 : B : Rolled.
10-May-00 : **T** : N treatments applied as 27.0 % N.
24-May-00 : B : Opus at 0.3 l with Unix at 0.5 kg in 100 l.
03-Jun-00 : B : Ally at 30 g with Duplosan at 1.0 l in 200 l.
20-Jun-00 : B : Opus at 0.3 l in 200 l.
17-Jul-00 : B : Hand rogued wild oats.
24-Aug-00 : B : Combine harvested.

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

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00/R/HB/2 MAIN PLOTS

GRAIN TONNES/HECTARE

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

N	0	48	96	144	Mean
MANURE					
---	0.86	1.49	1.04	1.44	1.21
-P-	1.01	2.10	3.17	2.59	2.22
--K	0.55	1.83	1.46	2.46	1.58
-PK	0.70	2.84	3.67	4.46	2.92
A--	0.24	0.91	1.32	0.73	0.80
AP-	1.61	2.43	2.16	2.07	2.07
A-K	0.88	1.55	1.66	2.32	1.60
APK	1.06	3.15	4.59	4.68	3.37
N----	0.88	1.72	2.36	2.22	1.79
NP---	1.70	3.17	3.31	3.06	2.81
N-K--	1.31	1.32	1.76	2.53	1.73
NPK--	1.24	2.97	4.76	5.05	3.51
N--S-	0.99	2.04	2.05	2.54	1.91
NP-S-	1.32	2.61	3.47	3.59	2.75
N-KS-	1.31	2.28	3.56	3.88	2.76
NPKS-	1.36	3.50	5.07	4.97	3.73
N---S	1.32	1.97	2.99	3.50	2.44
NP--S	1.70	3.18	3.77	4.32	3.24
N-K-S	1.05	2.07	2.97	2.49	2.15
NPK-S	1.37	3.08	4.76	5.13	3.58
N--SS	1.27	2.36	2.54	2.67	2.21
NP-SS	1.38	3.12	4.09	4.02	3.16
N-KSS	1.17	2.84	3.09	3.58	2.67
NPKSS	1.33	3.79	4.33	5.74	3.80
C(--)	0.85	2.40	2.71	3.59	2.39
C(P-)	0.83	2.94	3.45	4.37	2.90
C(-K)	1.24	2.16	3.79	2.94	2.53
C(PK)	1.24	3.61	4.13	4.92	3.47
D	5.10	6.82	6.68	6.87	6.37
(D)	1.27	1.81	1.95	1.97	1.75
(A)	0.87	1.76	2.27	3.30	2.05
-	0.43	1.79	1.13	1.45	1.20
Mean	1.23	2.55	3.13	3.42	2.58

GRAIN MEAN DM% 86.0

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00/R/HB/2 MAIN PLOTS

STRAW TONNES/HECTARE

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

N	0	48	96	144	Mean
MANURE					
---	0.21	0.34	0.24	0.37	0.29
-P-	0.28	0.62	1.14	0.67	0.68
--K	0.12	0.60	0.35	0.47	0.39
-PK	0.16	0.97	1.32	1.67	1.03
A--	0.10	0.31	0.17	0.13	0.18
AP-	0.52	0.86	0.75	0.50	0.65
A-K	0.20	0.39	0.43	0.52	0.39
APK	0.26	1.26	1.63	1.69	1.21
N----	0.13	0.44	0.32	0.58	0.37
NP---	0.50	1.08	1.09	0.88	0.89
N-K--	0.31	0.36	0.31	0.60	0.39
NPK--	0.18	1.26	1.88	2.08	1.35
N--S-	0.24	0.51	0.49	0.81	0.51
NP-S-	0.37	0.87	1.01	1.08	0.83
N-KS-	0.24	0.56	1.11	1.03	0.73
NPKS-	0.35	1.28	1.98	2.13	1.44
N---S	0.19	0.44	0.70	0.90	0.56
NP--S	0.44	1.19	1.27	1.00	0.97
N-K-S	0.24	0.48	0.68	0.48	0.47
NPK-S	0.29	0.91	1.85	1.83	1.22
N--SS	0.25	0.63	0.70	0.76	0.58
NP-SS	0.31	1.26	1.26	1.26	1.02
N-KSS	0.41	0.86	0.90	0.96	0.78
NPKSS	0.40	1.53	1.41	2.23	1.39
D	1.62	2.89	2.64	2.98	2.53
(D)	0.36	0.44	0.60	0.67	0.52
(A)	0.26	0.50	0.59	0.85	0.55
-	0.08	0.45	0.34	0.41	0.32
Mean	0.32	0.83	0.97	1.05	0.79

STRAW MEAN DM% 83.4

EXTRA PLOTS

GRAIN TONNES/HECTARE

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

MANURE	551AN2PK	561--PK	571NN2--	581NN2--	Mean
MGNESIUM					
0	3.54	0.40	2.20	1.43	1.89
35	3.61	0.42	2.24	1.56	1.96
Mean	3.57	0.41	2.22	1.50	1.92

GRAIN MEAN DM% 83.8

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00/R/WF/3

WHEAT AND FALLOW

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

The 145th year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-99/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:
12-Sep-99 : T : Ploughed.
04-Oct-99 : T : Flexitined
05-Oct-99 : T : Rotary harrowed, Hereward, tr. Sibutol, drilled at 380 seeds/m^2 with the Accord drill.
16-Mar-00 : T : Hawk at 2.5 l with Tolkan Turbo at 2.0 l and Cropoil at 1.0 l in 200 l.
09-May-00 : T : Opus at 0.7 l in 100 l.
24-May-00 : T : Amistar at 0.8 l with Folicur at 0.75 l in 100 l.
17-Jul-00 : T : Hand rogued wild oats.
12-Aug-00 : T : Combine harvested.
Fallow plot:
16-Mar-00 : T : Spring-tine cultivated.
06-Jun-00 : T : Thistle barred.
29-Jun-00 : T : Spring-tine cultivated.

GRAIN AND STRAW TONNES/HECTARE

	GRAIN	STRAW
YIELD	1.62	0.99
MEAN DM%	85.7	72.0

PLOT AREA HARVESTED 0.05064

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00/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 145th year, w. wheat.

For previous years see 'Details' 1977, 1973 and 74-99/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**		Maintenance P (20 kg P) applied annually from 2000 to maintain existing levels of available P in the soil. (P1) (P2) and (P3) are residues of P applied annually 1986-1992:

	2000	1986-92
O	None	None
P(P1)	20 kg P	44 kg P
P(P2)	20 kg P	87 kg P
P(P3)	20 kg P	131 kg P

NOTE: P treatments were applied at 61.5 kg P in error in 2000.

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:

10-Sep-99 : **T** : Muriate of potash at 250 kg.
: **T** : Triple superphosphate at 300 kg.

K test:

10-Sep-99 : **T** : Triple superphosphate at 300 kg.

All plots:

12-Sep-99 : B : Ploughed.
15-Sep-99 : B : Combination drilled, Hereward, tr. Sibutol, at 300 seeds/m^2 with the Accord drill.
14-Dec-99 : B : Lexus 50 DF at 20 g with Stomp 400 SC at 2.5 l and Toppel 10 at 250 ml in 200 l.
03-May-00 : B : 34.5% N at 580 kg.

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00/R/EX/4

Experimental diary:
All plots:
09-May-00 : B : Opus at 0.7 l in 100 l.
24-May-00 : B : Amistar at 0.8 l with Folicur at 0.75 l in 100 l.
17-Jul-00 : B : Hand rogued wild oats.
12-Aug-00 : B : Combine harvested.

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

P TEST

GRAIN TONNES/HECTARE

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

P	O	P(P1)	P(P2)	P(P3)	Mean
OLD RES					
O	0.58	3.51	3.97	3.77	2.96
D	2.11	3.59	3.95	4.00	3.41
N	0.79	3.91	3.43	3.92	3.01
P	1.71	3.75	4.07	3.81	3.33
NPKNAMG	1.87	3.64	3.83	3.68	3.25
Mean	1.41	3.68	3.85	3.84	3.19

GRAIN MEAN DM% 84.4

STRAW TONNES/HECTARE

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

P	O	P(P1)	P(P2)	P(P3)	Mean
OLD RES					
O	0.34	3.98	5.27	4.21	3.45
D	2.27	4.15	4.49	4.29	3.80
N	0.89	3.07	3.83	3.61	2.85
P	2.06	4.20	4.36	4.65	3.82
NPKNAMG	2.47	4.77	4.17	4.45	3.96
Mean	1.60	4.03	4.42	4.24	3.58

STRAW MEAN DM% 81.8

PLOT AREA HARVESTED 0.00614

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00/R/EX/4

K TEST

GRAIN TONNES/HECTARE

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

OLD RES	
O	3.52
D	3.25
N*	3.08
PK	4.21
N*PK	3.39
Mean	3.49

GRAIN MEAN DM% 84.9

STRAW TONNES/HECTARE

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

OLD RES	
O	3.44
D	3.99
N*	2.97
PK	3.83
N*PK	4.08
Mean	3.66

STRAW MEAN DM% 85.2

PLOT AREA HARVESTED 0.00614

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00/R/PG/5

PARK GRASS

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

The 145th year, hay.

For previous years see 'Details' 1977 and 1973 and 74-99/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 in years with no farmyard manure)
P:	35 kg P (15 kg P to plot 20 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 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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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 was applied in 2000, the third application in a triennial scheme of soil pH analysis and remedial chalk applications.

LIME 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' as 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.

Chalk applied 2000 (tonnes $CaCO_3$):

Plot	A	B	C
1	3.0	1.5	0.8
2/1	3.0	0.8	0.3
2/2	3.0	0.8	-
3	3.0	-	-
4/1	3.0	0.8	0.3
4/2	6.0	3.6	1.5
6	3.0	1.5	-
7	3.0	0.8	0.3
8	3.0	0.8	0.3
9/1	6.0	1.5	1.5
9/2	6.0	3.6	3.0
10	6.0	5.0	2.1
11/1	12.0	4.5	3.0
11/2	10.2	5.0	3.0
12	3.0	-	-
13/1	3.0	-	-
13/2	3.0	-	-
14/1	3.0	-	-
14/2	2.2	-	-
15	5.1	0.8	0.3
16	2.2	-	-
17	2.2	-	-
18	5.1	2.1	2.1

None applied to plots 18/2, 19 and 20.

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00/R/PG/5

Experimental diary:

07-Dec-99 : **T** : P applied (except plot 20).
09-Dec-99 : **T** : P to plot 20 only.
20-Dec-99 : **T** : K, Mg, Na and Si applied.
20-Mar-00 : **T** : Chalk application started.
22-Mar-00 : **T** : Chalk application completed.
10-Apr-00 : **T** : N applied.
20-Jun-00 : B : Cutting started.
17-Jul-00 : B : Cutting completed.
18-Jul-00 : B : Hay turned.
19-Jul-00 : B : Hay turned.
20-Jul-00 : B : Hay turned.
21-Jul-00 : B : Hay baled.
08-Jan-01 : B : Second cut started.
09-Jan-01 : B : Second cut completed.

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

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00/R/PG/5

1ST CUT (20-22/6/00) DRY MATTER TONNES/HECTARE

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

LIME / MANURE		A	B	C	D	MEAN
N1	1	3.59	3.16	3.07	1.29	2.78
K	2/1	3.78	4.03	2.27	3.00	3.27
O(D)	2/2	3.60	3.55	2.42	2.44	3.00
O	3	2.97	3.35	2.03	2.39	2.69
P	4/1	3.70	3.99	3.25	3.01	3.49
N2P	4/2	4.22	3.94	5.59	4.47	4.56
N1MN	6	5.45	5.80			5.62
MN	7	6.31	5.74	5.76	4.33	5.53
PNAMG	8	3.43	3.98	3.13	3.27	3.45
MN(N2)	9/1	5.25	5.54	5.76	2.05	4.65
N2MN	9/2	6.07	6.09	7.25	5.82	6.31
N2PNAMG	10	4.69	4.17	5.87	3.13	4.47
N3MN	11/1	6.94	6.46	5.29	5.37	6.02
N3MNSI	11/2	6.62	6.33	5.79	6.54	6.32
O	12	2.89	2.47	2.46	2.24	2.52
(D/F)	13/1	2.81	4.01	4.08	4.56	3.87
D/F	13/2	3.30	4.77	5.17	5.28	4.63
MN(N2*)	14/1	5.26	4.93	4.38	5.47	5.01
N2*MN	14/2	5.01	4.79	4.05	4.21	4.52
MN(N2*)	15	5.55	4.71	4.32	3.49	4.52
N1*MN	16	5.86	5.07	4.75	4.40	5.02
N1*	17	3.15	2.85	2.83	2.90	2.93
N2KNAMG0	18/1			6.12	2.51	4.32
N2KNAMG2	18/2					4.26
N2KNAMG1	18/3	3.02	3.63			3.33
D0	19/1					5.13
D2	19/2					5.63
D1	19/3					5.00
D/N*PK0	20/1					5.68
D/N*PK2	20/2					6.13
D/N*PK1	20/3					5.21

1ST CUT MEAN DM% 24.2

NOTE: The second cut was taken after prolonged heavy rain. Many of the samples were contaminated with soil and the yields were unreliable. Following chemical analysis an adjusted yield will be published.

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00/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.

The 158th year, grass and grass with clover

For previous years see 'Details' 1967 and 1973 and 74-99/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 (applied at 77 kg in 1990, 1994 and 1998)(sulphate of magnesia until 1973)
(D): Farmyard manure at 35 t until 1975, none since

Sub-plots

2. **N PERCUT**	Nitrogen fertilizer in 2000 (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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00/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.
(3) Only one cut was taken in 2000 prior to ploughing and re-drilling.

Experimental diary:
22-Dec-99 : **T** : P and K applied.
14-Mar-00 : **T** : N applied.
23-May-00 : B : Cut, herbage removed.
04-Jun-00 : B : Topped
05-Jun-00 : B : Baled.
28-Jun-00 : B : Azural at 4.0 l in 200 l.
13-Jul-00 : **T** : Topped sections 1 and 2.

NOTE: Samples of grass and grass/clover were taken for chemical analysis.

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00/R/BN/7

GRASS

1ST AND ONLY CUT (23/5/00) DRY MATTER TONNES/HECTARE

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

N PERCUT / MANURE	75	100	125	150	Mean
(D)	3.63	3.36	3.01	4.00	3.50
(D)PK	4.56	5.12	4.79	5.16	4.91
PKMG	3.73	4.19	4.87	4.78	4.39
P	3.18	2.54	2.96	3.61	3.08
PK	3.51	4.33	5.03	4.15	4.26
PMG	2.84	2.43	1.85	1.56	2.17
0	1.93	2.08	2.62	2.08	2.18
Mean	3.34	3.43	3.59	3.62	3.50

MANURE KMG 100 2.01

Grand mean 3.45

1ST CUT MEAN DM% 15.8

GRASS/CLOVER

1ST AND ONLY CUT (23/5/00) DRY MATTER TONNES/HECTARE

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

MANURE	(D)	(D)PK	PKMG	P	PK	PMG	0	Mean
	2.81	2.68	2.63	2.02	2.90	2.06	1.95	2.44

1ST CUT MEAN DM% 13.7

PLOT AREA HARVESTED 0.00155

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00/R/GC/8

GARDEN CLOVER

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

The 147th year, red clover.

For previous years see 'Details' 1967 and 1973, and 74-99/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:

15-Jun-00 : B : First cut, hand weeded.
23-Jun-00 : B : PK as (0:18:36) at 416 kg and Epsom salts at 527 kg.
07-Aug-00 : B : Second cut.
08-Nov-00 : B : Third cut.

NOTE: Clover samples were taken for chemical analysis.

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00/R/GC/8

FIRST CUT (15/6/00) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	6.29	4.37	5.33

1ST CUT MEAN DM% 19.9

SECOND CUT 7/8/00) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	6.40	4.72	5.56

2ND CUT MEAN DM% 23.0

THIRD CUT 8/11/00) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	1.70	1.78	1.74

3RD CUT MEAN DM% 18.7

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	14.39	10.86	12.63

TOTAL OF 3 CUTS MEAN DM% 20.5

PLOT AREA HARVESTED 0.00010

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00/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 63rd year, leys, w. beans, w. wheat, w. rye, forage maize.

For previous years see 'Details' 1967 & 1973 and 74-99/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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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 and two test crops:

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. **FYMRES64** Farmyard manure residues, last applied 1964:

   NONE
   FYM 38 t on each occasion

1/8 plots:

3. **N** Nitrogen fertilizer in spring 2000 (kg N) as 27% N:

   0
   70
   140
   210

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00/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. **FYMRES63** Farmyard manure residues, last applied 1963:

   NONE
   FYM 38 t on each occasion

1/8 plots:

3. **N** Nitrogen fertilizer in spring 2000 (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 1962 to 1st and 6th year leys, 1966 to 2nd and 7th year leys, 1965 to 3rd and 8th year leys, 1964 to 4th year leys, 1963 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. This was omitted in error and will be applied in spring 2001 to the rye crop.

Continuous rotations before wheat	No FYM half plots	FYM half plots
AF	(265)	(245)
AB	(245)	(360)

None to other plots.

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00/W/RN/3

Experimental diary:

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

13-Sep-99 : **T** : Potassium sulphate at 140 kg, triple superphosphate at 213 kg.
14-Sep-99 : **T** : Ploughed.
17-Sep-99 : **T** : Rolled.
03-Oct-99 : **T** : Spring-tine cultivated.
04-Oct-99 : **T** : LC1 and LLC1 only: 27% N at 93 kg.
: **T** : LN1 and LLN1 only: 27% N at 185 kg.
: **T** : Rotary harrowed.
: **T** : LC1 and LLC1 only: Promesse Timothy, Laura Meadow Fescue and Merwi white clover mixture (44.4:44.4:11.2 %) drilled at 30kg.
: **T** : LN1 and LLN1 only: Promesse Timothy and Laura Meadow Fescue mixture (50:50 %) drilled 30kg.
07-Oct-99 : **T** : Rolled.
19-Mar-00 : **T** : Legumex Extra at 7.0 l in 200 l.
22-Mar-00 : **T** : LN1 and LLN1 only: 27% N at 278 kg.
23-Mar-00 : **T** : Muriate of potash at 167 kg
13-Jun-00 : **T** : First cut.
17-Jun-00 : **T** : Hay turned.
18-Jun-00 : **T** : Hay turned.
19-Jun-00 : **T** : Hay baled and removed.
22-Jun-00 : **T** : Muriate of potash at 83kg.
: **T** : LN1 and LLN1 only: 27% N at 278 kg.
23-Jun-00 : **T** : Topped.
15-Jan-01 : **T** : Second cut.

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

08-Dec-99 : **T** : Potassium sulphate at 140 kg, triple superphosphate at 213 kg.
19-Mar-00 : **T** : Legumex Extra at 7.0 l in 200 l.
22-Mar-00 : **T** : 27% N at 278 kg.
23-Mar-00 : **T** : Muriate of potash at 167 kg.
13-Jun-00 : **T** : First cut.
17-Jun-00 : **T** : Hay turned.
18-Jun-00 : **T** : Hay turned.
19-Jun-00 : **T** : Hay baled and removed.
22-Jun-00 : **T** : Muriate of potash at 83kg, 27% N at 278 kg.
23-Jun-00 : **T** : Topped.
30-Aug-00 : **T** : LN3 and LLN8 only: Second cut
15-Jan-01 : **T** : Remaining leys: Second cut.

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

08-Dec-99 : **T** : Potassium sulphate at 140 kg, triple superphosphate at 213 kg.
19-Mar-00 : **T** : Legumex Extra at 7.0 l in 200 l.
23-Mar-00 : **T** : Muriate of potash at 167 kg.
13-Jun-00 : **T** : First cut.
17-Jun-00 : **T** : Hay turned.
18-Jun-00 : **T** : Hay turned.
19-Jun-00 : **T** : Hay baled and removed.
22-Jun-00 : **T** : Muriate of potash at 83kg.
23-Jun-00 : **T** : Topped.
30-Aug-00 : **T** : LN3 and LLN8 only: Second cut.
15-Jan-01 : **T** : Remaining leys: Second cut.

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00/W/RN/3

Experimental diary:

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

13-Sep-99 : **T** : Potassium sulphate at 140 kg, triple superphosphate at 127 kg.
28-Oct-99 : **T** : Punch C broadcast at 27 seeds/m^2, ploughed.
16-Dec-99 : **T** : Alpha Simazine 50 SC at 2.0 l in 220 l.
21-Aug-00 : **T** : Combine harvested.
25-Aug-00 : **T** : Straw baled and removed.

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

13-Sep-99 : **T** : Potassium sulphate at 140 kg, triple superphosphate at 213 kg.
04-Feb-00 : **T** : Ploughed.
17-May-00 : **T** : Rotary harrowed. Hudson, tr. Mesurol, drilled at 10.2 seeds/m^2 with the Nodet Gougis drill.
01-Jun-00 : **T** : 27 % N at 370 kg.
16-Jun-00 : **T** : Gesaprim at 3.0 l with Toil at 3.0 l in 200 l.
02-Oct-00 : **T** : Cut.

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

28-Aug-99 : **T** : Roundup at 4.0 l in 200 l.
13-Sep-99 : **T** : Potassium sulphate at 140 kg, triple superphosphate at 213 kg.
14-Sep-99 : **T** : Ploughed.
17-Sep-99 : **T** : Rolled.
03-Oct-99 : **T** : Spring-tine cultivated.
04-Oct-99 : **T** : Rotary harrowed, Hereward, tr. Sibutol, drilled at 380 seeds/m^2 with the Accord drill.
07-Oct-99 : **T** : Rolled
12-Nov-99 : **T** : Spannit 1.5 l in 100 l
21-Mar-00 : **T** : Ally at 30 g with Topic at 125 ml and Cropoil at 1.0 in 200 l.
13-Apr-00 : **T** : **N** 70, 140, 210: N applied as 27% N.
20-May-00 : **T** : Opus at 0.75 l in 200 l.
22-Aug-00 : **T** : Combine harvested.

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

28-Aug-99 : **T** : Roundup at 3.0 l in 200 l.
13-Sep-99 : **T** : Potassium sulphate at 140 kg, triple superphosphate at 213 kg.
14-Sep-99 : **T** : Ploughed.
17-Sep-99 : **T** : Rolled.
03-Oct-99 : **T** : Spring-tine cultivated.
04-Oct-99 : **T** : Rotary harrowed.
06-Oct-99 : **T** : Esprit, tr. Baytan Flowable, drilled at 300 seeds/m^2 with the Accord drill. Rolled.
12-Oct-99 : **T** : Stomp 400 SC at 2.5 l with Isoguard at 1.0 l in 200 l.
11-Nov-99 : **T** : Hallmark at 100 ml in 100 l.
13-Apr-00 : **T** : R only: **N** 40, 80, 120: N applied as 27% N.
: **T** : ABe and AM only: 27 % N at 296 kg.
08-Jun-00 : **T** : Folicur at 0.5 l in 200 l.
22-Aug-00 : **T** : Combine harvested.

NOTE: Samples of grass, grass and clover, forage maize, bean, wheat and rye grains were taken for chemical analysis.

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00/W/RN/3

LEYS

1ST CUT (13/6/00) DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	2.97	3.16	3.07
LC2	6.87	6.66	6.76
LC3	7.70	8.15	7.93
LN1	1.03	1.20	1.11
LN2	9.13	8.63	8.88
LN3	7.08	7.72	7.40
LLC1	1.48	1.97	1.73
LLC2	6.44	6.21	6.32
LLC3	7.13	7.03	7.08
LLC4	5.80	5.74	5.77
LLC5	4.50	5.71	5.10
LLC6	6.53	6.69	6.61
LLC7	5.99	5.77	5.88
LLC8	5.32	4.45	4.88
LLN1	3.91	4.73	4.32
LLN2	8.75	8.92	8.84
LLN3	8.58	8.91	8.74
LLN4	7.19	7.26	7.22
LLN5	7.75	7.28	7.52
LLN6	7.50	7.84	7.67
LLN7	7.65	7.74	7.70
LLN8	7.85	6.88	7.37
Mean	6.23	6.30	6.27

1ST CUT MEAN DM% 28.3

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00/W/RN/3

LEYS

2ND CUT (30/08/00 AND 15/01/01) DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	0.10	0.20	0.15
LC2	0.54	0.48	0.51
LC3	0.62	0.78	0.70
LN1	1.26	0.84	1.05
LN2	0.59	0.52	0.56
LN3	2.47	3.02	2.74
LLC1	0.40	0.40	0.40
LLC2	1.25	2.01	1.63
LLC3	0.82	0.49	0.65
LLC4	0.03	0.07	0.05
LLC5	0.16	0.09	0.13
LLC6	0.22	0.19	0.20
LLC7	0.17	0.09	0.13
LLC8	0.68	0.88	0.78
LLN1	1.21	1.50	1.35
LLN2	0.77	0.78	0.78
LLN3	1.36	1.59	1.47
LLN4	0.53	0.85	0.69
LLN5	0.95	1.27	1.11
LLN6	1.97	2.18	2.08
LLN7	0.75	0.75	0.75
LLN8	2.24	2.51	2.38
Mean	0.87	0.98	0.92

2ND CUT MEAN DM% 43.4

NOTE: LN3, LLN8, LC3, LLC8 cut on 30/08/00, remainder on 15/01/01.

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00/W/RN/3

LEYS

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	3.07	3.36	3.22
LC2	7.41	7.14	7.27
LC3	8.33	8.93	8.63
LN1	2.30	2.03	2.17
LN2	9.73	9.15	9.44
LN3	9.55	10.75	10.15
LLC1	1.88	2.37	2.13
LLC2	7.69	8.22	7.95
LLC3	7.95	7.52	7.73
LLC4	5.82	5.80	5.81
LLC5	4.66	5.80	5.23
LLC6	6.76	6.87	6.81
LLC7	6.16	5.86	6.01
LLC8	6.00	5.33	5.66
LLN1	5.11	6.23	5.67
LLN2	9.53	9.70	9.61
LLN3	9.94	10.50	10.22
LLN4	7.71	8.11	7.91
LLN5	8.70	8.55	8.62
LLN6	9.48	10.02	9.75
LLN7	8.40	8.49	8.44
LLN8	10.09	9.39	9.74
Mean	7.10	7.28	7.19

TOTAL OF 2 CUTS MEAN DM% 35.8

PLOT AREA HARVESTED 0.00200

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00/W/RN/3

MAIZE

WHOLE CROP (100% DRY MATTER) TONNES/HECTARE

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

FYMRES / ROTATION	NONE	FYM	Mean
AM	11.61	15.78	13.69
AB	12.18	12.04	12.11
Mean	11.90	13.91	12.90

GRAIN MEAN DM% 30.0

PLOT AREA HARVESTED 0.00108

BEANS

GRAIN (85% DRY MATTER) TONNES/HECTARE

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

FYMRES	
NONE	3.97
FYM	4.36
Mean	4.17

GRAIN MEAN DM% 85.5

PLOT AREA HARVESTED 0.00472

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00/W/RN/3

W. WHEAT

GRAIN TONNES/HECTARE

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

FYMRES64	NONE	FYM	Mean
ROTATION			
LLN 8	6.27	6.09	6.18
LN 3	6.90	7.01	6.95
LLC 8	7.86	7.33	7.59
LC 3	8.34	7.95	8.15
AF	5.04	4.71	4.87
AB	4.24	3.78	4.01
Mean	6.44	6.14	6.29

N	-	1	2	3	Mean
ROTATION					
LLN 8	3.42	6.58	7.22	7.49	6.18
LN 3	3.40	7.06	8.64	8.71	6.95
LLC 8	4.31	7.47	8.95	9.65	7.59
LC 3	5.05	8.24	8.96	10.33	8.15
AF	0.96	4.87	6.28	7.39	4.87
AB	1.45	4.54	4.52	5.53	4.01
Mean	3.10	6.46	7.43	8.18	6.29

N	-	1	2	3	Mean
FYMRES64					
NONE	3.17	6.87	7.39	8.33	6.44
FYM	3.03	6.05	7.46	8.04	6.14
Mean	3.10	6.46	7.43	8.18	6.29

N	-	1	2	3
ROTATION	FYMRES64			
LLN 8	NONE	3.45	7.76	6.91	6.95
	FYM	3.40	5.39	7.52	8.04
LN 3	NONE	3.42	7.11	8.78	8.27
	FYM	3.37	7.00	8.50	9.14
LLC 8	NONE	4.71	8.10	8.99	9.64
	FYM	3.91	6.83	8.91	9.65
LC 3	NONE	5.77	8.73	8.58	10.27
	FYM	4.33	7.74	9.34	10.40
AF	NONE	0.37	4.99	6.15	8.64
	FYM	1.54	4.75	6.40	6.15
AB	NONE	1.28	4.52	4.93	6.22
	FYM	1.61	4.57	4.10	4.83

GRAIN MEAN DM% 83.5

PLOT AREA HARVESTED 0.00183

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00/W/RN/3

W. RYE

GRAIN TONNES/HECTARE

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

FYMRES63	NONE	FYM	Mean
ROTATION			
LLN 8	8.78	7.97	8.38
LN 3	8.28	7.70	7.99
LLC 8	7.67	7.60	7.63
LC 3	7.73	8.18	7.95
AF	7.10	5.99	6.54
AB	6.30	6.64	6.47
Mean	7.64	7.35	7.49

N	-	1	2	3	Mean
ROTATION					
LLN 8	6.08	8.57	9.49	9.36	8.38
LN 3	6.48	8.06	8.88	8.54	7.99
LLC 8	6.33	8.15	8.19	7.86	7.63
LC 3	5.65	7.62	9.15	9.38	7.95
AF	3.86	6.64	7.44	8.24	6.54
AB	3.34	5.99	7.84	8.72	6.47
Mean	5.29	7.50	8.50	8.68	7.49

N	-	1	2	3	Mean
FYMRES63					
NONE	5.45	7.80	8.62	8.71	7.64
FYM	5.13	7.21	8.39	8.66	7.35
Mean	5.29	7.50	8.50	8.68	7.49

N		-	1	2	3
ROTATION	**FYMRES63**				
LLN 8	NONE	6.88	8.94	9.81	9.50
	FYM	5.27	8.20	9.17	9.23
LN 3	NONE	6.90	8.52	8.97	8.71
	FYM	6.07	7.59	8.78	8.36
LLC 8	NONE	6.65	8.37	8.22	7.42
	FYM	6.01	7.92	8.17	8.29
LC 3	NONE	4.50	7.91	9.28	9.21
	FYM	6.80	7.34	9.03	9.54
AF	NONE	4.78	7.27	7.55	8.80
	FYM	2.93	6.00	7.34	7.69
AB	NONE	2.98	5.78	7.86	8.59
	FYM	3.70	6.20	7.82	8.86

GRAIN MEAN DM% 86.1

PLOT AREA HARVESTED 0.00183

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00/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 36th year, w. wheat.

For previous years see 'Details' 1973 and 74-99/W/RN/12.

Design: 4 blocks of 8 plots.

Whole plot dimensions: 8.0 x 29.5.

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 to 2000 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 1998-2000
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 1998-2000

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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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:

13-Sep-99	B	Potassium sulphate at 200 kg. Triple superphosphate at 106 kg.
14-Sep-99	B	Ploughed.
17-Sep-99	B	Rolled.
03-Oct-99	B	Spring-tine cultivated.
04-Oct-99	B	Rotary harrowed. Drilled, Hereward, tr. Sibutol, at 380 seeds/m^2 with the Accord drill.
11-Nov-99	B	Hallmark at 100 ml in 100 l.
31-Dec-99	B	Panther at 2.0 l in 200 l.
21-Mar-00	B	tm) Ally at 30 g in 200 l.
	B	tm) Topik at 125 ml in 200 l.
	B	tm) Cropoil at 1.0 l in 200 l.
11-Apr-00	B	34.5% N at 278 kg.
30-Apr-00	B	tm) Marshland Liquid Manganese Complex at 2.0 l in 200 l.
	B	tm) Opus at 0.3 l in 200 l.
	B	tm) BASF 3C Chlormequat 720 at 2.0 l in 200 l.
20-May-00	B	Opus at 0.75 l in 200 l.
20-Aug-00	B	Combine harvested.
25-Aug-00	B	Straw baled and carted.

NOTE: Samples of grain were taken for chemical analysis.

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00/W/RN/12

GRAIN TONNES/HECTARE

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

CROPSEQ / TREATMNT	WHEAT A	WHEAT B	Mean
(LC 8 GM)	4.63	5.11	4.87
(LC 8 PT)	5.07	4.82	4.95
(LC 6 LC)	5.10	4.62	4.86
(LC 6 LN)	5.27	5.13	5.20
(FYM)	5.17	5.37	5.27
(STRAW)	5.19	4.41	4.80
(FERT-FYM)	4.07	4.45	4.26
(FERT-STR)	4.95	3.99	4.47
Mean	4.93	4.74	4.83

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

TREATMNT	CROPSEQ* TREATMNT
0.323	0.457

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

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	14	0.457	9.5

GRAIN MEAN DM% 84.4

AVERAGE PLOT AREA HARVESTED 0.01149

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00/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 third year, w. oats, w. wheat, w. rape, w. linseed, w. beans, lupins.

Design: 2 blocks of 42 plots, some 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.

Sub-plots: **ROTATION** 1 to 10, Phase A: (w. wheat plots were split for four levels of nitrogen).

NITROGEN	Kg N
N0	None
N1	120
N2	170
N2	220

For winter wheat plots split for N

PREVCROP	Crop in 1999
(RA)	**ROTATION** sequence 1A,8A,9A
(LN)	**ROTATION** sequence 2A
(LP)	**ROTATION** sequence 3A
(BE)	**ROTATION** sequence 4A,7A
(PE)	**ROTATION** sequence 5A
(W)	**ROTATION** sequence 6A
(O)	**ROTATION** sequence 10A

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

Experimental diary:
All crops:
24-Aug-99 : B : Muriate of potash at 600 kg and triple superphosphate at 290 kg.
28-Aug-99 : B : Ploughed.
31-Aug-99 : B : Ploughing completed.
02-Sep-99 : B : Rolled (except w. rape).
21-Aug-00 : B : Azural at 4.0 l in 200 l (except lupin plots)
W. wheat:
15-Sep-99 : **T** : Combination drilled Hereward, tr. Sibutol, at 300 seeds/m^2 with the Accord drill. Genesis at 8.0 kg.
23-Sep-99 : **T** : Genesis at 8.0 kg.
04-Nov-99 : **T** : tm) Lexus Class WSB at 60 g in 200 l.
: **T** : tm) Cyperkill 10 at 250 ml in 200 l.
10-Mar-00 : **T** : 34.5% N at 145 kg (except N0 sub-plots).
17-Mar-00 : **T** : Eagle at 30 g in 200 l.
20-Mar-00 : **T** : tm)Hawk at 2.5 l in 200 l.
: **T** : tm)Cropoil at 1.0 l in 200 l.
27-Apr-00 : B : tm)Opus at 0.5 l in 200 l.
: B : tm)Unix at 0.5 kg in 200 l.
04-May-00 : **T** : 34.5% N at 435 kg (except **ROTATION** 1 - 10, Phase A).
: **T** : **ROTATION** 1 to 10, Phase A, N1 : 34.5% N at 203 kg.
: **T** : **ROTATION** 1 to 10, Phase A, N2 : 34.5% N at 348 kg.

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Experimental diary:

W. wheat:

04-May-00	: **T** :	**ROTATION** 1 to 10, Phase A, N3 : 34.5% N at 493 kg.
07-May-00	: **T** :	tm) Sypex at 1.0 l in 200 l.
	: **T** :	tm) Enhance Low Foam at 80 ml in 200 l.
16-May-00	: **T** :	Starane 2 at 0.5 l in 200 l.
29-May-00	: **T** :	tm) Amistar at 0.8 l in 200 l.
	: **T** :	tm) Folicur at 0.5 l in 200 l.
27-Jun-00	: **T** :	Folicur at 0.25 l in 200 l.
06-Aug-00	: **T** :	Combine harvested and chopped straw.

W. oats:

29-Sep-99	: **T** :	Combination drilled, Gerald, tr. Sibutol, at 350 seeds/m^2 with the Accord drill.
04-Nov-99	: **T** :	tm) Lexus Class WSB at 60 g in 200 l.
	: **T** :	tm) Cyperkill 10 at 250 ml in 200 l.
20-Mar-00	: **T** :	Orka at 0.5 l in 200 l.
10-Apr-00	: **T** :	34.5% N at 145 kg.
05-May-00	: **T** :	34.5% N at 203 kg.
16-May-00	: **T** :	Starane 2 at 0.5 l in 200 l.
09-Jun-00	: **T** :	Folicur at 0.5 l in 200 l.
02-Aug-00	: **T** :	Combine harvested and chopped straw.
05-Aug-00	: **T** :	Combine harvesting completed.

W. rape:

02-Sep-99	: **T** :	Combination drilled, Pronto, tr. Rovral Liquid FS at 60 seeds/m^2 with the Accord drill.
03-Sep-99	: **T** :	tm) Katamaran at 2.0 l in 200 l.
	: **T** :	tm) Alpha Trifluralin 48 EC at 1.0 l in 200 l.
15-Sep-99	: **T** :	Genesis at 8.0 kg.
23-Sep-99	: **T** :	Genesis at 8.0 kg.
14-Oct-99	: **T** :	tm) Punch C at 0.4 l in 200 l.
	: **T** :	tm) Hallmark at 100 ml in 200 l.
19-Oct-99	: **T** :	34.5% N at 87 kg.
02-Dec-99	: **T** :	Punch C at 0.4 l in 200 l.
09-Feb-00	: **T** :	Sulphan 30% N, 7.6% S at 166 kg.
15-Mar-00	: **T** :	34.5% N at 377 kg.
16-Mar-00	: **T** :	tm) Laser at 1.0 l in 200 l.
	: **T** :	tm) Cropoil at 2.0 l in 200 l
17-Mar-00	: **T** :	tm) Bavistin DF at 1.0 kg in 100 l.
	: **T** :	tm) Hallmark with Zeon Technology at 75 ml in 100 l.
12-Jul-00	: **T** :	tm) Reglone at 3.0 l in 400 l.
	: **T** :	tm) Enhance Low Foam at 400 ml in 400 l.
19-Jul-00	: **T** :	Combine harvested and chopped straw.

W. linseed:

06-Oct-99	: **T** :	Combination drilled Oliver, tr. Prelude 20 LF, at 950 seeds/m^2 with the Nordsten drill.
10-Mar-00	: **T** :	34.5% N at 145 kg.
16-Mar-00	: **T** :	tm) Laser at 1.0 l in 200 l.
	: **T** :	tm) Cropoil at 2.0 l in 200 l.
17-Mar-00	: **T** :	Eagle at 30 g in 200 l.
31-Mar-00	: **T** :	34.5% N at 116 kg.
26-Jul-00	: **T** :	tm) Reglone at 3.0 l in 400 l.
	: **T** :	tm) Enhance Low Foam at 400 ml in 400 l.
01-Aug-00	: **T** :	Combine harvested and chopped straw.

W. beans:

28-Oct-99	: **T** :	Drilled Clipper, recleaned, at 40 seeds/m^2 with the Carrier drill.
08-Nov-99	: **T** :	tm) Alpha Simazine 50 SC at 2.0 l in 200 l.
	: **T** :	tm) Kerb 50 W at 1.5 kg in 200 l.
20-May-00	: **T** :	tm) Bravo 500 at 1.0 l in 200 l.
	: **T** :	tm) Folicur at 0.5 l in 200 l.
17-Aug-00	: **T** :	Combine harvested and chopped straw.

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00/R/RN/22

Experimental diary:

W. peas:

29-Oct-99	: **T** :	Drilled Victor, tr. Wakil, at 100 seeds/m^2 with the Carrier drill.
22-Nov-99	: **T** :	PDQ at 3.0 l in 220 l.
22-May-00	: **T** :	tm) Bravo 500 at 2.0 l in 220 l.
	: **T** :	tm) Ronilan FL at 0.75 l in 220 l.
16-Jun-00	: **T** :	tm) Compass at 3.0 l in 200 l.
	: **T** :	tm) Aphox at 280 g in 200 l.
31-Jul-00	: **T** :	Combine harvested and chopped straw.

W. lupins:

15-Sep-99	: **T** :	Genesis at 8.0 kg.
16-Sep-99	: **T** :	Combination drilled, DTN 20, tr. Germipro and Promet, at 40 seeds/m^2 with the Accord drill.
21-Sep-99	: **T** :	Stomp 400 SC at 5.0 l in 200 l.
23-Sep-99	: **T** :	Genesis at 8.0 kg.
14-Oct-99	: **T** :	Cyperkill 10 at 250 ml in 200 l.
12-Nov-99	: **T** :	tm) Alpha Simazine 50 SC at 2.3 l in 220 l.
	: **T** :	tm) Carbetamex at 3.0 kg in 200 l.
28-Apr-00	: **T** :	tm) Bravo 500 at 1.5 l in 200 l.
	: **T** :	tm) Folicur at 0.5 l in 200 l.
04-Jul-00	: **T** :	tm) Aphox at 280 g in 200 l.
	: **T** :	tm) Folicur at 0.5 l in 200 l.
	: **T** :	tm) Enhance Low Foam at 50 ml in 200 l.
14-Sep-00	: **T** :	Combine harvested and chopped straw.

NOTE: Peas were netted from 24-Nov-99 to 31-Jul-00. Soil was sampled on wheat plots for nitrogen content on 27-28-Jan-00. Wheat plots were assessed for lodging before harvest.

NOTE: Yields are presented by crop not by **ROTATION**.

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

CROPS OTHER THAN WINTER WHEAT

WINTER CROP	GRAIN TONNES/ HECTARE	GRAIN MEAN DM%
RAPE	3.42	85.3
LINSEED	0.59	90.9
LUPINS	3.72	54.4
BEANS	3.73	80.7
PEAS	3.24	80.7
WHEAT*	8.28	83.0
OATS	9.31	86.2

* FROM WHEAT PLOTS NOT SPLIT FOR **NITROGEN**

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00/R/RN/22

WINTER WHEAT

NITROGEN	0	120	170	220	Mean
PREVCROP					
(RA)	5.18	6.99	7.23	6.31	6.43
(LN)	3.99	7.11	7.07	6.71	6.22
(LP)	4.44	7.37	8.32	7.36	6.87
(BE)	3.96	5.79	5.45	5.60	5.20
(PE)	5.82	6.13	6.05	7.00	6.25
(W)	3.26	6.95	6.80	6.98	6.00
(O)	3.55	7.39	8.61	9.24	7.20
Mean	4.45	6.75	6.94	6.74	6.22

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

PREVCROP	**NITROGEN**	**PREVCROP NITROGEN**	
0.929		1.266	A v A
0.805		1.097	A v B
0.759	0.314	1.034	A v C
0.600		0.817	B v C

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

0.993	A v A
0.860	A v B
0.811	A v C
0.641	B v C
0.702	B v B
0.573	C v C

For comparing means

A is any of (LN), (LP), (PE), (W), (O)
B is (BE)
C is (RA)

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.929	14.9
BLOCK.WP.SP	39	0.993	16.0

GRAIN MEAN DM% (WHEAT) 83.6

SUB-PLOT AREA 0.00240 (BEANS 0.00150)

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00/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 16th year, w. wheat.

For previous years see 85-93,95-99/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 1995-2000:

NONE	None
CARB	Carbendazim at 0.25 kg
PRO	Prochloraz at 0.40 kg (0.50 kg in 1993, 1995-2000)
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:

23-Sep-99	B		Ploughed.
28-Sep-99	B		Combination drilled, Hereward, tr. Sibutol, at 380 seeds/m^2 with the Accord drill.
15-Nov-99	B		tm)Lexus Class WSB at 60 g in 200 l.
	B		tm)Toppel 10 at 250 ml in 200 l.
06-Mar-00	B		Sulphan 30% N, 7.6% S at 266 kg.
17-Mar-00	T	CARB	Bavistin DF at 0.5 kg in 220 l.
	T	CARB+PRO	Sportak 45 EW at 1.1 l with Bavistin DF at 0.5 kg in 220 l.
	T	PRO	Sportak 45 EW at 1.1 l in 220 l.
27-Apr-00	B		Sulphur Gold (30.0% N, 7.6% S), at 400 kg.

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00/R/CS/302

Experimental diary:

09-May-00	: **T** :	CARB	:	Bavistin DF at 0.5 kg in 220 l.
	: **T** :	CARB+PRO	:	Sportak 45 EW at 1.1 l with Bavistin DF at 0.5 kg in 220 l.
	: **T** :	PRO	:	Sportak 45 EW at 1.1 l in 220 l.
20-May-00	: B :		: tm)	Grasp at 0.5 l in 100 l.
	: B :		: tm)	Opus at 0.75 l in 100 l.
	: B :		: tm)	Output at 0.75 l in 100 l.
07-Aug-00	: B :		:	Combine harvested.

Previous crops: W. wheat 1998 and 1999.

NOTE: Plant samples were taken from the natural background population plots in June to assess eyespot and other stem base diseases, to characterise eyespot fungus populations by species and sensitivity to fungicides.

GRAIN TONNES/HECTARE

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

EYE INOC / **FUNGCIDE**	NATURAL	W 19R 1S	W 1R 19S	R 19R 1S	R 1R 19S	Mean
NONE	6.10	5.92	7.00	4.92	6.14	6.03
CARB	5.47	5.55	5.20	5.69	6.09	5.58
PRO	5.72	6.25	6.70	5.57	5.99	5.99
CARB+PRO	6.33	5.70	6.34	5.03	6.05	5.96
Mean	5.90	5.85	6.31	5.30	6.07	5.89

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

EYE INOC	**FUNGCIDE*** **EYE INOC**	
0.392	0.784	min.rep
0.340	0.679	max-min

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

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

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP.SP	24	0.784	13.3

GRAIN MEAN DM% 85.3

SUB-PLOT AREA HARVESTED 0.00144

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00/R/CS/309 and 00/W/CS/309

LONG-TERM STRAW INCORPORATION

Object: Originally 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. Now used to monitor turnover of biomass carbon and nitrogen - Rothamsted (R) Great Knott III and Woburn (W) Far Field I.

Sponsors: J.F. Jenkyn, C.A. Grace, P.R. Poulton.

The 16th year, s. wheat.

For previous years see 85-99/R & W/CS/309.

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

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

Treatments: All combinations of:-

STRAWCUL Treatment of straw of previous crops and type of cultivation up to 1994 (before the space) and subsequently (after the space), and the 2000 treatments:

Old codes	2000 codes
(BT1 BTTTTTT)	BAT
(BT1T2 CTTTTTT)	CT
(BP2 BPPPPPP)	BAP
(BT1P2 CPPPPPP)	CP
(CT1 CTTTTTT)	CT
(CT1 CPTTPTT)	BAT
(CT1T2 CTPTTPT)	BAT
(CT1T2 CTTPTTP)	CT
(CP2 CPPPPPP)	CP
(CP2 CPTTPTT)	BAP
(CT1P2 CTPTTPT)	BAP
(CT1P2 CTTPTTP)	CP

NOTE: 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
BA	Straw baled and removed
C	Straw chopped
T	Soil tined
P	Soil ploughed

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00/R/CS/309 and 00/W/CS/309

Experimental diary:

Great Knott III (R):

21-Aug-99	**T**	C	Straw chopped.
23-Aug-99	**T**	BA	Straw baled.
21-Sep-99	B		tm) PDQ at 3.0 l in 200 l.
	B		tm) Enhance Low Foam at 100 ml in 200 l.
30-Sep-99	**T**	T	Flexitined.
16-Nov-99	B		tm) PDQ at 3.0 l in 200 l.
	B		tm) Enhance Low Foam at 40 ml in 200 l.
03-Dec-99	**T**	P	Ploughed to 20cm
08-Mar-00	B		Rotary harrowed. Drilled, Axona, tr. Sibutol, at 350 seeds/m^2 with the Accord drill.
09-Mar-00	B		Rolled.
10-May-00	B		34.5% N at 435 kg.
03-Jun-00	B		tm) Ally at 30 g in 200 l.
	B		tm) BASF MCPA Amine 50 at 1.5 l in 200 l.
14-Jun-00	**T**		Mon 37500 at 25 g in 200 l, plots 4, 5, 7, 10, 13, 16, 19, 21, 22, 27, 28, 30, 31, 33, 37, 38, 43, 45 & 46.
24-Jun-00	B		Folicur at 1.0 l in 200 l.
23-Aug-00	**T**		Combine harvested.

Far Field I (W):

20-Aug-99	**T**	C	Straw chopped.
24-Aug-99	**T**	BA	Straw baled.
13-Oct-99	B		tm) PDQ at 3.0 l in 200 l.
	B		tm) Enhance Low Foam at 100 ml in 200 l.
31-Dec-99	B		PDQ at 4.0 l in 200 l.
25-Jan-00	**T**	P	Ploughed.
	T	T	Flexitined, twice.
27-Jan-00	B		Rotary harrowed. Drilled, Axona, tr. Sibutol, at 462 seeds/m^2 with the Accord drill.
27-Apr-00	B		Sulphan (30.0% N, 7.6% S) at 500 kg.
31-May-00	B		Harmony M at 75 g in 200 l.
26-Jun-00	B		Opus at 0.75 l in 200 l.
21-Aug-00	B		Combine harvested.

NOTE: Mon 37500 is an experimental herbicide for the control of brome grass.

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

GRAIN TONNES/HECTARE

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

	STRAWCUL	
(BT1 BTTTTTT)	BAT	4.71
(BT1T2 CTTTTTT)	CT	5.76
(BP2 BPPPPPP)	BAP	5.30
(BT1P2 CPPPPPP)	CP	5.59
(CT1 CTTTTTT)	CT	5.65
(CT1 CPTTPTT)	BAT	5.25
(CT1T2 CTPTTPT)	BAT	5.31
(CT1T2 CTTPTTP)	CT	4.85
(CP2 CPPPPPP)	CP	5.26
(CP2 CPTTPTT)	BAP	5.89
(CT1P2 CTPTTPT)	BAP	5.61
(CT1P2 CTTPTTP)	CP	5.63
Mean		5.40

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

STRAWCUL
0.377

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	33	0.533	9.9

GRAIN MEAN DM% 84.2

PLOT AREA HARVESTED 0.00672

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

GRAIN TONNES/HECTARE

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

	STRAWCUL	
(BT1 BTTTTTT)	BAT	2.10
(BT1T2 CTTTTTT)	CT	1.22
(BP2 BPPPPPP)	BAP	4.90
(BT1P2 CPPPPPP)	CP	4.07
(CT1 CTTTTTT)	CT	0.61
(CT1 CPTTPTT)	BAT	0.54
(CT1T2 CTPTTPT)	BAT	3.39
(CT1T2 CTTPTTP)	CT	3.36
(CP2 CPPPPPP)	CP	4.73
(CP2 CPTTPTT)	BAP	4.51
(CT1P2 CTPTTPT)	BAP	3.72
(CT1P2 CTTPTTP)	CP	4.63
Mean		3.15

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

STRAWCUL
0.573

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	11	0.573	18.2

GRAIN MEAN DM% 84.8

SUB-PLOT AREA HARVESTED 0.00720

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00/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 16th year, w. wheat, s. oilseed rape.

For previous years see 85-99/R/CS/311.

Design: 6 plots of 3 treatments (duplicated) split into 8.

Whole plot dimensions: 4.5 x 12.0.

Treatments: Combinations of:-

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

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

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

-	S. rape
G8	W. wheat after glyphosate in 1998
(RA)	W. wheat after s. rape in 1999
G9	W. wheat after glyphosate in 1999

NOTE: In diary **GLYPHOS** treatments are referred to by crop; s. rape as RA and w. wheat as WW.

Experimental diary:

20-Aug-99	**T**	BA	Wheat straw baled and removed.
	T	CH	Wheat straw chopped and incorporated.
23-Aug-99	**T**	BU	Wheat straw burnt and ash incorporated with discs to 10 cm.
24-Aug-99	B		Muriate of potash at 600 kg.
26-Aug-00	**T**	BA	Rape straw baled and removed.
06-Sep-00	**T**	CH	Rape straw chopped and incorporated.
	T	BU	Rape straw burnt and ash incorporated with discs to 10 cm.
21-Sep-99	B		tm) PDQ at 3.0 l in 200 l.
	B		tm) Enhance Low Foam at 100 ml in 200 l.
11-Oct-99	B		Disced twice.
14-Oct-99	**T**	WW	Combination drilled, Hereward, tr. Sibutol, at 380 seeds/m^2 with the Accord drill.
15-Oct-99	**T**	WW	Rolled.
	T	WW	Prebane at 3.0 l in 200 l.
12-Nov-99	**T**	WW	tm) Lexus 50 DF at 20 g in 200 l.
	T	WW	tm) Stomp 400 SC at 2.5 l in 200 l.
	T	WW	tm) Toppel 10 at 250 ml in 200 l.
07-Mar-00	**T**	WW	34.5% N at 232 kg.
15-Mar-00	**T**	RA	Sting CT at 4.0 l in 200 l.
21-Mar-00	**T**	RA	Disced. Combination drilled, Starlight, recleaned, at 180 seeds/m^2, with the Accord drill. Rolled.

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00/R/CS/311

Experimental diary:

21-Mar-00	: **T** :	RA	:	Butisan S at 1.0 l in 200 l.
08-Apr-00	: B :		:	Hallmark with Zeon Technology at 75 ml in 200 l.
23-Apr-00	: B :		:	Hallmark with Zeon Technology at 75 ml in 200 l.
27-Apr-00	: **T** :	WW	:	34.5% N at 348 kg.
	: **T** :	WW	:	tm) Opus at 0.5 l in 200 l.
	: **T** :	WW	:	tm) BASF 3C Chlormequat 720 at 2.0 l in 200 l.
29-Apr-00	: **T** :	RA	:	Genesis at 7.0 kg.
10-May-00	: **T** :	RA	:	34.5% N at 435 kg.
22-May-00	: **T** :	WW	:	Opus at 0.75 l in 100 l.
27-Jun-00	: B :		:	Hand rogued wild oats, started.
29-Jun-00	: B :		:	Hand rogued wild oats, completed.
17-Aug-00	: **T** :	WW	:	Combine harvested.
06-Sep-00	: **T** :	RA	:	Combine harvested.

Previous crops: W. wheat 1998, s. rape and w. wheat 1999.

NOTE: All plots were sampled in July to assess root and stem base diseases.

W. WHEAT

GRAIN TONNES/HECTARE

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

GLYPHOS	G8	G9	(RA)	Mean
STRAW				
BU	8.65	9.33	9.18	9.05
BA	6.67	7.77	8.67	7.70
CH	7.04	8.63	8.29	7.98
Mean	7.46	8.58	8.71	8.25

GRAIN MEAN DM% 86.0

SUB-PLOT AREA HARVESTED 0.00288

S. RAPE

GRAIN TONNES/HECTARE

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

STRAW	
BU	1.22
BA	1.03
CH	0.86
Mean	1.04

GRAIN MEAN DM% 73.8

SUB-PLOT AREA HARVESTED 0.00288

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00/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 13th year, w. wheat.

For previous years see 88-96,98-99/R/CS/323.

Design: 3 randomised blocks of 26 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

1. **FUNG99** Seed dressing in 1999:

   (NONE) None
   (FLUQUIN) Fluquinconazole

2. **FUNG00** Seed dressing in 2000:

   NONE None
   FLUQUIN Fluquinconazole

3. **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:

11-Aug-99	B		Ploughed.
30-Sep-99	B		tm) PDQ at 3.0 l in 200 l.
	B		tm) Enhance Low Foam at 100 ml in 200 l.
11-Oct-99	**T**	NONE	Combination drilled, Hereward, tr. Sibutol, at 380 seeds/m^2 with the Accord drill.
	T	FLUQUIN	Combination drilled, Hereward, tr. fluquinconazole, at 380 seeds/m^2 with the Accord drill.
15-Nov-99	B		tm) Lexus 50 DF at 20 g in 200 l.
	B		tm) Stomp 400 SC at 2.5 l in 200 l.
	B		tm) Toppel 10 at 250 ml in 200 l.
07-Mar-00	B		34.5% N at 232 kg.
27-Apr-00	B		34.5% N at 348 kg.
	B		tm) Opus at 0.5 l in 200 l.
	B		tm) Unix at 0.5 kg in 200 l.
	B		tm) BASF 3C Chlormequat 720 at 2.0 l in 200 l.
22-May-00	B		Opus at 0.75 l in 100 l.
29-Jun-00	B		Hand rogued wild oats.
11-Aug-00	B		Combine harvested.

Previous crops: W. wheat 1998 and 1999.

NOTE: All plots were sampled in June to assess root and stem base diseases.

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00/R/CS/323

GRAIN TONNES/HECTARE

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

FUNG99	(NONE)	(FLUQUIN)	Mean
GROUP			
I	9.23	8.90	9.06
II	9.48	9.02	9.25
III	9.04	8.65	8.84
Mean	9.25	8.85	9.05

FUNG00	NONE	FLUQUIN	Mean
GROUP			
I	9.14	8.99	9.06
II	9.10	9.39	9.25
III	8.64	9.05	8.84
Mean	8.96	9.14	9.05

FUNG00	NONE	FLUQUIN	Mean
FUNG99			
(NONE)	9.10	9.40	9.25
(FLUQUIN)	8.82	8.89	8.85
Mean	8.96	9.14	9.05

	FUNG00	NONE	FLUQUIN
GROUP	**FUNG99**		
I	(NONE)	9.20	9.26
	(FLUQUIN)	9.08	8.72
II	(NONE)	9.42	9.53
	(FLUQUIN)	8.78	9.26
III	(NONE)	8.67	9.41
	(FLUQUIN)	8.61	8.68

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

GROUP	**FUNG99**	**FUNG00**	**GROUP**
			FUNG99
0.142	0.116	0.116	0.200

GROUP	**FUNG99**	**GROUP**
FUNG00	**FUNG00**	**FUNG99**
		FUNG00
0.200	0.163	0.283

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	58	0.490	5.4

GRAIN MEAN DM% 86.5

PLOT AREA HARVESTED 0.00237

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00/R/CS/326 and 00/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 14th year, w. wheat.

For previous years see 87-99/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	4.4	4.0
2 NORMAL	Twice normal	8.8	8.0
4 NORMAL	Four times normal	17.6	16.0

Experimental diary:

Great Knott III (R):

24-Aug-99	**T**	NONE	Straw removed.
	T	NORMAL,2 NORMAL, 4 NORMAL	Straw applied and chopped.
16-Sep-99	B		Ploughed and furrow pressed.
17-Sep-99	B		Combination drilled, Hereward, tr. Sibutol, at 350 seeds/m^2 with the Accord drill. Rolled.
15-Nov-99	B		tm)Lexus 50 DF at 20 g in 200 l.
	B		tm)Stomp 400 SC at 2.5 l in 200 l.
	B		tm)Toppel 10 at 250 ml in 200 l.
09-Mar-00	B		34.5% N at 145 kg.
06-Apr-00	B		Boxer at 100 ml in 200 l.
19-Apr-00	B		34.5% N at 290 kg.
27-Apr-00	B		tm)Opus at 0.5 l in 200 l.
	B		tm)Unix at 0.5 kg in 200 l.
24-May-00	B		tm)Amistar at 0.8 l in 100 l.
	B		tm)Folicur at 0.75 l in 100 l.
12-Aug-00	**T**		Combine harvested.

Far Field I (W):

23-Aug-99	**T**	NONE	Straw removed.
	T	NORMAL,2 NORMAL,4 NORMAL	Straw applied and chopped.
20-Sep-99	B		Ploughed and furrow pressed.
01-Oct-99	B		Combination drilled, Hereward, tr. Sibutol, at 350 seeds/m^2 with the Nordsten drill.
11-Nov-99	B		Hallmark at 100 ml in 100 l.
19-Mar-00	B		Platform S at 1.0 kg in 200 l.
27-Apr-00	B		Sulphan (30.0% N, 7.6% S) at 333 kg.

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00/R/CS/326 and 00/W/CS/326

Experimental diary:

```
Far Field I (W):
   13-May-00 : B :      : tm)Ally at 30 g in 200 l.
             : B :      : tm)Starane 2 at 1.0 l in 200 l.
   20-May-00 : B :      : Opus at 0.75 l in 200 l.
   21-Aug-00 : B :      : Combine harvested.
```

NOTE: Grain and straw samples were analysed for nitrogen content.

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

GRAIN TONNES/HECTARE

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

STRAW	
NONE	7.10
NORMAL	7.18
2 NORMAL	7.51
4 NORMAL	7.57
Mean	7.34

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

STRAW
0.138

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	9	0.196	2.7

GRAIN MEAN DM% 88.5

STRAW TONNES/HECTARE

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

STRAW	
NONE	4.79
NORMAL	4.82
2 NORMAL	4.96
4 NORMAL	5.71
Mean	5.07

STRAW MEAN DM% 81.1

PLOT AREA HARVESTED 0.00324

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

GRAIN TONNES/HECTARE

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

	STRAW
NONE	3.56
NORMAL	4.31
2 NORMAL	3.56
4 NORMAL	3.05
Mean	3.62

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

STRAW
0.432

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	6	0.530	14.6

GRAIN MEAN DM% 85.4

STRAW TONNES/HECTARE

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

	STRAW
NONE	2.37
NORMAL	3.41
2 NORMAL	3.11
4 NORMAL	3.09
Mean	3.00

STRAW MEAN DM% 76.4

PLOT AREA HARVESTED 0.00348

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00/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 tenth year, w. wheat.

For previous years see 91-99/R/CS/355.

Design: 3 randomised blocks of 7 plots.

Whole plot dimensions: 21.0 x 23.0.

Treatments:

NITROGEN Nitrogen fertilizer (kg N) as 34.5% N cumulative to previous dressings:

0
50
100
150
200
250
300

Experimental diary:

29-Aug-99	B		Ploughing started.
30-Aug-99	B		Ploughing completed.
31-Aug-99	B		Rotary harrowed.
03-Sep-99	B		Rolled.
14-Sep-99	B		Disced.
16-Sep-99	B		Combination drilled, Consort, tr. Sibutol at 350 seeds/m^2 with the Nordsten drill.
22-Sep-99	B		Genesis at 5.0 kg.
27-Oct-99	B		tm) Lexus 50 DF at 20 g in 200 l.
	B		tm) Stomp 400 SC at 2.5 l in 200 l.
	B		tm) Cyperkill 10 at 250 ml in 200 l.
18-Apr-00	**T**	50,100,150,200,250,300	34.5% N at 145, 290, 435, 580, 725, 870 kg respectively
29-Apr-00	B		Landmark at 0.5 l in 200 l.
15-May-00	B		tm) Ally at 30 g in 200 l.
	B		tm) Starane 2 at 0.5 l in 200 l.
	B		tm) Topik at 0.125 l in 200 l.
	B		tm) Toil at 1.0 l in 200 l.
20-May-00	B		Landmark at 1.0 l in 100 l.
15-Aug-00	B		Combine harvested.

Previous crops: W. wheat since 1990.

NOTE: Samples of grain were taken for chemical analysis.

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00/R/CS/355

GRAIN TONNES/HECTARE

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

NITROGEN	
0	0.92
50	2.56
100	2.89
150	5.18
200	5.28
250	6.72
300	7.55
Mean	4.44

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

NITROGEN
0.407

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.499	11.2

GRAIN MEAN DM% 85.3

PLOT AREA HARVESTED 0.00504

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00/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 eighth year, grass.

For previous years see 94-99/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 annual dressings, kg N:
-	None
N1	60
N2	120

Experimental diary:

19-May-00	B		Muriate of potash at 583 kg. Triple superphosphate at 291 kg.
25-May-00	**T**	N1	34.5% N at 174 kg.
	T	N2	34.5% N at 348 kg.
16-Jun-00	B		Starane 2 at 1.0 l in 300 l.
07-Feb-01	B		Cut.

NOTE: Soil water was sampled during the winter for nitrate and ammonium content. Harvested samples were analysed for chemical content.

DRY MATTER TONNES/HECTARE

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

N	-	N1	N2	Mean
	14.51	12.38	13.73	13.54

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

N
0.721

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	4	0.883	6.5

MEAN DM% 51.3

AVERAGE PLOT AREA HARVESTED 0.00345

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00/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 eighth year, grass.

For previous year see 94-99/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. **SPECIES**

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 annual dressings:

-	None
N1	60

Experimental diary:

01-Apr-00	B		Alpha Glyphogan at 4.0 l in 220 l.
19-May-00	B		Muriate of potash at 462 kg. Triple superphosphate at 291 kg.
26-May-00	**T**	N1	34.5% N at 174 kg.
16-Jun-00	B		Starane 2 at 1.0 l in 300 l.
23-Jun-00	B		Dow Shield at 1.0 l in 220 l, spot sprayed thistles.
16-Jan-01	B		Cut.

NOTES: (1) Harvested samples were analysed for chemical content.
(2) The yield of one plot, with treatment combination **SPECIES** FORESTB **N** - was lost because of an error in weighing. An estimate was used in the analysis.

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00/R/CS/411

DRY MATTER TONNES/HECTARE

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

N	-	N1	Mean
SPECIES			
CAVIN R	9.26	11.26	10.26
KANLOW	11.67	10.37	11.02
PATHFIND	8.42	8.31	8.36
SUNBURST	8.69	7.73	8.21
FORESTB	9.07	7.59	8.33
NEBR 28	9.81	9.69	9.75
DACOTAH	5.55	7.39	6.47
Mean	8.92	8.91	8.91

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

SPECIES	N	SPECIES N
0.803	0.429	1.136

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	25	1.391	15.6

MEAN DM% 74.5

PLOT AREA HARVESTED 0.00068

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00/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 sixth year, grass.

For previous years see 98-99/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 (duplicated)
T3	Uncontaminated, undigested low rate
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
T18	Zinc 15 kg per annum
T19	Copper 7.5 kg per annum
T20	Cadmium 0.15 kg per annum

Experimental diary:

25-Sep-99	B		Treatments applied. Mechanical spade cultivated three times.
05-Oct-99	B		Rotary harrowed.
12-Oct-99	B		Broadcast Cotswold ryegrass Mix A at 40 kg. Rolled.
12-Nov-99	B		Spannit at 1.5 l in 100l.
25-Feb-00	B		Muriate of potash at 100 kg. 34.5% N at 116 kg.
	T	T1,T19,T20	Triple superphosphate at 63.8 kg.
19-Mar-00	**T**		Legumex Extra at 7.0 l in 200 l.
07-Apr-00	B		Broadcast Danergo and Ligrane ryegrass 50:50 mix at 30 kg.
11-Apr-00	B		27.0% N at 259 kg.

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00/W/CS/427

Experimental diary:

13-Apr-00	**T**	T16,T17,T18,T19,T20	27.0% N at 111 kg.
	T	T1	27.0% N at 148 kg.
13-Jun-00	B		Cut.
17-Jun-00	B		Hay turned.
18-Jun-00	B		Hay turned.
19-Jun-00	B		Baled and carted.
23-Jun-00	B		Topped.
17-Jul-00	B		Azural at 4.0 l in 200 l.
25-Jul-00	B		Topped.

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00/W/CS/427

1ST CUT (13/6/00) DRY MATTER TONNES/HECTARE

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

SLUDGE	
T1	5.60
T2	6.38
T3	6.23
T4	6.05
T5	6.37
T6	6.80
T7	6.63
T8	6.62
T9	5.58
T10	5.90
T11	6.89
T12	5.58
T13	6.24
T14	6.35
T15	6.65
T16	6.60
T17	6.30
T18	6.48
T19	5.54
T20	6.62
Mean	6.26

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

SLUDGE	
0.830	min.rep
0.719	max-min
0.587	max.rep

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

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	47	1.016	16.2

1ST CUT MEAN DM% 24.6

PLOT AREA HARVESTED 0.00081

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00/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 sixth year, grass.

For previous year see 98-99/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:

28-Aug-99	B	:	Alpha Glyphogan at 3.0 l in 200 l.
07-Sep-99	B	:	Hand dug and raked.
01-Oct-99	B	:	tm) PDQ at 3.0 l in 200 l.
	B	:	tm) Enhance Low Foam at 100 ml in 200 l.
13-Oct-99	B	:	Hand raked. Broadcast Cotswold ryegrass Mix A at 40 kg. Rolled.
12-Nov-99	B	:	Spannit at 1.5 l in 100 l.
25-Feb-00	B	:	Muriate of potash at 100 kg. 34.5% N at 116 kg.
19-Mar-00	B	:	Legumex Extra at 7.0 l in 200 l.
07-Apr-00	B	:	Broadcast Danergo and Ligrane ryegrass 50:50 mix at 100 kg.
11-Apr-00	B	:	27.0% N at 407 kg.
14-Jun-00	B	:	Cut.
17-Jul-00	B	:	Azural at 4.0 l in 200 l.
28-Jul-00	B	:	Topped.

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00/W/CS/428

1ST CUT (14/6/00) DRY MATTER TONNES/HECTARE

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

SLUDGE	
T21	4.68
T22	5.76
T23	5.55
T24	6.95
T25	6.77
T26	6.54
T27	6.17
T28	7.93
T29	6.34
T30	5.59
T31	5.26
Mean	6.00

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

SLUDGE	
0.884	min.rep
0.765	max-min
0.625	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	1.082	18.0

1ST CUT MEAN DM% 29.5

PLOT AREA HARVESTED 0.00032

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00/R/CS/429

WINTER RYE AS AN ENERGY CROP

Object: To measure the effects of rates of nitrogen fertilizer on the biomass yield of six consecutive crops of w. rye and a following w. wheat crop - Road Piece West.

Sponsor: D.G. Christian.

The seventh year, w. wheat.

For previous years see 94-99/R/CS/429.

Design: 3 randomised blocks of 5 plots.

Plot dimensions: 3.0 x 15.0.

Treatments:

N	Nitrogen fertilizer (kg N) annually to previous w. rye. Basal dressing in 2000:
(-)	None
(N1)	30
(N2)	60
(N3)	90
(N4)	120

Experimental diary:

19-Oct-99	B	Ploughed. Combination drilled, Malacca, tr. Sibutol, at 380 seeds/m^2 with the Accord drill.
08-Mar-00	B	34.5% N at 232 kg.
13-Mar-00	B	tm)Ally at 30 g in 200 l.
	B	tm)Tolkan Liquid at 3.5 l in 200 l.
06-Apr-00	B	Boxer at 100 ml in 200 l.
04-May-00	B	34.5% N at 290 kg.
08-May-00	B	Landmark at 0.7 l in 200 l.
15-Aug-00	B	Combine harvested.

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00/R/CS/429

GRAIN TONNES/HECTARE

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

	N
(-)	6.42
(N1)	5.71
(N2)	5.94
(N3)	5.17
(N4)	5.32
Mean	5.71

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

	N
	0.518

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	8	0.634	11.1

GRAIN MEAN DM% 83.1

STRAW TONNES/HECTARE

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

	N
(-)	4.41
(N1)	4.63
(N2)	4.33
(N3)	4.09
(N4)	4.07
Mean	4.30

STRAW MEAN DM% 91.6

PLOT AREA HARVESTED 0.00240

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00/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 sixth year, grass. For previous year see 98-99/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:

28-Aug-99	B	:	Alpha Glyphogan at 3.0 l in 200 l.
07-Sep-99	B	:	Hand dug and raked.
01-Oct-99	B	:	tm) PDQ at 3.0 l in 200 l.
	B	:	tm) Enhance Low Foam at 100 ml in 200 l.
13-Oct-99	B	:	Hand raked. Broadcast Cotswold ryegrass Mix A at 40 kg. Rolled.
12-Nov-99	B	:	Spannit at 1.5 l in 100 l.
25-Feb-00	B	:	Muriate of potash at 167 kg. 34.5% N at 116 kg.
19-Mar-00	B	:	Legumex Extra at 7.0 l in 200 l.
07-Apr-00	B	:	Broadcast Danergo and Ligrane ryegrass 50:50 mix at 100 kg.
11-Apr-00	B	:	27.0% N at 407 kg.
14-Jun-00	B	:	Cut.
17-Jul-00	B	:	Azural at 4.0 l in 200 l.

https://doi.org/10.23637/ERADOC-1-55

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00/W/CS/439

1ST CUT (16/6/00) DRY MATTER TONNES/HECTARE

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

SALTS	
A	5.56
ZN1	5.47
ZN2	5.62
ZN3	5.44
CU1	5.88
CU2	5.63
CU3	5.79
CD1	5.47
CD2	5.71
CD3	6.32
Mean	5.68

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

SALTS	
0.581	min.rep
0.503	max-min

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

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	21	0.712	12.5

1ST CUT MEAN DM% 29.2

PLOT AREA HARVESTED 0.00032

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00/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 fourth year, w. wheat.

For previous years see 97-99/R/CS/476.

Design: 2 randomised blocks of 2 x 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
4. **FUNG00**		Fungicidal seed treatment to the 2000 crop:
	F00	Seed treated
	-00	None

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

Experimental diary:

12-Sep-99	B		Ploughed.
22-Sep-99	**T**	-00	Combination drilled, Hereward, undressed, at 380 seeds/m^2 with the Accord drill.
	T	F00	Combination drilled, Hereward, tr. fluquinconazole, at 380 seeds/m^2 with the Accord drill.
14-Dec-99	B		tm) Lexus 50 DF at 20 g in 200 l.
	B		tm) Stomp 400 SC at 2.5 l in 200 l.
	B		tm) Toppel 10 at 250 ml in 200 l.
08-Mar-00	B		34.5% N at 232 kg.
27-Apr-00	B		tm) Opus at 0.5 l in 200 l.
	B		tm) Unix at 0.5 kg in 200 l.
04-May-00	B		34.5% N at 348 kg.
22-May-00	B		Opus at 0.75 l in 100 l.
07-Aug-00	B		Combine harvested.

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

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00/R/CS/476

GRAIN TONNES/HECTARE

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

FUNG98	(F98)	(-98)	Mean
FUNG97			
(F97)	4.47	4.49	4.48
(-97)	4.62	4.53	4.58
Mean	4.55	4.51	4.53

FUNG99	(F99)	(-99)	Mean
FUNG97			
(F97)	4.36	4.60	4.48
(-97)	3.92	5.24	4.58
Mean	4.14	4.92	4.53

FUNG99	(F99)	(-99)	Mean
FUNG98			
(F98)	4.44	4.65	4.55
(-98)	3.84	5.19	4.51
Mean	4.14	4.92	4.53

FUNG00	F00	-00	Mean
FUNG97			
(F97)	4.54	4.42	4.48
(-97)	5.28	3.87	4.58
Mean	4.91	4.14	4.53

FUNG00	F00	-00	Mean
FUNG98			
(F98)	4.88	4.21	4.55
(-98)	4.94	4.08	4.51
Mean	4.91	4.14	4.53

FUNG00	F00	-00	Mean
FUNG99			
(F99)	4.45	3.83	4.14
(-99)	5.38	4.46	4.92
Mean	4.91	4.14	4.53

	FUNG99	(F99)	(-99)
FUNG97	**FUNG98**		
(F97)	(F98)	4.79	4.15
	(-98)	3.93	5.05
(-97)	(F98)	4.09	5.15
	(-98)	3.74	5.32

	FUNG00	F00	-00
FUNG97	**FUNG98**		
(F97)	(F98)	4.65	4.30
	(-98)	4.44	4.54
(-97)	(F98)	5.12	4.12
	(-98)	5.44	3.62

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00/R/CS/476

GRAIN TONNES/HECTARE

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

FUNG97	FUNG00 FUNG99	F00	-00
(F97)	(F99)	4.34	4.37
	(-99)	4.74	4.46
(-97)	(F99)	4.55	3.28
	(-99)	6.02	4.46

FUNG98	FUNG00 FUNG99	F00	-00
(F98)	(F99)	4.55	4.33
	(-99)	5.22	4.09
(-98)	(F99)	4.34	3.33
	(-99)	5.54	4.83

FUNG97	FUNG98	FUNG00 FUNG99	F00	-00
(F97)	(F98)	(F99)	4.59	4.99
		(-99)	4.71	3.60
	(-98)	(F99)	4.10	3.75
		(-99)	4.78	5.32
(-97)	(F98)	(F99)	4.51	3.67
		(-99)	5.72	4.58
	(-98)	(F99)	4.58	2.90
		(-99)	6.31	4.34

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

FUNG97	FUNG98	FUNG99	FUNG00
0.360	0.360	0.360	0.360

FUNG97 FUNG98	FUNG97 FUNG99	FUNG98 FUNG99	FUNG97 FUNG00
0.508	0.508	0.508	0.508

FUNG98 FUNG00	FUNG99 FUNG00	FUNG97 FUNG98 FUNG99	FUNG97 FUNG98 FUNG00
0.508	0.508	0.719	0.719

FUNG97 FUNG99 FUNG00	FUNG98 FUNG99 FUNG00	FUNG97 FUNG98 FUNG99 FUNG00
0.719	0.719	1.017

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	1.017	22.5

GRAIN MEAN DM% 81.6

PLOT AREA HARVESTED 0.00237

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00/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 fourth year, forage maize and s. barley.

For previous years see 97-99/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
(B)M	Maize, after three years of s. barley with straw removed
BTM	Continuous spring barley, straw removed plus 10 t maize tops incorporated
B	Continuous spring barley, straw removed

Experimental diary:

27-Sep-99	**T**	MTB,BTM	Maize tops at 300 kg per plot.
18-Oct-99	B		Sulphate of potash at 217 kg.
	B		Triple superphosphate at 171 kg.
19-Oct-99	B		Ploughed.
07-Mar-00	B		Rotary harrowed.
	T	B,BTM	Combination drilled, Optic, tr. Raxil S, at 350 seeds/m^2 with the Accord drill. Rolled.
	T	M,MB,MTB,(B)M	Sting ECO at 4.0 l in 200 l.
11-May-00	B		34.5% N at 278 kg.
16-May-00	**T**	M,MB,MTB,(B)M	Rotary harrowed. Drilled, Hudson, tr. Mesurol, at 10.2 seeds/m^2 with the Nodet Gougis drill.
17-May-00	**T**	M,MB,MTB,(B)M	Rolled.
24-May-00	**T**	B,BTM	tm)Opus at 0.3 l in 100 l.
	T	B,BTM	tm)Unix at 0.5 kg in 100 l.
03-Jun-00	**T**	B,BTM	tm)Ally at 30 g in 200 l.
	T	B,BTM	tm)Duplosan at 1.0 l in 200 l.
20-Jun-00	**T**	B,BTM	Opus at 0.3 l in 200 l.
26-Jun-00	**T**	M,MB,MTB,(B)M	tm)Gesaprim at 3.0 l in 220 l.
	T	M,MB,MTB,(B)M	tm)Toil at 1.5 l in 220 l.
17-Jul-00	B		Hand rogued wild oats.
24-Aug-00	**T**	B,BTM	Combine harvested.
02-Oct-00	**T**	M,MB,MTB,(B)M	Hand harvested

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00/R/CS/477

MAIZE

GRAIN TONNES/HECTARE

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

CROP	
M	10.91
MB	12.00
MTB	11.69
(B)M	12.77
Mean	11.84

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

CROP
0.670

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	6	0.821	6.9

GRAIN MEAN DM% 27.6

PLOT AREA HARVESTED 0.00108

SPRING BARLEY

GRAIN TONNES/HECTARE

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

CROP	
BTM	4.53
B	4.49
Mean	4.51

GRAIN MEAN DM% 87.5

PLOT AREA HARVESTED 0.00600

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00/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 fourth year, forage maize and s. barley.

For previous years see 97-99/W/CS/478.

Design: 3 randomised blocks of 6 plots.

Plot dimensions: 9.0 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
(B)M	Maize after three years of spring barley, straw removed
BTM	Continuous spring barley, straw removed plus 10 t maize tops incorporated
B	Continuous spring barley, straw removed

Experimental diary:

28-Sep-99 : **T** : BTM,MTB : Chopped maize tops at 10 t.
18-Oct-99 : B : : Ploughed.
13-Mar-00 : **T** : B,BTM: Combination drilled, Optic, tr. Raxil S, at 350 seeds/m^2 with the Accord drill.
14-Mar-00 : **T** : B,BTM : Rolled.
08-May-00 : **T** : M,MB,MTB,(B)M : PDQ at 4.0 l in 200 l.
17-May-00 : **T** : M,MB,MTB,(B)M : Rotary harrowed. Drilled, Hudson, tr. Mesurol, at 10.2 seeds/m^2 with Nodet Gougis drill.
25-May-00 : B : : 33.5% N at 286 kg.
16-Jun-00 : **T** : M,MB,MTB,(B)M : tm)Gesaprim at 3.0 l in 200 l.
: **T** : M,MB,MTB,(B)M : tm)Toil at 3.0 l in 200 l.
20-Jun-00 : **T** : B,BTM : tm)Ally at 30 g in 200 l.
: **T** : B,BTM : tm)Starane 2 at 0.75 l in 200 l.
26-Jun-00 : **T** : B,BTM : Opus at 0.75 l in 200 l.
21-Aug-00 : **T** : B,BTM : Combine harvested.
02-Oct-00 : **T** : M,MB,MTB,(B)M :Hand harvested.

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

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00/W/CS/478 MAIZE

GRAIN TONNES/HECTARE

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

CROP	
M	12.61
MB	12.83
MTB	13.89
(B)M	12.35
Mean	12.92

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

CROP
0.906

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	6	1.110	8.6

GRAIN MEAN DM% 31.3

PLOT AREA HARVESTED 0.00108

S. BARLEY

GRAIN TONNES/HECTARE

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

CROP	
BTM	0.99
B	0.65
Mean	0.82

GRAIN MEAN DM% 79.5

PLOT AREA HARVESTED 0.00600

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00/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 98-99/R/CS/480.

The fourth 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:

31-Mar-00	B	: Alpha Glyphogan at 4.0 l in 200 l.
18-May-00	B	: 34.5% N at 174 kg.
19-May-00	B	: Muriate of potash at 262 kg.
23-Jun-00	B	: Dow Shield at 1.0 l in 220 l, spot sprayed thistles.
29-Jan-01	B	: Cut.

NOTE: Harvest samples were analysed for chemical content.

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00/R/CS/480

DRY MATTER TONNES/HECTARE

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

GENOTYPE	
1	12.40
2	12.72
3	10.83
4	11.92
5	9.98
6	10.54
7	14.65
8	7.63
9	11.63
10	8.92
11	8.46
12	7.77
13	8.22
14	6.11
15	7.32
Mean	9.94

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

GENOTYPE
0.962

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	28	1.179	11.9

MEAN DM% 62.7

AVERAGE PLOT AREA HARVESTED 0.00123

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00/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 third year, potatoes.

For previous year see 98-99/W/CS/482.

Design: 4 randomised blocks of 6 plots.

Plot dimensions: 3.0 x 12.0.

Treatments:-

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

Experimental diary:

06-Sep-99	B		Ploughed and furrow pressed.
08-May-00	B		PDQ at 4.0 l in 200 l.
10-May-00	B		Rotaspiked. Planted Estima, tr. Fungazil 100 SL, at 30 cm spacing in 75 cm rows.
25-May-00	B		34.5% N at 435 kg.
08-Jun-00	**T**	S1,S2,S3,S4,S5	Gypsum at 29, 57, 114, 229 and 457 respectively.
	B		Rota-ridged.
21-Jun-00	B		Shirlan at 300 ml in 200 l.
26-Jun-00	B		tm) Shirlan at 300 ml in 200 l.
	B		tm) Aphox at 280 g in 200 l.
28-Jun-00	B		tm) Titus at 50 g in 200 l.
	B		tm) Enhance Low Foam at 200 ml in 200 l.
06-Jul-00	B		tm) Shirlan at 300 ml in 200 l.
	B		tm) Plenum at 0.6 kg in 200 l.
12-Jul-00	B		Shirlan at 300 ml in 200 l.
22-Jul-00	B		Shirlan at 300 ml in 200 l.
02-Aug-00	B		Shirlan at 300 ml in 200 l.
24-Aug-00	B		Keytin at 0.5 l in 200 l.
14-Sep-00	B		Potatoes lifted.

NOTE: Plant leaves were sampled in June and tubers at harvest for sulphur content.

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00/W/CS/482

TOTAL TUBERS TONNES/HECTARE

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

SULPHUR	
S0	25.8
S1	30.0
S2	25.7
S3	26.9
S4	30.5
S5	27.2
Mean	27.7

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

SULPHUR
1.67

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	2.36	8.5

PERCENTAGE WARE 4.0 CM RIDDLE

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

SULPHUR	
S0	76.8
S1	80.5
S2	78.5
S3	81.1
S4	79.0
S5	78.2
Mean	79.0

PLOT AREA HARVESTED 0.00180

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00/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 third year, w. wheat.

For previous years see 98-99/R/CS/494.

Design: 4 randomised blocks of 18 plots.

Plot dimensions: 3.0 x 10.0.

Treatments: Selected combinations of:-

1. **Y1998**		Treatment to 1998 crop:
	(-8)	None
	(P8)	*Phialophora* inoculum to seedbed
	(T8)	Take-all inoculum to seedbed
2. **Y1999**		Treatment to 1999 crop:
	(-9)	None
	(P9)	*Phialophora* inoculum to seedbed
	(T9)	Take-all inoculum to seedbed
3. **Y2000**		Treatment to 2000 crop:
	-0	None
	P0	*Phialophora* inoculum to seedbed
	S0	Seed treatment fungicide; fluquinconazole at 75 g a.i./100 kg
	PS0	*Phialophora* inoculum and seed treatment fungicide; fluquinconazole at 75 g a.i./100 kg

Experimental diary:

02-Sep-99	B		Shallow (10 cm) ploughed.
04-Sep-99	B		Rolled.
04-Oct-99	**T**	P0,PS0	*Phialophora* inoculum applied.
	T	-0,P0	Combination drilled, Hereward, tr. undressed, at 380 seeds/m^2 with the Accord drill.
	T	S0,PS0	Combination drilled, Hereward, tr. fluquinconazole, at 380 seeds/m^2 with the Accord drill.
06-Oct-99	B		Rolled.
12-Nov-99	B		tm)Lexus 50 DF at 20 g in 200 l.
	B		tm)Stomp 400 SC at 2.5 l in 200 l.
	B		tm)Toppel 10 at 250 ml in 200 l.
07-Mar-00	B		34.5% N at 232 kg.
19-Apr-00	B		34.5% N at 435 kg.
24-Apr-00	B		tm)Opus at 0.5 l in 100 l.
	B		tm)Unix at 0.5 kg in 100 l.
	B		tm)BASF 3C Chlormequat 720 at 2.2 l in 100 l.

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00/R/CS/494

Experimental diary:

12-May-00	: B :	:	tm)Ally at 30 g in 200 l.
	: B :	:	tm)Starane 2 at 0.5 l in 200 l.
22-May-00	: B :	:	Opus at 0.75 l in 100 l.
27-Jun-00	: B :	:	Folicur at 0.25 l in 100 l.
29-Jun-00	: B :	:	Hand rogued wild oats.
10-Aug-00	: B :	:	Combine harvested.

Previous crops: S. wheat 1998, w. wheat 1999.

NOTE: All plots were sampled in April and June to assess root and stem base diseases.

GRAIN TONNES/HECTARE

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

Y1998	Y2000 Y1999	-0	P0	S0	PS0
(-8)	(-9)	5.98	5.47	6.80	6.60
	(P9)	5.29	5.11	6.86	6.43
	(T9)	+	+	+	+
(P8)	(-9)	5.76	+	6.69	+
	(P9)	+	5.43	+	+
	(T9)	4.45	+	5.45	+
(T8)	(-9)	6.02	+	7.17	+
	(P9)	6.12	6.50	6.91	+
	(T9)	+	+	+	+

+ TREATMENT COMBINATIONS NOT TESTED

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

Y1998
Y1999
Y2000
0.404

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	51	0.572	9.4

GRAIN MEAN DM% 82.1

PLOT AREA HARVESTED 0.00237

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00/R/CS/498

PANICUM VIRGATUM STUDY

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

Sponsors: D.G. Christian.

The third 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:

31-Mar-00	B	Gesaprim at 3.0 l in 200 l.
12-May-00	B	tm)Gesaprim at 3.0 l in 200 l.
	B	tm)Toil at 5.0 l in 200 l.
18-May-00	B	34.5% N at 58 kg.
19-May-00	B	Muriate of potash at 262 kg.
16-Jun-00	B	Starane 2 at 1.0 l in 300 l.
16-Jan-01	B	Cut.

NOTE: Harvest samples were analysed for chemical content.

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00/R/CS/498

TOTAL DRY WEIGHT TONNES/HECTARE

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

CULTIVAR	
A	16.72
B	12.11
C	12.12
D	15.30
E	11.62
F	18.49
G	11.12
H	9.00
I	18.91
J	15.08
K	12.00
L	12.89
M	14.21
N	10.28
O	10.72
X1	14.55*
X2	15.29*
X3	17.05*
Mean	13.37

* Unreplicated and not included in analysis or mean

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

CULTIVAR
1.958

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	28	2.399	17.9

MEAN DM% 72.4

PLOT AREA HARVESTED 0.00027

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00/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 third 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:

01-Apr-00	**T**		Alpha Glyphogan at 4.0 l in 220 l, spot sprayed canary grass.
	T		Duplosan at 2.0 l in 220 l, spot sprayed nettles.
08-May-00	**T**		Spannit at 1.5 l in 200 l, spot sprayed phalaris volunteers.
12-May-00	B		tm)Gesaprim at 3.0 l in 200 l.
	B		tm)Toil at 5.0 l in 200 l.
19-May-00	B		Muriate of potash at 262 kg.
25-May-00	**T**	N1	34.5% N at 72.5 kg.
	T	N2	34.5% N at 144.9 kg.
	T	N3	34.5% N at 217 kg.
	T	N4	34.5% N at 434.8 kg.
23-Jun-00	B		Dow Shield at 1.0 l in 220 l, spot sprayed thistles.
13-Feb-01	B		Cut.

NOTE: Soil water was sampled during the winter for nitrate and ammonium content. Harvest samples were analysed for chemical content.

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00/R/CS/499

TOTAL DRY WEIGHT TONNES/HECTARE

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

NITROGEN / **CULTIVAR**	N-	N3	Mean
B	16.35	10.79	13.57
CT	17.20	12.03	14.61
CR	14.94	12.79	13.86
P	11.39	11.15	11.27
S	12.64	13.39	13.02
Mean	14.50	12.03	13.27

EXTRA	N1	N2	N4	Mean
	12.10	11.06	9.80	10.99

Grand mean 12.74

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

CULTIVAR	**NITROGEN**	**CULTIVAR NITROGEN & EXTRA**
1.824	1.154	2.580

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	24	3.160	24.8

GRAIN MEAN DM% 74.3

PLOT AREA HARVESTED 0.00108

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00/R/CS/503

WINTER RAPE AND TAKE-ALL

Object: To test effects of different management regimes for winter oilseed rape on take-all (*Gaeumannomyces graminis*) in the following wheat - Great Harpenden II.

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

Design: 4 blocks of 4 x 2.

The second year.

Whole plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. **W VOLUNT** Wheat volunteers in previous rape:

(P)	Prevented
(EE)	Encouraged then destroyed early
(EL)	Encouraged then destroyed late
(E)	Encouraged

2. N Nitrogen in 1999 (kg N):

(N1)	41 in autumn and 104 in February
(N2)	41 in autumn, 104 in February and 104 in March

Experimental diary:

```
19-Aug-98 : B :      : Shakerated
20-Aug-98 : B :      : Ploughing and furrow pressing started.
21-Aug-98 : B :      : Ploughing and furrow pressing completed.
28-Aug-98 : T : W VOLUNT EE,EL,E : Combination drilled, Abbot, tr. Beret
                      Gold, at 60 seeds/m², (wheat volunteers).
          : B :      : Combination drilled, Apex, tr. Lindex-Plus FS Seed
                       Treatment, at 120 seeds/m².
29-Aug-98 : B :      : Hardy at 7.5 kg.
16-Sep-98 : B :      : Hardy at 7.5 kg.
17-Sep-98 : B :      : Decis at 250 ml in 200 l.
25-Sep-98 : B :      : 34.5% N at 120 kg.
28-Sep-98 : T : W VOLUNT P : tm) Laser at 0.7 l in 220 l.
                     : tm) Cropoil at 2.0 l in 220 l.
13-Oct-98 : B :      : Hardy at 7.5 kg.
04-Nov-98 : T : W VOLUNT EE : tm) Laser at 0.75 l in 220 l.
                    : tm) Cropoil at 2.0 l in 220 l.
04-Dec-98 : B :     : tm) Punch C at 0.4 l in 200 l.
                    : tm) Stefes Cypermethrin 2 at 250 ml in 200 l.
08-Feb-99 : T : W VOLUNT P, EE, EL : tm) Laser at 1.0 l in 220 l.
                     : tm) Cropoil at 2.0 l in 220 l.
10-Feb-99 : B :      : 34.5% N at 300 kg.
15-Mar-99 : B :      : Punch C at 0.4 l in 200 l.
17-Mar-99 : T : W VOLUNT P, EE, EL : tm) Laser at 2.25 l in 220 l.
                     : tm) Cropoil at 2.0 l in 220 l.
23-Mar-99 : T : N N2 : 34.5% N at 300 kg.
29-Apr-99 : B :      : tm) Bavistin DF at 1.0 kg in 200 l.
                     : tm) Ronilan FL at 0.5 l in 200 l.
                     : tm) Hallmark at 100 ml in 200 l.
07-Jul-99 : B :      : tm) Reglone at 3.0 l in 400 l.
                     : tm) Enhance Low Foam at 400 ml in 400 l.
17-Jul-99 : B :      : Combine harvested.
19-Jul-99 : B :      : Straw removed.
```


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00/R/CS/503

Experimental diary:

01-Sep-99	B	:	Ploughing and furrow pressing started.
02-Sep-99	B	:	Ploughing and furrow pressing completed.
14-Sep-99	B	:	Disced, rolled.
15-Sep-99	B	:	Disced.
17-Sep-99	B	:	Combination drilled, Hereward, tr. Sibutol, at 380 seeds/m^2, with the Accord drill.
22-Sep-99	B	:	Genesis at 5.0 kg.
26-Oct-99	B	:	tm) Lexus 50 DF at 20 g in 200 l.
	B	:	tm) Stomp 400 SC at 2.5 l in 200 l.
	B	:	tm) Cyperkill 10 at 250 ml in 200 l.
09-Mar-00	B	:	34.5% N at 145 kg.
06-Apr-00	B	:	tm) Topik at 125 ml in 200 l.
	B	:	tm) Toil at 0.5 l in 200 l.
19-Apr-00	B	:	34.5% N at 377 kg.
27-Apr-00	B	:	Opus at 0.4 l in 200 l.
01-May-00	B	:	Moddus at 0.2 l in 200 l.
07-May-00	B	:	tm) Sypex at 1.0 l in 200 l.
	B	:	tm) Enhance Low Foam at 80 ml in 200 l.
22-May-00	B	:	Opus at 0.75 l in 100 l.
10-Aug-00	B	:	Combine harvested.

Previous crops: W. wheat 1998, w. rape 1999.

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

GRAIN TONNES/HECTARE

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

N / **W VOLUNT**	(N1)	(N2)	Mean
(P)	7.03	7.35	7.19
(EE)	6.87	6.98	6.93
(EL)	6.61	6.36	6.49
(E)	6.57	6.64	6.60
Mean	6.77	6.83	6.80

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

W VOLUNT	**N**	**W VOLUNT N**
0.267	0.189	0.378

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	21	0.534	7.9

GRAIN MEAN DM% 83.1

PLOT AREA HARVESTED 0.00237

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00/R/CS/504

BREAK CROPS AND TAKE-ALL

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

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

Design: 4 Blocks of 7 plots.

The second year, w. wheat.

For previous year see 99/R/CS/504.

Whole plot dimensions: 6.0 x 10.0.

Treatments:

CROP	Crop in 1999:
(BE)	Winter beans
(LN)	Winter linseed
(LP)	Winter lupins
(W)	Winter wheat
(PE)	Winter peas
(RA)	Winter rape
(O)	Winter oats

Experimental diary:

01-Sep-99	B		Ploughing started.
02-Sep-99	B		Ploughing completed.
14-Sep-99	B		Disced, rolled.
15-Sep-99	B		Disced.
17-Sep-99	B		Combination drilled, Hereward, tr. Sibutol at 380 seeds/m^2, with the Accord drill.
22-Sep-99	B		Genesis at 5.0 kg.
26-Oct-99	B		tm) Lexus 50 DF at 20 g in 200 l.
	B		tm) Stomp 400 SC at 2.5 l in 200 l.
	B		tm) Cyperkill 10 at 250 ml in 200 l.
09-Mar-00	B		34.5% N at 145 kg.
06-Apr-00	B		tm) Topik at 125 ml in 200 l.
	B		tm) Toil at 0.5 l in 200 l.
19-Apr-00	B		34.5% N at 377 kg.
27-Apr-00	B		Opus at 0.4 l in 200 l.
01-May-00	B		Moddus at 0.2 l in 200 l.
07-May-00	B		tm) Sypex at 1.0 l in 200 l.
	B		tm) Enhance Low Foam at 80 ml in 200 l.
22-May-00	B		Opus at 0.75 l in 100 l.
10-Aug-00	B		Combine harvested.

Previous crops: W. wheat 1998, treatment 1999.

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

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00/R/CS/504

GRAIN TONNES/HECTARE

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

CROP	
(BE)	6.47
(LN)	7.15
(LP)	6.75
(W)	3.81
(PE)	6.53
(RA)	6.29
(O)	7.84
Mean	6.41

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

CROP
0.325

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	18	0.460	7.2

GRAIN MEAN DM% 83.3

PLOT AREA HARVESTED 0.00237

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00/R/CS/505

BREAK CROPS AND TAKE-ALL

Object: To test the effects of growing different break crops on take-all (*Gaeumannomyces graminis*) in the following wheat - Bones Close.

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

Design: 4 randomised 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
OW	Winter oats
PEW	Winter peas
RAW	Winter rape
WW	Winter wheat

Experimental diary:

28-Aug-99	B		Ploughed.
01-Sep-99	T	RAW	Combination drilled, Apex, tr. Lindex-Plus FS Seed Treatment, at 120 seeds/m^2 with the Accord drill.
03-Sep-99	T	RAW	tm)Alpha Trifluralin 48 EC at 1.0 l in 200 l.
	T	RAW	tm)Katamaran at 2.0 l in 200 l.
13-Sep-99	T	LP	Combination drilled, DTN 12, tr. Promet and Germipro, at 40 seeds/m^2 with the Accord drill.
14-Sep-99	T	RAW	PBI Slug Pellets at 8.0 kg.
17-Sep-99	T	WW	Combination drilled, Hereward, tr. Sibutol, at 380 seeds/m^2 with the Accord drill.
23-Sep-99	T	RAW	PBI Slug Pellets at 7.0 kg.
30-Sep-99	T	RAW	Genesis at 5.0 kg.
06-Oct-99	T	LNW	Combination drilled, Oliver, tr. Prelude 20 LF, at 950 seeds/m^2 with the Accord drill.
	T	OW	Combination drilled, Gerald, tr. Sibutol, at 350 seeds/m^2 with the Accord drill.
14-Oct-99	T	RAW	tm)Punch C at 0.4 l in 200 l.
	T	RAW	tm)Hallmark with Zeon Technology at 100 ml in 200 l.
19-Oct-99	T	RAW	34.5% N at 87 kg.
28-Oct-99	T	BEW	Drilled, Clipper, recleaned, at 40 seeds/m^2 with the Carrier drill.
29-Oct-99	T	PEW	Drilled, Victor, tr. Wakil, at 100 seeds/m^2 with the Carrier drill.
03-Nov-99	T	BEW	tm)Alpha Simazine 50 SC at 2.0 l in 220 l.
	T	BEW	tm)Kerb 50 W at 1.5 kg in 220 l.
	T	OW,WW	tm)Cyperkill 10 at 250 ml in 220 l.
	T	OW,WW	tm)Lexus Class WSB at 60 g in 220 l.
18-Nov-99	T	LNW	Eagle at 10 g in 220 l.
22-Nov-99	T	BEW,PEW	PDQ at 3.0 l in 220 l.
25-Nov-99	T	LP	Lo-Gran 20 WG at 12 g in 220 l.
10-Dec-99	T	LP	Hand weeded.
14-Dec-99	T	LP	Stomp 400 SC at 5.0 l in 220 l.
20-Jan-00	T	RAW	Punch C at 0.4 l in 220 l.
14-Feb-00	T	RAW	Sulphan (30% N, 7.6% S) at 166 kg, by hand.

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Experimental diary:

09-Mar-00	: **T** :	WW	:	34.5% N at 145 kg.
13-Mar-00	: **T** :	LNW	:	Eagle at 40 g in 220 l.
	: **T** :	LNW,LP,PEW	:	Falcon at 0.3 l in 220 l.
15-Mar-00	: **T** :	RAW	:	Sulphan (30.0% N, 7.6% S) at 433 kg, by hand.
17-Mar-00	: **T** :	OW	:	Orka at 0.5 l in 200 l.
01-Apr-00	: **T** :	LNW	:	Eagle at 20 g in 220 l.
	: **T** :	LP	:	Lo-Gran 20 WG at 18 g in 220 l.
19-Apr-00	: **T** :	OW	:	34.5% N at 145 kg, by hand.
	: **T** :	LNW	:	34.5% N at 262 kg, by hand.
	: **T** :	WW	:	34.5% N at 377 kg, by hand.
	: **T** :	PEW	:	Basagran SG at 1.65 kg in 330 l.
25-Apr-00	: **T** :	BEW,PEW	:	Hand rogued rape plants.
28-Apr-00	: **T** :	WW	:	tm)Ally at 30 g in 220 l.
	: **T** :	WW	:	tm)Starane 2 at 1.0 l in 220 l.
	: **T** :	WW	:	tm)Punch C at 0.8 l in 220 l.
	: **T** :	LP	:	tm)Bravo 500 at 0.5 l in 220 l.
	: **T** :	LP	:	tm)Folicur at 0.5 l in 220 l.
09-May-00	: **T** :	RAW	:	tm)Bavistin DF at 1.0 kg in 100 l.
	: **T** :	RAW	:	tm)Hallmark with Zeon Technology at 75 ml in 100 l.
22-May-00	: **T** :	WW	:	Opus at 0.75 l in 220 l.
	: **T** :	BEW	:	tm)Bravo 500 at 1.0 l in 220 l.
	: **T** :	BEW	:	tm)Folicur at 0.5.1 in 220 l.
	: **T** :	PEW	:	tm)Bravo 500 at 2.0 l in 220 l.
	: **T** :	PEW	:	tm)Ronilan FL at 0.75 l in 220 l.
24-May-00	: **T** :	OW	:	27.0% N at 259 kg, by hand.
16-Jun-00	: **T** :	OW,WW	:	Folicur at 0.75 l in 200 l.
	: **T** :	PEW	:	tm)Compass at 3.0 l in 200 l.
	: **T** :	PEW	:	tm)Aphox at 280 g in 200 l.
04-Jul-00	: **T** :	LP	:	tm)Folicur at 0.5 l in 200 l.
	: **T** :	LP	:	tm)Aphox at 280 g in 200 l.
	: **T** :	LP	:	tm)Enhance Low Foam at 50 ml in 200 l.
12-Jul-00	: **T** :	RAW	:	Azural at 4.0 l in 200 l.
23-Jul-00	: **T** :	RAW	:	Combine harvested.
25-Jul-00	: **T** :	RAW	:	Baled straw.
26-Jul-00	: **T** :	LNW	:	tm)Enhance Low Foam at 400 ml in 400 l.
	: **T** :	LNW	:	tm)Reglone at 3.0 l in 400 l.
31-Jul-00	: **T** :	PEW	:	Combine harvested.
01-Aug-00	: **T** :	LNW	:	Combine harvested.
02-Aug-00	: **T** :	OW	:	Combine harvested.
	: **T** :	LNW,OW,PEW	:	Baled straw.
06-Aug-00	: **T** :	WW	:	Combine harvested.
13-Aug-00	: **T** :	WW	:	Baled straw.
17-Aug-00	: **T** :	BEW	:	Combine harvested.
06-Sep-00	: **T** :	LP	:	Combine harvested.

Previous crops: W. wheat 1998 and 1999.

NOTE: Wheat samples were taken in June to assess root and stem base diseases. Soil was sampled after harvest and used in bioassays to measure the take-all infectivity.

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00/R/CS/505

GRAIN TONNES/HECTARE

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

CROP	
BEW	4.28
LNW	1.12
LP	1.51
OW	9.50
PEW	3.96
RAW	4.66
WW	5.96
Mean	4.43

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

CROP
0.495

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	18	0.699	15.8

GRAIN MEAN DM% 78.8

PLOT AREA HARVESTED 0.00240 (EXCEPT BEANS 0.00150)

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00/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 second year, w. wheat.

For previous year see 99/R/CS/508.

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

Plot dimensions: 6.0 x 10.0.

Treatments:

1. **S1999**	Seed dressing and year applied:	
(-99)	1999 none	
(F99)	1999 fluquinconazole	
2. **S2000**	Seed dressing and year applied:	
-00	2000 none	
F00	2000 fluquinconazole and prochloraz	

Randomised for treatments as above in two subsequent years

Experimental diary:

02-Sep-99	B		Shallow (10 cm) ploughed.
04-Sep-99	B		Rolled.
04-Oct-99	**T**	-00	Combination drilled, Hereward, undressed, at 380 seeds/m^2 with the Accord drill.
	T	F00	Combination drilled, Hereward, tr. fluquinconazole, at 380 seeds/m^2 with the Accord drill.
06-Oct-99	B		Rolled.
12-Nov-99	B		tm) Lexus 50 DF at 20 g in 200 l.
	B		tm) Stomp 400 SC at 2.5 l in 200 l.
	B		tm) Toppel 10 at 250 ml in 200 l.
07-Mar-00	B		34.5% N at 232 kg.
19-Apr-00	B		34.5% N at 435 kg.
24-Apr-00	B		tm) Opus at 0.5 l in 100 l.
	B		tm) Unix at 0.5 kg in 100 l.
	B		tm) BASF 3C Chlormequat 720 at 2.2 l in 100 l.
12-May-00	B		tm) Ally at 30 g in 200 l.
	B		tm) Starane 2 at 0.5 l in 200 l.
22-May-00	B		Opus at 0.75 l in 100 l.
27-Jun-00	B		Folicur at 0.25 l in 100 l.
29-Jun-00	B		Hand rogued wild oats.
11-Aug-00	B		Combine harvested.

Previous crops: S. wheat 1998, w. wheat 1999.

NOTE: Plant and soil samples were taken in June to assess root and stem base diseases, take-all infectivity of the soil and diversity of fungal communities on roots.

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00/R/CS/508

GRAIN TONNES/HECTARE

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

S2000 S1999	-00	F00	Mean
(-99)	6.40	6.69	6.55
(F99)	6.06	6.53	6.30
Mean	6.23	6.61	6.42

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

S1999	S2000	S1999 S2000
0.265	0.265	0.375

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	57	1.061	16.5

GRAIN MEAN DM% 83.2

PLOT AREA HARVESTED 0.00240

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00/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 second year, w. wheat.

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

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** Type of rape grown in 1999:

   (RR) Glyphosate resistant
   (LL) Glufosinate resistant
   (IME) Imazamox resistant
   (CON) Conventional

Experimental diary:

24-Jul-99	**T**	R2	Ploughed.
18-Aug-99	B		Triple superphosphate at 580 kg.
25-Aug-99	**T**	R1	Ploughed.
06-Sep-99	**T**	R2	tm) PDQ at 3.0 l in 200 l.
	T	R2	tm) Enhance Low Foam at 100 ml in 200 l.
09-Sep-99	B		Combination drilled, Riband, at 250 seeds/m^2 with the Accord drill.
	B		Rolled.
14-Sep-99	B		PBI Slug Pellets at 8.0 kg.
15-Oct-99	B		Cyperkill 10 at 250 ml in 200 l.
03-Nov-99	B		tm) Duplosan at 0.5 l in 200 l.
	B		tm) Tolkan Turbo at 2.0 l in 200 l.
	B		tm) Cyperkill 10 at 250 ml in 200 l.
14-Dec-99	B		tm) Hawk at 2.5 l in 200 l.
	B		tm) Cropoil at 1.0 l in 200 l.
01-Apr-00	B		tm) BASF 3C Chlormequat 720 at 2.0 l in 200 l.
	B		tm) Moddus at 0.2 l in 200 l.
24-Apr-00	B		Landmark at 0.5 l in 100 l.
27-Apr-00	B		Sulphur Gold (30.0% N, 7.6% S), at 500 kg.
16-Aug-00	B		Combine harvested.

Previous crops: W. oats 1998, w. rape 1999.

NOTES: (1) Estimates of seed loss from combine harvesting were made in July and August 1999. Weed populations were assessed in October and March. Rape seed in soil samples were counted in January and weed biomass was measured in June.

(2) Because of contractual reasons the yields are not published in this edition.

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00/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 second year, w. rape.

Design: 3 randomised blocks of 4 plots split into 4 sub-plots.

Whole plot dimensions: 12.0 x 48.0.
Sub-plot dimensions: 12.0 x 12.0.

Treatments:

Whole plots

RES 1999	Type of rape undersown into w. wheat in 1999:
(RR)	Glyphosate resistant
(LL)	Glufosinate resistant
(IME)	Imazamox resistant
(CON)	Conventional

Sub-plots

RES 2000	Rape; conventional or herbicide resistant sown in 2000 (seed dressing in brackets):
RR	Glyphosate resistant (tr. Rovral Liquid FS)
LL	Glufosinate resistant (tr. Rovral Liquid FS)
IME	Imazamox resistant (tr. Rovral Liquid FS)
CON	Conventional; Apex (tr. Lindex-Plus FS Seed Treatment)

Experimental diary:

18-Aug-99	B		Triple superphosphate at 580 kg.
26-Aug-99	B		Ploughing started.
27-Aug-99	B		Ploughing completed.
09-Sep-99	B		Cleaver seed broadcast.
10-Sep-99	**T**		Combination drilled, varieties at 120 seeds/m^2 with the Accord drill. Rolled.
11-Sep-99	**T**	CON	tm) Katamaran at 2.0 l in 220 l.
	T	CON	tm) Alpha Trifluralin 48 EC at 2.0 l in 220 l.
14-Sep-99	B		PBI Slug Pellets at 8.0 kg.
14-Oct-99	B		tm) Punch C at 0.4 l in 200 l.
	B		tm) Hallmark at 100 ml in 200 l.
20-Oct-99	B		34.5% N at 87 kg.
27-Oct-99	**T**	IME	Imazamox at 1.75 l in 220 l.
28-Oct-99	**T**	RR	Roundup Biactive at 2.0 l in 220 l.
29-Oct-99	**T**	LL	Liberty at 3.0 l in 220 l.
16-Dec-99	B		Punch C at 0.4 l in 200 l.
09-Feb-00	B		Sulphan (30% N, 7.6% S) at 166 kg.
06-Mar-00	B		Sulphan (30% N, 7.6% S) at 433 kg.
09-May-00	B		tm) Bavistin DF at 1.0 kg in 50:50 mix with Bavistin FL at 1.0 l in 200 l.

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00/R/CS/512

Experimental diary:

09-May-00	B		tm) Hallmark with Zeon Technology at 75 ml in 200 l.
12-Jul-00	B		tm) Enhance Low Foam at 400 ml in 400 l.
	B		tm) Reglone at 3.0 l in 400 l.
25-Jul-00	B		Combine harvested.

Previous crops: W. oats 1998, w. wheat 1999.

NOTES: (1) Estimates of seed loss from combine harvesting were made in July and August 1999. Weed populations were assessed in October, November and January. Percentage flowering was assessed in April and May and weed biomass was measured in June.

(2) Because of contractual reasons the yields are not published in this edition.

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00/W/CS/527

SULPHUR AND MALTING BARLEY

Object: To test types and rates of sulphur fertilizer on the yield and quality of winter malting barley - Woburn, Butt Close II.

Sponsors: F.J. Zhao.

Design: 4 randomised blocks of 5 plots.

Plot dimensions: 3.0 x 12.0.

Treatments:-

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

Experimental diary:

06-Sep-99	B		Ploughed and furrow pressed.
14-Sep-99	B		Dutch harrowed.
	B		Drilled, Regina, tr. Raxil S, at 300 seeds/m^2 with the Accord drill.
12-Oct-99	B		tm) Stomp 400 SC at 2.5 l in 200 l.
	B		tm) Cyperkill 10 at 250 ml in 200 l.
	B		tm) Isoguard at 1.0 l in 200 l.
23-Mar-00	**T**	S1,S2,S4	Gypsum at 57, 114 and 229 kg respectively.
	T	S2T	Thiovit at 25 kg.
	B		34.5% N at 145 kg.
08-May-00	B		tm) Vytel Manganese at 3.0 l in 200 l.
	B		tm) Amistar at 0.5 l in 200 l.
	B		tm) Folicur at 0.5 l in 200 l.
	B		tm) BASF 3C Chlormequat 720 at 2.0 l in 200 l.
09-May-00	B		34.5% N at 217 kg.
20-May-00	B		tm) Amistar at 0.8 l in 200 l.
	B		tm) Opus at 0.5 l in 200 l.
31-Jul-00	B		Combine harvested.

Previous crops: W. wheat 1998, s. peas 1999.

NOTE: Crop samples were taken at stem extension and grain at harvest for nitrogen and sulphur content. Grain was also tested for malting quality.

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00/W/CS/527

GRAIN TONNES/HECTARE

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

SULPHUR	
S0	3.17
S1	4.11
S2	3.91
S4	4.21
S2T	4.75
Mean	4.03

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

SULPHUR
0.470

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.665	16.5

GRAIN MEAN DM% 86.5

PLOT AREA HARVESTED 0.00240

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00/W/CS/530

EFFECTS ON TAKE-ALL OF VARIOUS STROBILURINS

Object: To measure effects on take-all (*Gaeumannomyces graminis*) of various strobilurin fungicides - Woburn, Broad Mead I-IV.

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

Design: 4 randomised blocks of 8 plots.

Plot dimensions: 3.0 x 10.0.

Treatments:-

FUNGICIDE

-	None (duplicated)
A	Azoxystrobin at 250 g a.i.
K	Kresoxim-methyl at 250 g a.i.
F	Trifloxystrobin at 250 g a.i.
X	HGCA X at 250 g a.i.
Y	HGCA Y at 250 g a.i.
Z	HGCA Z at 250 g a.i.

NOTE: HGCA X, Y and Z are under commercial development, composition disclosed in confidence.

Experimental diary:

04-Sep-99	B		Ploughed and furrow pressed.
10-Sep-99	B		Disced.
15-Sep-99	B		Disced.
16-Sep-99	B		Combination drilled, Consort, tr. Sibutol, at 300 seeds/m^2 with the Nordsten drill.
12-Oct-99	B		Cyperkill 10 at 250 ml in 200 l.
05-Mar-00	B		tm) Hawk at 2.5 l in 200 l.
	B		tm) Lexus 50 DF at 20 g in 200 l.
	B		tm) Cropoil at 1.0 l in 200 l.
27-Apr-00	**T**	A,K,F,X,Y,Z	Treatments applied.
30-Apr-00	B		tm) Profol 500 at 0.5 l in 200 l.
	B		tm) Vytel Copper at 0.4 l in 200 l.
	B		Opus at 0.5 l in 200 l.
	B		tm) BASF 3C Chlormequat 720 at 2.0 l in 200 l.
	B		tm) Moddus at 0.2 l in 200 l.
02-May-00	B		Sulphan (30.0% N, 7.6% S) at 500 kg.
20-May-00	B		tm) Opus at 0.75 l in 200 l.
	B		tm) Sipcam UK Rover 500 at 1.0 l in 200 l.
	T	A,K,F,X,Y,Z	Treatments applied.
18-Aug-00	B		Combine harvested.

Previous crops: W. wheat 1998 and 1999.

NOTE: Plant samples were assessed in June for root and stem base diseases.

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00/W/CS/530

GRAIN TONNES/HECTARE

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

FUNGICIDE

-	7.31
A	8.42
K	7.69
F	8.03
X	7.51
Y	7.94
Z	8.45
Mean	7.83

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

FUNGICIDE

0.451	min.rep
0.391	max-min

FUNGICIDE

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	22	0.638	8.1

GRAIN MEAN DM% 84.5

PLOT AREA HARVESTED 0.00237

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00/R/WW/3

WINTER WHEAT

PLANT N INDICATORS

Object: To calibrate plant monitoring methods for fine-tuning nitrogen fertiliser applications - Fosters.

Sponsor: P.B. Barraclough.

Design: 3 randomised blocks of 19 plots.

Whole plot dimensions: 3.0 x 20.0.

Treatments:

NITROGEN Kg N and timing:

	Mid-March GS 24	Late April GS 31	Mid-May GS 37	Early June GS 51	Total
-	0	0	0	0	0
A	50	0	0	0	50
B	50	0	50	0	100
C	50	0	100	0	150
D	50	0	0	100	150
E	50	50	0	0	100
F	50	50	50	0	150
G	50	50	100	0	200
H	50	50	0	100	200
I	50	100	0	0	150
J	50	100	50	0	200
K	50	100	100	0	250
L	50	100	0	100	250
M	50	150	0	0	200
N	50	150	50	0	250
O	50	150	100	0	300
P	50	150	0	100	300
Q	50	200	0	0	250
R	50	250	0	0	300

Experimental diary:

01-Sep-99	B	:	Ploughed.
15-Sep-99	B	:	Tiger 90 at 15.0 kg. Combination drilled, Hereward, tr. Sibutol, at 300 seeds/m^2 with the Accord drill.
27-Oct-99	B	:	tm) Lexus 50 DF at 20 g in 200 l.
	B	:	tm) Stomp 400 SC at 2.5 l in 200 l.
	B	:	tm) Cyperkill 10 at 250 ml in 200 l.
14-Mar-00	**T**	:	Nitrogen applied as 34.5% N (GS 24).
21-Mar-00	B	:	tm) Ally at 30 g in 200 l.
	B	:	tm) Starane 2 at 0.75 l in 200 l.
	B	:	tm) Topik at 125 ml in 200 l.
	B	:	tm) Toil at 1.0 l in 200 l.
25-Apr-00	B	:	tm) BASF 3C Chlormequat 720 at 2.0 l in 200 l.
	B	:	tm) Moddus at 0.2 l in 200 l.
28-Apr-00	**T**	:	Nitrogen applied as 34.5% N (GS 31).

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00/R/WW/3

Experimental diary:

09-May-00	: B :	:	tm) Opus at 0.5 l in 100 l.
	: B :	:	tm) Unix at 0.5 kg in 100 l.
18-May-00	: **T** :	:	Nitrogen applied as 34.5% N (GS 37).
20-May-00	: B :	:	tm) Bravo 500 at 1.0 l in 200 l.
	: B :	:	tm) Opus at 0.75 l in 200 l.
02-Jun-00	: **T** :	:	Nitrogen applied as 34.5% N (GS 51).
29-Jun-00	: B :	:	Hand rogued wild oats.
07-Jul-00	: B :	:	Hand rogued wild oats.
16-Aug-00	: **T** :	:	Combine harvested.

Previous crops: S. beans 1998, w. oats 1999.

NOTES: (1) Some plots received the wrong nitrogen fertilizer in June. 7 plots were lost with treatment combinations; one of each B, C, G, K, M and two of Q, a plot with treatment P was created. Estimated values were used in the analysis.

(2) Soil was sampled in February for nitrogen content. Crop reflectance measurements were taken in March and April. Chlorophyll meter (SPAD) readings were taken during May and June. Assessments of BYDV damage were made in May. Plant nitrogen content (JUBIL) was measured in May and an assessment of lodging in July.

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00/R/WW/3

GRAIN TONNES/HECTARE

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

NITROGEN

-	4.37
A	6.07
B	7.55
C	8.83
D	7.50
E	8.15
F	8.89
G	9.98
H	9.13
I	8.93
J	10.22
K	10.75
L	10.37
M	10.04
N	10.66
O	10.54
P	10.76
Q	10.41
R	10.86
Mean	9.17

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

NITROGEN
0.215

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	30	0.263	2.9

GRAIN MEAN DM% 83.3

PLOT AREA HARVESTED 0.00359 (AVERAGE)

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00/R/WW/4

WINTER WHEAT

FUSARIUM STUDY

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

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

Design: 3 randomised blocks of 12 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:

11-Sep-99	B		Ploughed.
12-Oct-99	**T**	D O	Combination drilled, Charger, recleaned, at 380 seeds/m^2 with the Accord drill.
	T	H O,H A,H B,H C	Combination drilled, Charger, tr. Sibutol, at 380 seeds/m^2 with the Accord drill.
	B		Rolled.
29-Oct-99	B		Genesis at 5.0 kg.
13-Dec-99	B		tm)Lexus 50 DF at 20 g in 200 l.
	B		tm)Stomp 400 SC at 2.5 l in 200 l.
	B		tm)Toppel 10 at 250 ml in 200 l.
08-Mar-00	B		34.5% N at 232 kg.
21-Mar-00	B		Topik at 250 ml in 200 l.
01-Apr-00	B		tm)BASF 3C Chlormequat 720 at 2.0 l in 200 l.
	B		tm)Moddus at 0.2 l in 200 l.
07-Apr-00	**T**	H A	Inoculated with colonised sterile oat grain, at 1.5 kg to the central 3 x 6 metre area of each plot.
19-Apr-00	B		34.5% N at 377 kg.
12-May-00	B		tm)Ally at 30 g in 200 l.
	B		tm)Starane 2 at 0.5 l in 200 l.
09-Jun-00	**T**	I	Mist irrigated, completed 19-Jun-00.
	T	H B	Inoculated ears.

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00/R/WW/4

Experimental diary:
09-Jun-00 : **T** : H C : Inoculated ears.
17-Aug-00 : B : : Combine harvested.

Previous crops: W. wheat 1998, w. oats 1999.

NOTE: Ear samples were taken from selected plots during ripening to identify fungi on grains. Whole plant samples were taken in July to assess stem base *fusarium*. Fungal populations and mycotoxins were identified and quantified in fresh grain at harvest.

GRAIN TONNES/HECTARE

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

T / **IRRIGATN**	D O	H O	H A	H B	H C	Mean
-	7.00	7.01	7.07	6.52	7.29	6.98
I	6.83	7.07	6.85	5.79	6.91	6.71
Mean	6.92	7.04	6.96	6.15	7.10	6.85

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

IRRIGATN	**T**	**IRRIGATN** **T**	
	0.208	0.294	min.rep
0.120	0.180	0.255	max-min
		0.208	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	0.360	5.3

GRAIN MEAN DM% 83.9

PLOT AREA HARVESTED 0.00144

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00/R/WW/5

WINTER WHEAT

SEMIOCHEMICALS AND APHIDS

Object: To test semiochemicals on cereal aphids and their parasitoids - Sawyers II.

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

Design: 4 x 4 Latin square.

Whole plot dimensions: 6.0 x 6.0.

Treatments:

SEMICHEM	Semiochemicals:
-	None
N	Nepetalactone
M	AJH/8/158
NS	Nepetalactone and AJH/8/158

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

Experimental diary:

30-Aug-99	B		Ploughed.
07-Sep-99	B		Rolled. Combination drilled, Riband, tr. Sibutol, at 200 seeds/m^2 with the Accord drill. Rolled.
05-Oct-99	**T**	M,NS	AJH/8/158 at 50 g a.i. in 200 l.
	T	N,NS	Nepetalactone applied.
03-Nov-99	B		Lexus Class WSB at 60 g in 200 l.
24-Feb-00	B		tm)Hawk at 2.5 l in 220 l.
	B		tm)Tolkan Turbo at 2.0 l in 220 l.
	B		tm)Cropoil at 1.0 l in 2201 l.
08-Mar-00	B		34.5% N at 232 kg.
25-Apr-00	B		tm)BASF 3C Chlormequat 720 at 2.0 l in 200 l.
	B		tm)Moddus at 0.2 l in 200 l.
27-Apr-00	B		34.5% N at 348 kg.
01-May-00	B		tm)Opus at 0.5 l in 200 l.
	B		tm)Unix at 0.5 kg in 200 l.
12-May-00	**T**	M,NS	AJH/8/158 at 50 g a.i. in 200 l.
22-May-00	B		Folicur at 0.75 l in 100 l.
25-May-00	**T**	N,NS	Nepetalactone applied.
17-Aug-00	B		Combine harvested.

Previous crops: W. wheat 1998, set-aside 1999.

NOTES: (1) Nepetalactone was dispensed from point-sources placed at the centre of the plots.
(2) Assessments of aphid and aphid numbers were made on five occasions in October and November and seven occasions in May and June.

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00/R/WW/5

GRAIN TONNES/HECTARE

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

SEMICHEM

-	5.86
N	6.30
M	6.32
NS	5.94
Mean	6.11

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

SEMICHEM

0.371

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

Stratum	d.f.	s.e.	cv%
ROW.COL	6	0.524	8.6

GRAIN MEAN DM% 85.5

PLOT AREA HARVESTED 0.00228

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00/R/WW/6

WINTER WHEAT

HERBICIDE RESISTANT BLACK-GRASS

Object: To evaluate the efficacy of different herbicide treatments on a herbicide-resistant black-grass population - Claycroft.

Sponsors: S.R. Moss.

Design: 4 randomised blocks of 15 plots.

Whole plot dimensions: 3.0 x 12.0.

Treatments:

HERBICIDE	Herbicide type, rate of active ingredient and timing (black-grass growth stage):
A	Isoproturon at 2.5 kg post emergence
B	Tri-allate at 2.25 kg pre-emergence and trifluralin at 0.96 kg with isoproturon at 1.5 kg post emergence
C	Tri-allate at 2.25 kg pre-emergence and pendimethalin at 1.32 kg with isoproturon at 1.5 kg post emergence
D	Trifluralin at 0.96 kg pre-emergence and flupyrsulfuron-methyl at 0.01 kg with pendimethalin at 1.32 kg post emergence
E	Tri-allate at 2.25 kg pre-emergence and flupyrsulfuron-methyl at 0.01 kg with pendimethalin at 1.32 kg post emergence
F	Tri-allate at 2.25 kg pre-emergence and flupyrsulfuron-methyl at 0.01 kg with trifluralin at 0.96 kg post emergence
G	Tri-allate at 2.25 kg pre-emergence and clodinafop-propargyl at 0.03 kg with trifluralin at 0.96 kg and adjuvant at two leaf stage
H	Tri-allate at 2.25 kg pre-emergence and clodinafop-propargyl at 0.03 kg with trifluralin at 0.96 kg, flupyrsulfuron at 0.01 kg and adjuvant at two leaf stage
J	Fenoxaprop-P-ethyl at 0.069 kg at two leaf stage
K	Compound K at two leaf stage
L	Compound L pre-emergence
M	Compound M pre-emergence
N	Compound N at two leaf stage with adjuvant
O	None (duplicated)

NOTE: Herbicides K, L, M and N are under commercial development, composition undisclosed.

Experimental diary:

29-Aug-99	B		: Ploughing started.
30-Aug-99	B		: Ploughing completed.
31-Aug-99	B		: Rotary harrowed.
03-Sep-99	B		: Rolled.
14-Sep-99	B		: Disced.
16-Sep-99	B		: Combination drilled, Consort, tr. Sibutol at 350 seeds/m^2 with the Nordsten drill.
21-Sep-99	**T**	D	: Alpha Trifluralin 48 EC at 2.0 l in 220 l.
	T	L	: Compound L at 4.0 l in 220 l.
	T	M	: Compound M at 1.0 kg in 220 l.

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00/R/WW/6

Experimental diary:

22-Sep-99	: B	:	:	Genesis at 5.0 kg.
	: **T**	: B,C,E,F,G,H	:	Avadex Excel 15G at 15.0 kg.
15-Oct-99	: B	:	:	Cyperkill 10 at 250 ml in 200 l.
26-Oct-99	: **T**	: A	:	Isoguard at 5.0 l in 220 l.
	: **T**	: B	:	tm) Isoguard at 3.0 l in 220 l.
	: **T**	: B	:	tm) Alpha Trifluralin 48 EC at 2.0 l in 220 l.
	: **T**	: C	:	tm) Isoguard at 3.0 l in 220 l.
	: **T**	: C	:	tm) Stomp 400 SC at 3.3 l in 220 l.
	: **T**	: D,E	:	tm) Lexus 50 DF at 20 g in 220 l.
	: **T**	: D,E	:	tm) Stomp 400 SC at 3.3 l in 220 l.
	: **T**	: F	:	tm) Lexus 50 DF at 20 g in 220 l.
	: **T**	: F	:	tm) Alpha Trifluralin 48 EC at 2.0 l in 220 l.
15-Nov-99	: **T**	: G	:	tm) Hawk at 2.5 l in 220 l.
	: **T**	: G	:	tm) Actipron at 1.1 l in 220 l.
	: **T**	: H	:	tm) Hawk at 2.5 l in 220 l.
	: **T**	: H	:	tm) Actipron at 1.1 l in 220 l.
	: **T**	: H	:	tm) Lexus 50 DF at 20 g in 220 l.
	: **T**	: J	:	Cheetah Super at 1.25 l in 220 l.
	: **T**	: K	:	tm) Compound K in 220 l.
	: **T**	: N	:	tm) Compound N in 220 l.
	: **T**	: N	:	tm) Agral at 0.22 l in 220 l.
31-Mar-00	: B	:	:	Avenge 2 at 3.3 l in 200 l.
18-Apr-00	: B	:	:	34.5% N at 580 kg.
29-Apr-00	: B	:	:	Landmark at 0.5 l in 200 l.
12-May-00	: B	:	:	tm) Ally at 30 g in 200 l.
	: B	:	:	tm) Starane 2 at 0.5 l in 200 l.
20-May-00	: B	:	:	Landmark at 1.0 l in 100 l.
15-Aug-00	: B	:	:	Combine harvested.

Previous crops: W. wheat 1998 and 1999.

NOTE: Black-grass populations were assessed in March and heads counted in June.

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00/R/WW/6

GRAIN TONNES/HECTARE

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

HERBCIDE	
A	4.93
B	7.47
C	7.50
D	7.26
E	7.92
F	7.20
G	7.53
H	7.41
J	4.87
K	7.66
L	6.63
M	3.73
N	5.41
O	3.72
Mean	6.20

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

HERBCIDE	
0.566	min.rep
0.490	max-min

HERBCIDE
max-min O 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	43	0.800	12.9

GRAIN MEAN DM% 85.8

PLOT AREA HARVESTED 0.00230

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00/R/WW/7

WINTER WHEAT

SEPTORIA LEAF BLOTCH ON WINTER WHEAT

Object: To study the role of wind-dispersed ascospores and splash-dispersed conidia in the epidemiology of septoria leaf blotch on winter wheat - Harwoods Piece

Sponsors: A.H. Rajasab, B.D.L. Fitt, W.Z. Tan.

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

Whole plot dimensions: 3.0 x 15.0.

Treatments: All combinations of:-

1. **GS32** Fungicides at growth stage 32:

   32- Flutriafol
   32S Azoxystrobin with flutriafol

2. **GS39** Fungicides at growth stage 39:

   39- Flutriafol
   39S Azoxystrobin with flutriafol

3. **SEEDTRT** Seed treatment:

   \- None
   F Fluquinconazole

Experimental diary:

22-Jul-99	B			Ploughing and furrow pressing started.
23-Jul-99	B			Ploughing and furrow pressing completed.
08-Sep-99	**T**	-		Combination drilled, Riband, recleaned, at 200 seeds/m^2 with the Accord drill.
	T	F		Combination drilled, Riband, tr. fluquinconazole, at 200 seeds/m^2 with the Accord drill.
	B			Rolled.
22-Sep-99	B			Genesis at 5.0 kg.
15-Oct-99	B			tm) Lexus 50 DF at 20 g in 200 l.
	B			tm) Stomp 400 SC at 2.5 l in 200 l.
	B			tm) Cyperkill 10 at 250 ml in 200 l.
10-Mar-00	B			34.5% N at 145 kg.
25-Apr-00	B			tm) BASF 3C Chlormequat 720 at 2.0 l in 200 l.
	B			tm) Moddus at 0.2 l in 200 l.
27-Apr-00	**T**	32-		Pointer at 1.0 l in 220 l.
	T	32S		tm) Amistar at 0.6 l with Pointer at 1.0 l in 220 l.
04-May-00	B			34.5% N at 435 kg.
10-May-00	B			Plantvax 20 at 2.0 l in 100 l.
20-May-00	**T**	39-		Pointer at 1.0 l in 220 l.
	T	39S		tm) Amistar at 0.8 l with Pointer at 1.0 l in 220 l.
16-Aug-00	B			Combine harvested.

Previous crops: W. barley 1998, set-aside 1999.

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00/R/WW/7

NOTE: Samples were taken weekly from April to July to record the development of *tritici* leaf blotch.

GRAIN TONNES/HECTARE

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

GS32	32-	32S	Mean
SEEDTRT			
-	7.93	9.48	8.70
F	7.38	8.68	8.03
Mean	7.66	9.08	8.37

GS39	39-	39S	Mean
SEEDTRT			
-	7.89	9.52	8.70
F	6.89	9.18	8.03
Mean	7.39	9.35	8.37

GS39	39-	39S	Mean
GS32			
32-	6.68	8.63	7.66
32S	8.10	10.06	9.08
Mean	7.39	9.35	8.37

	GS39	39-	39S
SEEDTRT	**GS32**		
-	32-	7.18	8.68
	32S	8.60	10.36
F	32-	6.19	8.58
	32S	7.60	9.77

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

SEEDTRT	**GS32**	**GS39**	**SEEDTRT GS32**
0.189	0.189	0.189	0.267

SEEDTRT GS39	**GS32 GS39**	**SEEDTRT GS32 GS39**
0.267	0.267	0.378

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	14	0.463	5.5

GRAIN MEAN DM% 85.8

PLOT AREA HARVESTED 0.00360

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00/R/WW/10

WINTER WHEAT

VARIETIES AND N

Object: To compare chlorophyll meter readings on different varieties of wheat as an indicator of nitrogen content and potential yield - Appletree.

Sponsors: C.G. Peters, J. Kyte, P.B. Barraclough.

Design: 4 randomised blocks of 3 x 5.

Whole plot dimensions: 3.0 x 11.0.

Treatments: All combinations of:-

1. **NITROGEN** Kg N:

	Early	Later	Total
N1	0	0	0
N2	50	0	50
N3	50	50	100
N4	50	100	150
N5	50	150	200

2. **CULTIVAR**

CH	Charger
MD	Madrigal
ML	Malacca
RI	Rialto
SH	Shamrock
SV	Savannah

Experimental diary:

06-Sep-99	B		Glyphogan at 3.0 l in 200 l (to ex-99/R/RAW/1 site only).
14-Sep-99	B		PBI Slug Pellets at 8.0 kg.
01-Oct-99	**T**		Combination drilled, varieties, tr. Sibutol, at 380 seeds/m^2 with the Accord drill.
02-Oct-99	B		Genesis at 5.0 kg.
08-Oct-99	B		Genesis at 5.0 kg.
08-Nov-99	B		tm)Duplosan at 0.5 l in 200 l.
	B		tm)Tolkan Liquid at 2.0 l in 200 l.
	B		tm)Cyperkill 10/Toppel 10 (ratio 2:3) at 250 ml in 200 l.
26-Feb-00	B		tm)Ally at 20 g in 200 l.
	B		tm)Hawk at 2.0 l in 200 l.
	B		tm)Cropoil at 1.0 l in 200 l.
14-Mar-00	**T**	N2,N3,N4,N5	34.5% N at 145 kg.
01-Apr-00	B		tm)BASF 3C Chlormequat 720 at 2.0 l in 200 l.
	B		tm)Moddus at 0.2 l in 200 l.
27-Apr-00	B		tm)Boxer at 100 ml in 200 l.
	B		tm)Amistar at 0.6 l in 200 l.
	B		tm)Opus at 0.4 l in 200 l.

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Experimental diary:

03-May-00	: **T** : N3	: 34.5% N at 145 kg.
	: **T** : N4	: 34.5% N at 290 kg.
	: **T** : N5	: 34.5% N at 435 kg.
22-May-00	: B :	: tm) Amistar at 0.8 l in 100 l.
	: B :	: tm) Folicur at 0.5 l in 100 l.
13-Aug-00	: B :	: Combine harvested.

NOTES: (1) Some plots were severely lodged before harvest.
(2) Soils were sampled in February for nitrogen content. Chlorophyll meter readings were taken in spring and summer and crop sampled for nitrogen and chlorophyll content of leaves. Lodging assessments were made in July and August. Grain was analysed for nitrogen content.

Previous crops: W. barley 1998, w. rape 1999.

GRAIN TONNES/HECTARE

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

NITROGEN / **CULTIVAR**	N1	N2	N3	N4	N5	Mean
CH	9.53	9.80	10.49	10.07	9.63	9.90
MD	10.13	10.32	11.49	11.29	10.81	10.81
ML	9.90	10.11	10.43	10.65	10.54	10.33
RI	9.01	9.86	10.11	10.57	10.23	9.96
SH	8.90	9.51	10.23	10.60	10.47	9.94
SV	10.33	10.81	11.10	11.18	10.60	10.81
Mean	9.63	10.07	10.64	10.73	10.38	10.29

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

CULTIVAR	**NITROGEN**	**CULTIVAR NITROGEN**
0.157	0.143	0.351

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	87	0.496	4.8

GRAIN MEAN DM% 86.5

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00/R/WW/10

STRAW TONNES/HECTARE

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

NITROGEN	N1	N2	N3	N4	N5	Mean
CULTIVAR						
CH	6.54	7.02	7.37	7.10	7.26	7.06
MD	6.86	6.69	7.52	7.74	8.04	7.37
ML	7.54	8.02	7.83	7.99	8.14	7.90
RI	7.90	8.97	8.87	9.11	8.82	8.73
SH	7.59	8.40	8.26	8.56	8.32	8.23
SV	7.69	7.87	7.82	8.50	7.92	7.96
Mean	7.35	7.83	7.94	8.17	8.08	7.88

STRAW MEAN DM% 75.3

PLOT AREA HARVESTED 0.00216

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00/R/WW/11

WINTER WHEAT

SEED TREATMENTS AND NITROGEN

Object: To study interactions between fluquinconazole seed treatment and amounts of nitrogen fertiliser - Bones Close.

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

Design: 4 randomised blocks of (6 x 2).

Whole plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

2. **NITROGEN** Kg N:

	Early	Later	Total	
N1	50	0	50	
N2	50	50	100	
N3	50	100	150	
N4	50	150	200	
N5	50	200	250	
N4+	50	150	200	+ (**NITROGEN** and foliar fungicides; azoxystrobin and fluquinconazole applied twice)

2. **SEED TRT** Seed treatment:

S	Bitertanol and fuberidazole (Sibutol)
SF	Bitertanol, fuberidazole and fluquinconazole (Sibutol and Jockey Flexi)

Experimental diary:

28-Sep-99	B		Ploughed.
08-Oct-99	**T**	S	Combination drilled, Rialto, tr. Sibutol, at 380 seeds/m^2 with the Accord drill.
	T	SF	Rotary harrowed, drilled, Rialto, tr. Sibutol and Jockey Flexi at 380 seeds/m^2 with the Accord drill.
	B		Genesis at 5.0 kg.
13-Dec-99	B		tm) Lexus 50 DF at 20 g in 200 l.
	B		tm) Stomp 400 SC at 2.5 l in 200 l.
	B		tm) Toppel 10 at 250 ml in 200 l.
09-Mar-00	B		34.5% N at 145 kg.
19-Apr-00	**T**	N2	34.5% N at 145 kg.
	T	N3	34.5% N at 290 kg.
	T	N4,N4+	34.5% N at 435 kg.
	T	N5	34.5% N at 580 kg.
24-Apr-00	B		tm) Starane 2 at 1.0 l in 100 l.
	B		tm) BASF 3C Chlormequat 720 at 2.0 l in 100 l.
27-Apr-00	**T**	N4+	tm) Flamenco at 0.63 l in 220 l.
	T	N4+	tm) Amistar at 0.6 l in 220 l.
	B		tm) Opus at 0.5 l in 200 l.
	B		tm) Unix at 0.5 kg in 200 l.
20-May-00	**T**	N4+	tm) Flamenco at 0.63 l in 220 l.

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Experimental diary:

20-May-00	**T**	N4+	tm)Amistar at 0.6 l in 220 l.
	B		tm)Bravo 500 at 1.0 l in 200 l.
	B		tm)Opus at 0.75 l in 200 l.
20-May-00	B		Upgrade at 1.0 l in 200 l.
24-May-00	B		tm)Topik at 125 ml in 100 l.
	B		tm)Toil at 0.5 l in 100 l.
14-Aug-00	B		Combine harvested.

Previous crops: W. wheat 1998 and 1999.

NOTE: All plots were sampled in March and June to assess diseases on the roots and stem bases.

GRAIN TONNES/HECTARE

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

NITROGEN / **SEED TRT**	N1	N2	N3	N4	N5	N4+	Mean
S	7.07	8.46	8.69	9.39	9.55	9.45	8.77
SF	7.24	8.55	8.95	9.58	9.91	10.00	9.04
Mean	7.16	8.51	8.82	9.48	9.73	9.73	8.90

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

SEED TRT	**NITROGEN**	**SEED TRT NITROGEN**
0.115	0.199	0.281

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	33	0.397	4.5

GRAIN MEAN DM% 82.7

PLOT AREA HARVESTED 0.00237

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00/R/WW/12

WINTER WHEAT

SEED TREATMENTS AGAINST TAKE-ALL

Object: To test experimental compounds for their activity against take-all (*Gaeumannomyces graminis*) in the field - Bones Close..

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

Design: 4 randomised blocks of 9 plots.

Whole plot dimensions: 1.5 x 10.0.

Treatments:

FUNGICIDE

-	Undressed
S	Undressed, foliar sprays at growth stages 30 and 39
A	Seed dressing A
B	Seed dressing B
C	Seed dressing C
D	Seed dressing D
E	Seed dressing E
F	Seed dressing F
G	Seed dressing G

Experimental diary:

28-Sep-99	B		Ploughed.
08-Oct-99	B		Rotary harrowed.
	T		Drilled, Hereward, tr. as treatment, at 180 seeds/m^2 with Novartis's Hege drill.
	B		Genesis at 5.0 kg.
13-Dec-99	B		tm) Lexus 50 DF at 20 g in 200 l.
	B		tm) Stomp 400 SC at 2.5 l in 200 l.
	B		tm) Toppel 10 at 250 ml in 200 l.
09-Mar-00	B		34.5% N at 145 kg.
24-Apr-00	B		tm) Starane 2 at 1.0 l in 100 l.
	B		tm) BASF 3C Chlormequat 720 at 2.0 l in 100 l.
27-Apr-00	B		tm) Opus at 0.5 l in 200 l.
	B		tm) Unix at 0.5 kg in 200 l.
	T	S	Amistar at 0.6 l in 220 l.
03-May-00	B		34.5% N at 435 kg.
20-May-00	B		tm) Bravo 500 at 1.0 l in 200 l.
	B		tm) Opus at 0.75 l in 200 l.
	T	S	Amistar at 0.8 l in 220 l.
	B		Upgrade at 1.0 l in 200 l.
24-May-00	B		tm) Topik at 125 ml in 100 l.
	B		tm) Toil at 0.5 l in 100 l.
14-Aug-00	B		Combine harvested.

Previous crops: W. wheat 1998 and 1999.

NOTE: All plots were sampled in March and July to assess diseases on the roots and stem bases.

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GRAIN TONNES/HECTARE

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

FUNGICIDE

-	9.59
S	10.76
A	10.95
B	10.91
C	10.55
D	10.31
E	11.40
F	10.48
G	10.09
Mean	10.56

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

FUNGICIDE
0.426

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	24	0.602	5.7

GRAIN MEAN DM% 80.6

AVERAGE PLOT AREA HARVESTED 0.00134

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00/R/WW/13

WINTER WHEAT

STROBILURIN AND NITROGEN CURVE

Object: To measure the yield, nitrogen uptake and mineral nitrogen remaining in the soil at harvest from a range of nitrogen fertilisers on wheat sprayed with strobilurin or conventional fungicides - Bones Close.

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:

	Early	Later	Total
N0	0	0	0
N1	0	60	60
N2	50	70	120
N3	50	130	180
N4	50	190	240
N5	50	250	300

2. **FUNGICIDE** Fungicides:

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

Experimental diary:

28-Sep-99	B		Ploughing started.
29-Sep-99	B		Ploughing finished.
08-Oct-99	B		Combination drilled, Hereward, tr. Sibutol, at 380 seeds/m^2 with the Accord drill.
	B		Genesis at 5.0 kg.
13-Dec-99	B		tm) Lexus 50 DF at 20 g in 200 l.
	B		tm) Stomp 400 SC at 2.5 l in 200 l.
	B		tm) Toppel 10 at 250 ml in 200 l.
14-Mar-00	**T**	N2,N3,N4,N5	34.5% N at 145 kg.
24-Apr-00	B		tm) Starane 2 at 1.0 l in 100 l.
	B		tm) BASF 3C Chlormequat 720 at 2.0 l in 100 l.
26-Apr-00	**T**	C	Opus at 1.0 l in 220 l.
	T	S	Landmark at 1.0 l in 220 l.
03-May-00	**T**	N1	34.5% N at 174 kg.
	T	N2	34.5% N at 203 kg.
	T	N3	34.5% N at 377 kg.
	T	N4	34.5% N at 551 kg.
	T	N5	34.5% N at 725 kg.
22-May-00	**T**	C	Opus at 1.0 l in 220 l.
	T	S	Landmark at 1.0 l in 220 l.
24-May-00	B		tm) Topik at 125 ml in 100 l.
	B		tm) Toil at 0.5 l in 100 l.
15-Aug-00	**T**		Combine harvested.

Previous crops: W. rye, s. and w. wheat 1998, lupins 1999.

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00/R/WW/13

NOTE: Soil was sampled in January for nitrogen content. Grain was assessed for quality and nitrogen content. Straw was analysed for nitrogen content.

GRAIN TONNES/HECTARE

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

NITROGEN / **FUNGICIDE**	N0	N1	N2	N3	N4	N5	Mean
S	6.94	8.07	9.73	9.75	10.88	10.73	9.35
C	6.67	8.07	9.37	9.69	9.76	9.88	8.91
Mean	6.80	8.07	9.55	9.72	10.32	10.31	9.13

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

FUNGICIDE	**NITROGEN**	**FUNGICIDE NITROGEN**
0.220	0.382	0.540

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	22	0.661	7.2

GRAIN MEAN DM% 84.4

STRAW TONNES/HECTARE

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

NITROGEN / **FUNGICIDE**	N0	N1	N2	N3	N4	N5	Mean
S	5.90	5.90	7.47	7.07	6.82	7.62	6.79
C	5.52	6.74	6.62	6.98	6.34	7.31	6.58
Mean	5.71	6.32	7.05	7.02	6.58	7.46	6.69

STRAW MEAN DM% 80.5

PLOT AREA HARVESTED 0.00240

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00/R/WW/14

WINTER WHEAT

STROBILURINS AND WINTER WHEAT

Object: To compare diseases, green area duration, nitrogen translocation, yield and grain quality of two varieties of wheat, treated with strobilurin or conventional fungicides - Bones Close

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

Design: 4 randomised blocks of 2 x 4 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. **FUNGICIDE**

F1	None
F2	Epoxiconazole on two occasions
F3	Epoxiconazole with azoxystrobin on two occasions
F4	Epoxiconazole on two occasions with azoxystrobin on the second occasion

2. **VARIETY**

V1	Hereward
V2	Madrigal

Experimental diary:

28-Sep-99	B		Ploughed.
29-Sep-99	B		Ploughing finished.
08-Oct-99	**T**	V1,V2	Combination drilled, varieties, tr. Sibutol, at 380 seeds/m^2 with the Accord drill.
	B		Genesis at 5.0 kg.
13-Dec-99	B		tm) Lexus 50 DF at 20 g in 200 l.
	B		tm) Stomp 400 SC at 2.5 l in 200 l.
	B		tm) Toppel 10 at 250 ml in 200 l.
09-Mar-00	B		34.5% N at 145 kg.
24-Apr-00	B		tm) Starane 2 at 1.0 l in 100 l.
	B		tm) BASF 3C Chlormequat 720 at 2.0 l in 100 l.
27-Apr-00	**T**	F2,F4	Opus at 0.5 l in 220 l.
	T	F3	tm) Opus at 0.5 l with Amistar at 0.6 l in 220 l.
03-May-00	B		34.5% N at 435 kg.
22-May-00	**T**	F2	Opus at 0.75 l in 220 l.
	T	F3,F4	tm) Opus at 0.5 l with Amistar at 0.8 l in 220 l.
24-May-00	B		tm) Topik at 125 ml in 100 l.
	B		tm) Toil at 0.5 l in 100 l.
15-Aug-00	**T**		Combine harvested.

Previous crops: W. rye and s. wheat 1998, lupins and w. wheat 1999.

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00/R/WW/14

GRAIN TONNES/HECTARE

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

FUNGICIDE / VARIETY	F1	F2	F3	F4	Mean
V1	7.37	8.76	10.00	9.68	8.95
V2	6.03	9.82	11.49	10.61	9.49
Mean	6.70	9.29	10.74	10.15	9.22

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

VARIETY	FUNGICIDE	VARIETY FUNGICIDE
0.246	0.348	0.492

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	21	0.696	7.5

GRAIN MEAN DM% 85.4

PLOT AREA HARVESTED 0.00240

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00/W/WW/23

WINTER WHEAT

TIMING OF SULPHUR APPLICATION ON WINTER WHEAT

Object: To test the timing of sulphur fertilizer applications on the yield and quality of winter wheat - Woburn, Butt Close III.

Sponsors: M.J. Hawkesford, F.J. Zhao, M.M.A. Blake-Kalff.

Design: 4 randomised blocks of 5 plots.

Plot dimensions: 4.0 x 10.0.

Treatments:-

S TIMING	Sulphur timing (30 kg S applied as gypsum):
-	None
T1	05-Mar-00
T2	06-Apr-00
T3	09-May-00
T4	07-Jun-00

Experimental diary:

06-Sep-99	B		Ploughed and furrow pressed.
14-Sep-99	B		Dutch harrowed.
	B		Drilled, Hereward, tr. Sibutol, at 275 seeds/m^2 with the Accord drill.
12-Oct-99	B		tm) Stomp 400 SC at 2.5 l in 200 l.
	B		tm) Cyperkill 10 at 250 ml in 200 l.
	B		tm) Isoguard at 1.0 l in 200 l.
05-Mar-00	**T**	T1	Gypsum at 171 kg.
23-Mar-00	B		34.5% N at 145 kg.
06-Apr-00	**T**	T2	Gypsum at 171 kg.
08-May-00	B		tm) Vytel Copper at 0.1 l in 200 l.
	B		tm) Vytel Manganese at 3.0 l in 200 l.
	B		tm) Landmark at 0.5 l in 200 l.
	B		tm) BASF 3C Chlormequat 720 at 2.0 l in 200 l.
09-May-00	**T**	T3	Gypsum at 171 kg.
	B		34.5% N at 377 kg.
13-May-00	B		Starane 2 at 2.0 l in 200 l.
20-May-00	B		Landmark at 1.0 l in 200 l.
07-Jun-00	**T**	T4	Gypsum at 171 kg.
17-Aug-00	B		Combine harvested.

Previous crops: S. barley 1998, s. linseed 1999.

NOTE: Plant samples were taken monthly April to August for biomass, nitrogen and sulphur content.

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00/W/WW/23

GRAIN TONNES/HECTARE

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

S TIMING	
-	5.75
T1	7.56
T2	6.88
T3	7.40
T4	5.48
Mean	6.62

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

S TIMING
0.402

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.568	8.6

GRAIN MEAN DM% 83.7

PLOT AREA HARVESTED 0.00192

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00/W/WW/24

WINTER WHEAT

EFFECTS OF SULPHUR AND NITROGEN ON WINTER WHEAT

Object: To test combinations of nitrogen and sulphur fertilizers on the yield and quality of winter wheat - Woburn, Butt Close IV.

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

Design: 4 randomised blocks of 3 x 3 plots.

Plot dimensions: 4.0 x 10.0.

Treatments:-

1. SULPHUR Kg S:

S-	None
S1	10
S2	40

2. NITROGEN Kg N:

	Early	Late	Total
NL	50	50	100
NM	50	100	150
NH	50	150	200

Experimental diary:

06-Sep-99	B		Ploughed and furrow pressed.
14-Sep-99	B		Drilled, Hereward, tr. Sibutol, at 275 seeds/m^2 with the Accord drill.
	B		Dutch harrowed.
12-Oct-99	B		tm) Stomp 400 SC at 2.5 l in 200 l.
	B		tm) Cyperkill 10 at 250 ml in 200 l.
	B		tm) Isoguard at 1.0 l in 200 l.
23-Mar-00	**T**	S1	Gypsum at 57 kg.
	T	S2	Gypsum at 228 kg.
	B		34.5% N at 145 kg.
08-May-00	B		tm) Vytel Copper at 0.1 l in 200 l.
	B		tm) Vytel Manganese at 3.0 l in 200 l.
	B		tm) Landmark at 0.5 l in 200 l.
	B		tm) BASF 3C Chlormequat 720 at 2.0 l in 200 l.
09-May-00	**T**	NL	34.5% N at 145 kg.
	T	NM	34.5% N at 290 kg.
	T	NH	34.5% N at 435 kg.
20-May-00	B		Landmark at 1.0 l in 200 l.
17-Aug-00	B		Combine harvested.

Previous crops: S. barley 1998, s. linseed.

NOTE: Plant samples were taken on five occasions between April and August for malate, sulphur, nitrogen and biomass.

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00/W/WW/24

GRAIN TONNES/HECTARE

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

NITROGEN SULPHUR	NL	NM	NH	Mean
S-	6.30	5.77	5.49	5.85
S1	6.12	6.71	7.04	6.63
S2	5.73	6.61	7.65	6.66
Mean	6.05	6.36	6.73	6.38

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

SULPHUR	NITROGEN	SULPHUR NITROGEN
0.469	0.469	0.812

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	24	1.149	18.0

GRAIN MEAN DM% 83.4

PLOT AREA HARVESTED 0.00192

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00/W/WW/25

WINTER WHEAT

STROBILURINS AND TAKE-ALL

Object: To measure the effects on take-all (*Gaeumannomyces graminis*) of various fungicides - Woburn, Broad Mead.

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

Design: 4 randomised blocks of 8 plots.

Plot dimensions: 3.0 x 10.0.

Treatments:-

FUNGCIDE	Fungicide and rate of active ingredient:
-	None
F1	Trifloxystrobin at 125 g
F2	Trifloxystrobin at 250 g
A1	Azoxystrobin at 125 g
A2	Azoxystrobin at 250 g
C	Cyprodinil at 500 g
CA	Cyprodinil at 500 g and azoxystrobin at 125 g
KE	Kresoxim-methyl at 125 g and epoxiconazole at 125 g

Experimental diary:

04-Sep-99	B	:	Ploughed and furrow pressed.
10-Sep-99	B	:	Disced.
15-Sep-99	B	:	Disced.
16-Sep-99	B	:	Combination drilled, Consort, tr. Sibutol, at 300 seeds/m^2 with the Nordsten drill.
12-Oct-99	B	:	Cyperkill 10 at 250 ml in 200 l.
05-Mar-00	B	:	tm) Hawk at 2.5 l in 200 l.
	B	:	tm) Lexus 50 DF at 20 g in 200 l.
	B	:	tm) Cropoil at 1.0 l in 200 l.
27-Apr-00	**T**	:	Treatments applied in 220 l.
30-Apr-00	B	:	tm) Profol 500 at 0.5 l in 200 l.
	B	:	tm) Vytel Copper at 0.4 l in 200 l.
	B	:	Opus at 0.5 l in 200 l.
	B	:	tm) BASF 3C Chlormequat 720 at 2.0 l in 200 l.
	B	:	tm) Moddus at 0.2 l in 200 l.
02-May-00	B	:	Sulphan (30.0% N, 7.6% S) at 500 kg.
20-May-00	B	:	tm) Opus at 0.75 l in 200 l.
	B	:	tm) Sipcam UK Rover 500 at 1.0 l in 200 l.
	T	:	Treatments applied in 220 l.
20-Aug-00	B	:	Combine harvested.

Previous crops: W. wheat 1998 and 1999.

NOTE: Plant samples were assessed in June for root and stem base diseases.

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00/W/WW/25

GRAIN TONNES/HECTARE

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

FUNGCIDE	
-	6.23
F1	6.40
F2	6.84
A1	6.79
A2	7.44
C	7.22
CA	6.94
KE	6.58
Mean	6.80

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

FUNGCIDE
0.416

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	21	0.588	8.6

GRAIN MEAN DM% 83.1

PLOT AREA HARVESTED 0.00233

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00/R/BW/1

WINTER BARLEY

HYBRID BARLEY

Object: To test a new hybrid variety with different rates of nitrogen - Whittlocks.

Sponsor: C.G. Peters.

Design: 2 randomised blocks of 2 x 8 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. **NITROGEN** Nitrogen kg N:

	Early	Later	Total
R1	50	0	50
R2	50	50	100
R3	50	75	125
R4	50	100	150
R5	80	96	176
R6	80	120	200
R7	80	145	225
R8	80	170	250

2. **VARIETY**

N	NFC 99-1395
S	Carola

Experimental diary:

18-Aug-99	B		Ploughing started.
19-Aug-99	B		Ploughing completed.
07-Sep-99	B		Rolled.
01-Oct-99	**T**	N	Combination drilled, NFC 99-1395, tr. Raxil S, at 200 seeds/m^2 with the Accord drill.
	T	S	Combination drilled, Carola, tr. Raxil S, at 200 seeds/m^2 with the Accord drill.
02-Oct-99	B		Genesis at 5.0 kg.
08-Oct-99	B		Genesis at 5.0 kg.
23-Nov-99	B		tm) Stomp 400 SC at 2.5 l in 200 l.
	B		tm) Tolkan Turbo at 2.5 l in 200 l.
25-Nov-99	B		Hallmark at 100 ml in 150 l.
20-Jan-00	**T**		tm) Corbel at 0.5 l in 220 l.
	T		tm) Fortress at 0.2 l in 220 l.
09-Mar-00	**T**	R1,R2,R3,R4	34.5% N at 145 kg.
	T	R5,R6,R7,R8	34.5% N at 232 kg.
01-Apr-00	B		tm) Orka at 0.4 l in 200 l.
	B		tm) BASF 3C Chlormequat 720 at 2.0 l in 200 l.
	B		tm) Moddus at 0.2 l in 200 l.
19-Apr-00	**T**	R2,R3,R4,R5,R6,R7,R8	34.5% N at 145, 217, 290, 277, 348, 420, 493 kg respectively.
24-Apr-00	B		tm) Amistar at 0.5 l in 100 l.
	B		tm) Unix at 0.5 kg in 100 l.
07-May-00	B		tm) Sypex at 1.0 l in 200 l.

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00/R/BW/1

Experimental diary:

```
   07-May-00 : B :      : tm)Enhance Low Foam at 80 ml in 200 l.
   29-May-00 : B :      : tm)Amistar at 0.6 l in 200 l.
             : B :      : tm)Punch C at 0.4 l in 200 l.
   26-Jul-00 : B :      : Combine harvested.
```

Previous crops: W. barley 1998, w. rape 1999.

GRAIN TONNES/HECTARE

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

NITROGEN / VARIETY	R1	R2	R3	R4	R5	R6	R7	R8	Mean
N	11.47	11.70	11.61	11.92	11.21	11.49	11.09	10.58	11.38
S	10.37	10.30	9.96	10.28	10.48	10.84	9.84	10.60	10.33
Mean	10.92	11.00	10.79	11.10	10.85	11.16	10.46	10.59	10.86

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

VARIETY	NITROGEN	VARIETY NITROGEN
0.202	0.404	0.572

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	0.572	5.3

GRAIN MEAN DM% 88.0

STRAW TONNES/HECTARE

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

NITROGEN / VARIETY	R1	R2	R3	R4	R5	R6	R7	R8	Mean
N	6.47	6.34	6.76	7.78	7.36	8.27	8.13	7.85	7.37
S	6.82	6.44	5.89	6.43	6.75	5.76	6.81	6.99	6.49
Mean	6.64	6.39	6.32	7.11	7.06	7.01	7.47	7.42	6.93

STRAW MEAN DM% 64.7

PLOT AREA HARVESTED 0.00194

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00/R/RAW/2

WINTER OILSEED RAPE

CLEAVERS IN WINTER RAPE

Object: To compare early autumn, late autumn and winter applications of herbicide on the control and competitiveness of cleavers (*Galium aparine*)- Great Harpenden I.

Sponsor: P.J.W. Lutman.

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

Whole plot dimensions: 4.0 x 16.0.

Treatments: All combinations of:-

1. **CL DENS** Cleaver density (target) plants per m^2:

D1	8
D2	16
D3	32

2. **APP TIME** Herbicide timing:

HO	None
HE	Early autumn
HL	Late autumn
HW	Winter

Plus 2 extra plots

3. **EXTRA** No cleavers nor herbicides:

-

Experimental diary:

08-Aug-99	B		Ploughing and furrow pressing started.
12-Aug-99	B		Ploughing and furrow pressing completed.
01-Sep-99	B		Rotary harrowed.
	T	D1,D2,D3	Cleavers broadcast at 8, 16 or 32 seeds/m^2 respectively.
	B		Combination drilled, Apex, tr. Lindex-Plus FS Seed Treatment, at 120 seeds/m^2 with the Accord drill. Rolled.
03-Sep-99	B		Alpha Trifluralin 48 EC at 2.0 l in 200 l.
07-Sep-99	B		Irrigated 15 mm.
14-Sep-99	B		PBI Slug Pellets at 8.0 kg.
13-Oct-99	B		tm) Punch C at 0.4 l in 200 l.
	B		tm) Hallmark at 100 ml in 200 l.
19-Oct-99	B		34.5% N at 87 kg.
29-Oct-99	**T**	HE	Galtak 50 SC at 1.5 l in 220 l.
02-Dec-99	B		Punch C at 0.4 l in 200 l.
20-Jan-00	**T**	HE,HL	Galtak 50 SC at 1.5 l in 220 l.
09-Feb-00	B		Sulphan (30% N, 7.6% S) at 166 kg.
05-Mar-00	**T**	HL,HW	Galtak 50 SC at 1.5 l in 220 l.

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OO/R/RAW/2

Experimental diary:

16-Mar-00	B		tm) Laser at 1.0 l in 200 l.
	B		tm) Cropoil at 2.0 l in 200 l.
17-Mar-00	B		Sulphan (30.0% N, 7.6% S) at 433 kg.
09-May-00	B		tm) Bavistin DF at 1.0 kg in 100 l.
	B		tm) Hallmark with Zeon Technology at 75 ml in 100 l.
12-Jul-00	B		Azural at 4.0 l in 200 l.
23-Jul-00	B		Combine harvested.

Previous crops: W. rape and turnip rape 1998, w. wheat 1999.

NOTE: Establishment counts of crop and weeds were made in October. Cleavers were recounted in November. Late-November samples were taken for biomass and leaves were counted. Biomass was measured in March and again in May and July with plant height and populations measured. After harvest grain was cleaned to remove weed seeds.

GRAIN TONNES/HECTARE (FROM COMBINE HARVESTER)

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

APP TIME / **CL DENS**	HO	HE	HL	HW	Mean
D1	3.89	3.68	4.01	3.83	3.85
D2	3.63	3.61	3.69	3.75	3.67
D3	3.64	3.48	3.70	3.88	3.68
Mean	3.72	3.59	3.80	3.82	3.73

EXTRA - 3.92

GRAND MEAN 3.76

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

CL DENS	**APP TIME**	**CL DENS APP TIME**
0.081	0.093	0.161

SED for comparing **EXTRA** - with any item in **CL DENS**, **APP TIME** table is 0.140

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	27	0.197	5.2

GRAIN MEAN DM% 84.9

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00/R/RAW/2

GRAIN TONNES/HECTARE (AFTER REMOVING WEED SEEDS)

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

APP TIME / CL DENS	HO	HE	HL	HW	Mean
D1	3.73	3.65	3.94	3.79	3.78
D2	3.24	3.58	3.65	3.72	3.55
D3	3.24	3.46	3.66	3.83	3.55
Mean	3.41	3.56	3.75	3.78	3.63

EXTRA - 3.88

GRAND MEAN 3.66

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

CL DENS	APP TIME	CL DENS APP TIME
0.089	0.103	0.178

SED for comparing **EXTRA** - with any item in **CL DENS**, **APP TIME** table is 0.154

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	27	0.218	6.0

PLOT AREA HARVESTED 0.00310 (for 1 block) or 0.00283 (for 2 blocks)

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00/R/RAW/4

WINTER OILSEED RAPE

CONTROL OF STEM CANKER

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

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

Design: 3 randomised blocks of 15 + 4 + 2 plots.

Whole plot dimensions: 3.0 x 20.0.

Treatments:

FUNGCIDE	Fungicide combinations and timing							
	05-Oct-99	25-Oct	29-Oct	3-Nov	13-Dec	20-Jan-00	3-Feb	18-Feb
1	-	-	-	-	-	-	-	-
2	✓	-	-	-	-	-	-	-
3	-	-	-	✓	-	-	-	-
4	-	-	-	-	✓	-	-	-
5	-	-	-	-	-	✓	-	-
2+3	✓	-	-	✓	-	-	-	-
2+4	✓	-	-	-	✓	-	-	-
2+5	✓	-	-	-	-	✓	-	-
3+4	-	-	-	✓	✓	-	-	-
3+5	-	-	-	✓	-	✓	-	-
4+5	-	-	-	-	✓	✓	-	-
2+3+4	✓	-	-	✓	✓	-	-	-
2+3+5	✓	-	-	✓	-	✓	-	-
2+4+5	✓	-	-	-	✓	✓	-	-
3+4+5	-	-	-	✓	✓	✓	-	-
2+3+4+5	✓	-	-	✓	✓	✓	-	-
2WKS>2+3+4+5	-	✓	-	✓	✓	✓	-	-
4WKS>2+3+4+5	-	-	✓	✓	✓	✓	-	-
2+3+4+2WKS>5	✓	-	-	✓	✓	-	✓	-
2+3+4+4WKS>5	✓	-	-	✓	✓	-	-	✓

NOTE: All fungicide treatments were difenoconazole at 62.5 g with carbendazim at 125 g as Plover 250 EC and Bavistin DF in 220 l.

Experimental diary:

15-Jul-99	B	Subsoiled.
16-Jul-99	B	Ploughing and furrow pressing started.
19-Jul-99	B	Ploughing and furrow pressing completed.
26-Jul-99	B	Rolled.
05-Aug-99	B	Rotary harrowed.
27-Aug-99	B	Combination drilled, Apex, tr. Lindex-Plus FS Seed Treatment, at 120 seeds/m^2 with the Accord drill.
	B	tm) Scythe at 2.0 l in 200 l.
	B	tm) Enhance Low Foam at 100 ml in 200 l.
28-Aug-99	B	Rolled.
29-Aug-99	B	tm) Alpha Trifluralin 48 EC at 2.0 l in 200 l.
	B	tm) Katamaran at 2.0 l in 200 l.
30-Aug-99	B	PBI Slug Pellets at 8.0 kg.

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00/R/RAW/4

Experimental diary:

05-Oct-99	**T**	:	Spray treatments applied.
08-Oct-99	B	:	Genesis at 5.0 kg.
14-Oct-99	B	:	tm) Hallmark at 100 ml in 200 l.
	B	:	tm) Enhance Low Foam at 60 ml in 200 l.
20-Oct-99	B	:	34.5% N at 87 kg.
25-Oct-99	**T**	:	Spray treatment applied.
29-Oct-99	**T**	:	Spray treatment applied.
03-Nov-99	**T**	:	Spray treatments applied.
13-Dec-99	**T**	:	Spray treatments applied.
20-Jan-00	**T**	:	Spray treatments applied.
03-Feb-00	**T**	:	Spray treatment applied.
09-Feb-00	B	:	Sulphan (30.0% N, 7.6% S) at 166 kg.
18-Feb-00	**T**	:	Spray treatment applied.
15-Mar-00	B	:	Sulphan (30.0% N, 7.6% S) at 433 kg.
	B	:	Hallmark with Zeon Technology at 75 ml in 200 l.
12-Jul-00	B	:	tm) Enhance Low Foam at 400 ml in 400 l.
	B	:	tm) Reglone at 3.0 l in 400 l.
20-Jul-00	B	:	Combine harvested.

Previous crops: Peas 1998, set-aside 1999.

NOTE: Samples were taken in October, November, January, February, March, June and July for assessments of diseases, particularly light leaf spot, phoma and stem canker.

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00/R/RAW/4

GRAIN TONNES/HECTARE

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

FUNGCIDE	
1	3.75
2	3.65
3	3.91
4	3.67
5	3.85
2+3	4.22
2+4	3.96
2+5	4.12
3+4	4.46
3+5	4.40
4+5	4.41
2+3+4	4.51
2+3+5	4.35
2+4+5	3.99
3+4+5	4.54
2+3+4+5	4.57
2WKS>2+3+4+5	4.59
4WKS>2+3+4+5	4.64
2+3+4+2WKS>5	4.45
2+3+4+4WKS>5	4.34
Mean	4.20

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

FUNGCIDE	
0.219	min.rep
0.190	max-min

FUNGCIDE	
Min.rep	Any of the remainder
Max-min	1 v any of the remainder

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	41	0.269	6.4

GRAIN MEAN DM% 89.0

PLOT AREA HARVESTED 0.00408

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00/R/RAW/5

WINTER OILSEED RAPE

STEM CANKER STUDY

Object: To test fungicide programmes on two varieties of oilseed rape - Great Knott II.

Sponsors: J.S. West, B.D.L. Fitt, C. Underwood, N. Evans.

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:-

Whole plots

1. **FUNGSPRY** Difenoconazole and carbendazim (as Plover 250 EC and Bavistin DF):

-	None
S-F	Applied on five occasions
N-F	Applied on two occasions
A2	Applied on two occasions
A1	Applied once

Sub-plots

2. **CULTIVAR**

C	Capitol
L	Lipton

Experimental diary:

15-Jul-99	B		Subsoiled.
16-Jul-99	B		Ploughing and furrow pressing started.
19-Jul-99	B		Ploughing and furrow pressing completed.
26-Jul-99	B		Rolled.
05-Aug-99	B		Rotary harrowed.
27-Aug-99	**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.
	B		tm) Scythe at 2.0 l in 200 l.
	B		tm) Enhance Low Foam at 100 ml in 200 l.
28-Aug-99	B		Rolled.
29-Aug-99	B		tm) Alpha Trifluralin 48 EC at 2.0 l in 200 l.
	B		tm) Katamaran at 2.0 l in 200 l.
30-Aug-99	B		PBI Slug Pellets at 8.0 kg.
30-Sep-99	**T**	S-F	tm) Plover 250 EC at 0.25 l with Bavistin DF at 0.25 kg in 220 l.
08-Oct-99	B		Genesis at 5.0 kg.
11-Oct-99	**T**	A1	tm) Plover 250 EC at 0.25 l with Bavistin DF at 0.25 kg in 220 l.

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00/R/RAW/5

Experimental diary:

```
   14-Oct-99 : B :      : tm)Hallmark at 100 ml in 200 l.
   14-Oct-99 : B :      : tm)Enhance Low Foam at 60 ml in 200 l.
   20-Oct-99 : B :      : 34.5% N at 87 kg.
   27-Oct-99 : T : A2,S-F  : tm)Plover 250 EC at 0.25 l with Bavistin DF at 0.25
                             kg in 220 l.
   25-Nov-99 : T : A2,N-F,S-F  : tm)Plover 250 EC at 0.25 l with Bavistin DF at
                             0.25 kg in 220 l.
   10-Jan-00 : T : S-F : tm)Plover 250 EC at 0.25 l with Bavistin DF at 0.25 kg in
                             220 l.
   09-Feb-00 : B :      : Sulphan (30.0% N, 7.6% S) at 166 kg.
   05-Mar-00 : T : N-F,S-F : Plover 250 EC at 0.25 l with Bavistin DF at 0.25 kg
                             in 220 l.
   15-Mar-00 : B :      : Sulphan (30.0% N, 7.6% S) at 433 kg.
   28-Apr-00 : B :      : tm)Bavistin DF at 0.25 kg in 200 l.
             : B :      : tm)Plover 250 EC at 250 ml in 200 l.
   15-May-00 : B :      : Hallmark with Zeon Technology at 75 ml in 200 l.
   12-Jul-00 : B :      : tm)Enhance Low Foam at 400 ml in 400 l.
             : B :      : tm)Reglone at 3.0 l in 400 l.
   20-Jul-00 : B :      : Combine harvested.
```

Previous crops: Peas 1998, set-aside 1999.

GRAIN TONNES/HECTARE

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

CULTIVAR	C	L	Mean
FUNGSPRY			
-	4.21	4.51	4.36
S-F	4.60	5.15	4.88
N-F	4.71	4.89	4.80
A2	4.63	4.89	4.76
A1	4.55	4.57	4.56
Mean	4.54	4.80	4.67

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

	FUNGSPRY	**CULTIVAR**	**FUNGSPRY CULTIVAR**
	0.225	0.086	0.263
Except when comparing means with the same level(s) of **FUNGSPRY**			0.192

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.318	6.8
BLOCK.WP.SP	15	0.271	5.8

GRAIN MEAN DM% 87.3

SUB-PLOT AREA HARVESTED 0.00288

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00/R/RAS/1

SPRING OILSEED RAPE

EFFECTS OF SULPHUR AND NITROGEN ON SPRING OILSEED RAPE

Object: To study the timing of sulphur applications and test a novel diagnostic indicator with different nitrogen rates - Webbs.

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

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

Whole plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. **S**	Sulphur kg S:	
S0	None	
S1	80	
2. **N**	Nitrogen kg N:	
N1	150	
N2	200	

Extra

LATE SULPHUR	Kg S:	
SL	80	

Experimental diary:

19-Aug-99			Muriate of potash at 300 kg.
04-Oct-99			Ploughed.
21-Mar-00	B		Combination drilled, Canyon, tr. Rovral Liquid FS and Hydraguard, at 180 seeds/m^2, with the Accord drill.
	B		Rolled.
22-Mar-00	B		Butisan S at 1.0 l in 200 l.
24-Apr-00	B		Hallmark with Zeon Technology at 75 ml in 200 l.
28-Apr-00	B		34.5% N at 435 kg.
03-May-00	B		Combination drilled, Sprinter, tr. Rovral Liquid FS, at 250 seeds/m^2, with the Accord drill.
05-May-00	B		Rolled.
12-Jun-00	**T**	N2	34.5% N at 145 kg.
16-Jun-00	**T**	S1	Gypsum at 457 kg.
26-Jun-00	B		Hallmark with Zeon Technology at 100 ml in 200 l.
17-Jul-00	**T**	SL	Gypsum at 457 kg.
06-Sep-00	B		Combine harvested.

Previous crops: W. barley 1998, w. linseed 1999.

NOTE: Plants were sampled on 28-Jun-00 for sulphur and nitrogen analysis.

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00/R/RAS/1

GRAIN TONNES/HECTARE

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

S N	S0	S1	Mean
N1	2.19	2.42	2.31
N2	2.19	2.36	2.28
Mean	2.19	2.39	2.29

LATE SULPHUR 2.14

Grand mean 2.26

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

N	S	N S & LATE SULPHUR
0.050	0.050	0.071

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.100	4.4

GRAIN MEAN DM% 82.2

PLOT AREA HARVESTED 0.00233

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00/R/LNW/1

LINSEED

WINTER LINSEED DISEASES

Object: To assess the effects of diseases on the growth and yield of winter linseed by using fungicide treatments to control them - Drapers.

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

Design: 3 randomised blocks of 10 plots.

Plot dimensions: 3.0 x 15.0.

Treatments:

DIS	CONT	Fungicides and timing:
-		None (duplicated)
B1		Benomyl mid-flowering
B2		Benomyl mid-flowering and at capsule development
A1		Iprodione mid-flowering
A2		Iprodione mid-flowering and at capsule development
C1		Iprodione and thiophanate-methyl mid-flowering
C2		Iprodione and thiophanate-methyl mid-flowering and at capsule development
APM		Tebuconazole in autumn and benomyl pre-flowering and mid-flowering
PM		Benomyl pre-flowering and mid-flowering

Experimental diary:

30-Sep-99	B		tm) PDQ at 3.0 l in 200 l.
	B		tm) Enhance Low Foam at 100 ml in 200 l.
05-Oct-99	B		Rotary harrowed, drilled Oliver, tr. Prelude 20 LF, at 950 seeds/m^2 with the Accord drill.
07-Oct-99	B		Rolled.
23-Nov-99	**T**	APM	Folicur at 0.5 l in 220 l.
24-Feb-00	B		tm) Laser at 1.0 l in 200 l.
	B		tm) Cropoil at 2.0 l in 200 l.
09-Mar-00	B		34.5% N at 145 kg.
17-Mar-00	B		Eagle at 30 g in 200 l.
22-Mar-00	**T**	APM,PM	Benlate Fungicide at 1.1 kg in 220 l.
22-Mar-00	B		New 5C Cycocel at 2.5 l in 200 l.
31-Mar-00	B		34.5% N at 116 kg.
	B		tm) Basagran SG at 1.1 kg in 200 l.
	B		tm) Vindex at 1.0 l in 200 l.
31-May-00	**T**	A1,A2	Rovral Flo at 2.0 l in 220 l.
	T	B1,B2,APM,PM	Benlate Fungicide at 1.1 kg in 220 l.
	T	C1,C2	Compass at 3.0 l in 220 l.
26-Jun-00	**T**	A2	Rovral Flo at 2.0 l in 220 l.
	T	B2	Benlate Fungicide at 1.1 kg in 220 l.
	T	C2	Compass at 3.0 l in 220 l.
26-Jul-00	B		tm) Enhance Low Foam at 400 ml in 400 l.
	B		tm) Reglone at 3.0 l in 400 l.
01-Aug-00	B		Combine harvested.

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00/R/LNW/1

Previous crops: Linseed 1998, w. barley 1999.

NOTES: (1) Crop samples were taken on ten occasions from November to July for disease assessments.
(2) Yields presented have been adjusted for the proportion of plants chewed by rabbits as assessed on 26-Apr-00.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

DIS CONT	
-	1.39
B1	1.49
B2	1.43
A1	1.26
A2	1.22
C1	1.72
C2	1.65
APM	1.60
PM	1.59
Mean	1.48

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

DIS CONT	
0.226	min.rep
0.196	max-min

DIS CONT	
Max-min	- v any of the remainder
Min.rep	Any of the remainder

***** Stratum standard errors and coefficients of variation (adjusted for covariate) *****

Stratum	d.f.	s.e.	cv%
BLOCK.WP	18	0.273	18.5

GRAIN MEAN DM% 93.1

PLOT AREA HARVESTED 0.00288

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00/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 - Drapers.

Sponsor: P.J.W. Lutman.

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

Plot dimensions: 3.0 x 16.0.

Treatments: All combinations of:-

1. TIMEWEED Timing of weed removal:

-	None
SP	Spring

2. WEEDDENS 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:

30-Sep-99	B		tm) PDQ at 3.0 l in 200 l.
	B		tm) Enhance Low Foam at 100 ml in 200 l.
05-Oct-99	B		Rotary harrowed.
	T	CH,CL	Weed seed broadcast as treatment.
	B		Rotary harrowed, drilled, Oliver, tr. Prelude 20 LF at 950 seeds/m2 with the Accord drill.
07-Oct-99	B		Rolled.
24-Feb-00	B		tm) Laser at 1.0 l in 200 l.
	B		tm) Cropoil at 2.0 l in 200 l.
09-Mar-00	B		34.5% N at 145 kg.
13-Mar-00	**T**	N0,SP	Eagle at 40 g in 220 l.
31-Mar-00	B		34.5% N at 116 kg.
26-Jul-00	B		tm) Enhance Low Foam at 400 ml in 400 l.
	B		tm) Reglone at 3.0 l in 400 l.
01-Aug-00	B		Combine harvested.

Previous crops: Linseed 1998, w. barley 1999.

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00/R/LNW/2

NOTE: Emergence of weeds and crop was monitored from October to March. Crop and weeds were sampled in March, May and July. Lodging and weed abundance were assessed in late July.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE (FROM COMBINE HARVESTER)

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

TIMEWEED	-	SP	Mean
WEEDDENS			
L	1.17	1.36	1.27
M	1.34	1.46	1.40
H	1.24	1.46	1.35
VH	1.28	1.28	1.28
Mean	1.26	1.39	1.32

WEEDSPEC	CH	CL	Mean
WEEDDENS			
L	1.29	1.25	1.27
M	1.29	1.51	1.40
H	1.28	1.42	1.35
VH	1.16	1.40	1.28
Mean	1.25	1.39	1.32

WEEDSPEC	CH	CL	Mean
TIMEWEED			
-	1.08	1.43	1.26
SP	1.42	1.36	1.39
Mean	1.25	1.39	1.32

TIMEWEED	-		SP	
WEEDSPEC	CH	CL	CH	CL
WEEDDENS				
L	1.06	1.28	1.51	1.22
M	1.15	1.53	1.43	1.49
H	1.05	1.44	1.52	1.40
VH	1.08	1.48	1.24	1.32

EXTRA N0 1.29

Grand mean 1.32

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

WEEDSPEC	**WEEDDENS**	**TIMEWEED**	**WEEDSPEC WEEDDENS**
0.050	0.071	0.050	0.100

WEEDSPEC TIMEWEED	**WEEDDENS TIMEWEED**	**WEEDSPEC WEEDDENS TIMEWEED**
0.071	0.100	0.141

S.e.d. for comparing N0 with any item in the **WEEDSPEC.WEEDDENS.TIMEWEED** table is 0.122

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00/R/LNW/2

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE (FROM COMBINE HARVESTER)

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	35	0.173	13.1

GRAIN MEAN DM% 90.1

PLOT AREA HARVESTED 0.00326

CLEAN GRAIN (AT 90% DRY MATTER) TONNES/HECTARE (WEED SEED REMOVED)

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

TIMEWEED	-	SP	Mean
WEEDDENS			
L	0.85	1.32	1.08
M	0.95	1.38	1.17
H	0.89	1.39	1.14
VH	0.88	1.24	1.06
Mean	0.89	1.33	1.11

WEEDSPEC	CH	CL	Mean
WEEDDENS			
L	1.17	1.00	1.08
M	1.14	1.20	1.17
H	1.11	1.17	1.14
VH	1.03	1.08	1.06
Mean	1.11	1.11	1.11

WEEDSPEC	CH	CL	Mean
TIMEWEED			
-	0.86	0.93	0.89
SP	1.37	1.29	1.33
Mean	1.11	1.11	1.11

TIMEWEED	-		SP	
WEEDSPEC	CH	CL	CH	CL
WEEDDENS				
L	0.87	0.83	1.47	1.16
M	0.89	1.01	1.38	1.38
H	0.80	0.99	1.43	1.35
VH	0.87	0.88	1.20	1.28

EXTRA N0 1.22

Grand mean 1.12

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00/R/LNW/2

CLEAN GRAIN (AT 90% DRY MATTER) TONNES/HECTARE (WEED SEED REMOVED)

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

WEEDSPEC	WEEDDENS	TIMEWEED	WEEDSPEC WEEDDENS
0.043	0.061	0.043	0.086

WEEDSPEC TIMEWEED	WEEDDENS TIMEWEED	WEEDSPEC WEEDDENS TIMEWEED
0.061	0.086	0.122

S.e.d. for comparing N0 with any item in the **WEEDSPEC.WEEDDENS.TIMEWEED** table is 0.106

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	35	0.149	13.3

GRAIN MEAN DM% 90.1

PLOT AREA HARVESTED 0.00326

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00/R/LNS/1

LINSEED

FUNGICIDES AND SPRING LINSEED

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

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. **FUNGICIDE** 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 and mid-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:

16-Mar-00	B		Rolled. Spring-tine cultivated.
02-May-00	**T**	A	Combination drilled, Antares, tr. Prelude 20 LF at 700 seeds/m^2, with the Accord drill.
	T	J	Combination drilled, Jupiter, tr. Prelude 20 LF at 700 seeds/m^2, with the Accord drill.
05-May-00	B		Rolled.
10-May-00	B		34.5% N at 174 kg. Hallmark with Zeon Technology at 75 ml in 200 l.
12-May-00	B		Hallmark with Zeon Technology at 75 ml in 200 l.
16-May-00	B		Hallmark with Zeon Technology at 75 ml in 200 l.

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00/R/LNS/1

Experimental diary:

```
   27-Jun-00 : T : P+M : Fungicides applied.
   06-Jul-00 : T : M+C,MF,P+M : Fungicides applied.
   21-Jul-00 : T : CD,M+C : Fungicides applied.
   18-Aug-00 : B :     : tm)Enhance Low Foam at 400 ml in 400 l.
   18-Aug-00 : B :     : tm)Reglone at 3.0 l in 400 l.
   25-Aug-00 : B :     : Combine harvested.
```

Previous crops: Linseed 1998, w. barley 1999.

NOTE: Crop samples were taken on four occasions from June to August for disease assessments.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

FUNGICIDE / **TIMING**	AL	BO	A+B	Mean
P+M	0.92	1.36	1.12	1.13
MF	1.04	1.06	1.12	1.07
CD	1.18	1.09	1.03	1.10
F+C	0.89	1.16	0.91	0.98
Mean	1.01	1.17	1.04	1.07

VARIETY / **TIMING**	A	J	Mean
P+M	1.11	1.15	1.13
MF	1.16	0.98	1.07
CD	1.04	1.16	1.10
F+C	0.96	1.00	0.98
Mean	1.07	1.07	1.07

VARIETY / **FUNGICIDE**	A	J	Mean
AL	1.03	0.98	1.01
BO	1.18	1.16	1.17
A+B	1.01	1.08	1.04
Mean	1.07	1.07	1.07

FUNGICIDE	AL		BO		A+B	
VARIETY / **TIMING**	A	J	A	J	A	J
P+M	0.96	0.87	1.24	1.48	1.13	1.11
MF	1.00	1.08	1.29	0.83	1.21	1.04
CD	1.32	1.05	1.03	1.15	0.78	1.27
F+C	0.83	0.94	1.15	1.17	0.91	0.90

EXTRA	A	J	Mean
	0.83	1.05	0.94

Grand mean 1.05

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00/R/LNS/1

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

FUNGICIDE	TIMING	VARIETY* FUNGICIDE
0.090	0.104	0.127

VARIETY* TIMING	FUNGICIDE TIMING	VARIETY* FUNGICIDE TIMING
0.147	0.180	0.255

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

S.e.d. for comparing **EXTRA** A or J with any item in **VARIETY.FUNGICIDE.TIMING** table is 0.220 within the same level of VARIETY only

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP.SP	28	0.255	24.2

GRAIN MEAN DM% 80.5

PLOT AREA HARVESTED 0.00240

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00/R/SU/1

SUNFLOWERS

N, K AND DENSITY

Object: To test potassium, nitrogen and seed rates on the yield of sunflowers - Long Hoos VI/VII 6.

Sponsors: C.G. Peters, P. Hutley-Bull.

Design: 2 blocks of 2 x 2 x 2

Whole plot dimensions: 10 x 3.

Treatments:

All combinations of:

1. **SEEDRATE** Seeds per m^2:

   R1 8
   R2 12

2. **K** Potassium, kg K:

   K0 0
   K1 850

3. **N** Nitrogen, kg N:

   N0 0
   N1 6

Experimental diary:

03-Jun-00	B		Glyfos at 4.0 l in 200 l.
07-Jun-00	B		Rotary harrowed.
08-Jun-00	**T**	K1	Muriate of potash at 1700 kg.
	T	R1	Antonil, tr. Apron, drilled at 8 seeds/m^2 with the Nodet Gougis drill.
	T	R2	Antonil, tr. Apron, drilled at 12 seeds/m^2 with the Nodet Gougis drill.
22-Jun-00	**T**	N1	34.5% N at 20 kg.
11-Oct-00	B		Hand harvested.

Previous crops: W. wheat 1998, s. barley 1999.

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00/R/SU/1

GRAIN TONNES/HECTARE

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

K	K0	K1	Mean
SEEDRATE			
R1	2.63	1.50	2.06
R2	2.72	2.34	2.53
Mean	2.68	1.92	2.30

N	N0	N1	Mean
SEEDRATE			
R1	2.06	2.06	2.06
R2	2.44	2.62	2.53
Mean	2.25	2.34	2.30

N	N0	N1	Mean
K			
K0	2.68	2.67	2.68
K1	1.82	2.02	1.92
Mean	2.25	2.34	2.30

	N	N0	N1
SEEDRATE	**K**		
R1	K0	2.70	2.56
	K1	1.42	1.57
R2	K0	2.67	2.78
	K1	2.21	2.46

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

SEEDRATE	K	N	SEEDRATE K
0.253	0.253	0.253	0.357

SEEDRATE N	K N	SEEDRATE K N
0.357	0.357	0.505

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	7	0.505	22.0

GRAIN MEAN DM% *

PLOT AREA HARVESTED 0.00030

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00/W/BES/20

SPRING BEANS

MECHANICAL WEED CONTROL IN SPRING BEANS

Object: To measure the efficacy of mechanical weed control in spring beans - Woburn, Lansome II/III.

Sponsor: P.J.W. Lutman.

Design: 3 blocks of 2 x 5 + 2 plots.

Whole plot dimensions: 4.0 x 10.0.

Treatments:

1. **WEEDS** Sown weeds and seed rate:

OA	Oats 80 seeds/m^2
CH	Chickweed (*stellaria media*) 200 seeds/m^2

2. **MECHCTRL** Mechanical control timing and number of passes:

-	None
W1SP	April single pass
W1DP	April double pass
W2SP	May single pass
W2DP	May double pass

3. **EXTRA** Weed free:

N01	Herbicide applied
NO2	Weeded twice

Experimental diary:

08-Mar-00	B		Flexitined.
16-Mar-00	**T**	CH	Broadcast chickweed at 200 seeds/m^2.
	T	OA	Broadcast oats at 80 seeds/m^2.
	B		Combination drilled, Quattro, at 40 seeds/m^2 with the Accord drill. Rolled.
19-Apr-00	B		Decis at 250 ml in 200 l.
03-May-00	**T**	W1SP	Weeded once.
	T	W1DP	Weeded twice.
15-May-00	**T**	NO2,W2DP	Weeded twice.
20-May-00	B		Hallmark at 150 ml in 200 l.
	T	NO1	Basagran SG at 1.65 kg in 220 l.
11-Jun-00	B		Folio at 2.0 l in 200 l.
26-Jun-00	B		tm) Bravo 500 at 1.5 l in 200 l.
	B		tm) Folicur at 0.5 l in 200 l.
	B		tm) Aphox at 280 g in 200 l.
22-Aug-00	B		Combine harvested.

Previous crops: Potatoes and w. rape 1998, w. wheat 1999.

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00/W/BES/20

NOTE: Emergence counts were made in April. Bean, oat and chickweed numbers, heights and biomass were measured in May and August, other weeds were identified and weighed.

GRAIN TONNES/HECTARE

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

MECHCTRL / **WEEDS**	-	W1SP	W1DP	W2SP	W2DP	Mean
OA	3.73	3.45	3.26	3.79	2.91	3.43
CH	4.01	3.34	4.01	4.12	3.40	3.78
Mean	3.87	3.40	3.63	3.96	3.15	3.60

EXTRA	NO1	NO2	Mean
	4.27	3.45	3.86

Grand mean 3.65

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

WEEDS	**MECHCTRL**	**WEEDS MECHCTRL & EXTRA**
0.124	0.196	0.278

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	22	0.340	9.3

GRAIN MEAN DM% 86.4

PLOT AREA HARVESTED 0.00240

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00/R/LP/3

LUPINS

WEEDS IN LUPINS

Object: To study the competitive effects of two broad-leaved weeds on the growth and yield of lupins. To test the effects of delaying control of chickweed until the spring - Highfield IV/Road Piece East.

Sponsors: P.J.W. Lutman.

Design: 4 randomised blocks of 5 + 5 + 2 plots.

Whole plot dimensions: 6.0 x 9.0.

Treatments:

WEEDHERB	Weed type and target populations, plants per m^2:
G0	*Galium aparine* 0
G1	*Galium aparine* 4
G2	*Galium aparine* 8
G3	*Galium aparine* 16
G4	*Galium aparine* 32
S0	*Stellaria media* 0
S1	*Stellaria media* 100
S2	*Stellaria media* 200
S3	*Stellaria media* 400
S4	*Stellaria media* 800
S2H	*Stellaria media* 200 with herbicide in January
S4H	*Stellaria media* 800 with herbicide in January

Experimental diary:

13-Aug-99	B		Ploughing started.
14-Aug-99	B		Ploughing completed.
13-Sep-99	**T**		Weed seed broadcast as treatment.
	B		Rotary harrowed, drilled, DTN 20, tr. iprodione and carbendazim, at 40 seeds/m^2 with the Accord drill.
	B		Dursban 4 at 1.5 l in 200 l.
14-Sep-99	B		Rolled.
15-Sep-99	B		Draza at 5.0 kg.
17-Sep-99	**T**	G0,S0	Stomp 400 SC at 5.0 l in 220 l.
14-Oct-99	B		Cyperkill 10 at 250 ml in 200 l.
09-Nov-99	B		Falcon at 1.0 l in 200 l.
12-Nov-99	**T**	G0,S0	tm) Alpha Simazine 50 SC at 2.3 l in 220 l.
	T	G0,S0	tm) Carbetamex at 3.0 kg in 220 l.
24-Jan-00	**T**	S2H,S4H	Lo-Gran 20 WP at 18.5 g in 220 l.
28-Apr-00	B		tm) Bravo 500 at 1.5 l in 200 l.
	B		tm) Folicur at 0.5 l in 200 l.
04-Jul-00	B		tm) Folicur at 0.5 l in 200 l.
	B		tm) Aphox at 280 g in 200 l.
	B		tm) Enhance Low Foam at 50 ml in 200 l.
14-Sep-00	B		Combine harvested.

Previous crops: W. wheat 1998, w. barley 1999.

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00/R/LP/3

NOTE: Plant densities were assessed regularly in autumn. Plant biomass and components of yield were measured in January, April, June and August. Harvested grain was cleaned to remove weed seed. S2H and S4H herbicide treatment severely damaged lupins.

GRAIN TONNES/HECTARE

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

WEEDHERB

G0	4.23
G1	3.57
G2	3.50
G3	3.00
G4	2.86
S0	4.08
S1	3.65
S2	3.95
S3	3.47
S4	3.80
S2H	1.40
S4H	1.10
Mean	3.22

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

WEEDHERB
0.343

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	33	0.484	15.1

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00/R/LP/3

CLEANED GRAIN TONNES/HECTARE

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

WEEDHERB	
G0	4.19
G1	3.45
G2	3.37
G3	2.78
G4	2.58
S0	4.04
S1	3.61
S2	3.91
S3	3.43
S4	3.76
S2H	1.38
S4H	1.09
Mean	3.13

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

WEEDHERB
0.346

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	33	0.489	15.6

GRAIN MEAN DM% 63.8

PLOT AREA HARVESTED 0.00216

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00/R/LP/4

LUPINS

GENOTYPE EVALUATION

Object: To test the expression of agronomically useful characters of two new genotypes under UK conditions - Long Hoos VI/VII 3.

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

Design: 6 blocks of 2 plots.

Whole plot dimensions: 3.0 x 9.0.

Treatments:

GENOTYPE	Code number:
20	
108	

Experimental diary:

12-Sep-99	B		Ploughed.
04-Oct-99	B		Rotary harrowed.
06-Oct-99	**T**	108	Hand sown at 33 seeds/m^2.
	T	20	Hand sown at 50 seeds/m^2.
07-Oct-99	B		Rolled.
12-Oct-99	B		Stomp 400 SC at 5.0 l in 220 l.
12-Nov-99	B		tm) Alpha Simazine 50 SC at 2.3 l in 200 l.
	B		tm) Carbetamex at 3.0 kg in 200 l.
13-Mar-00	B		Folicur at 1.0 l in 220 l.
28-Apr-00	B		tm) Bravo 500 at 1.5 l in 220 l.
	B		tm) Folicur at 0.5 l in 220 l.
28-Jun-00	B		tm) Aphox at 280 g in 220 l.
	B		tm) Enhance Low Foam at 50 ml in 220 l.
04-Jul-00	B		tm) Folicur at 0.5 l in 200 l.
	B		tm) Aphox at 280 g in 200 l.
	B		tm) Enhance Low Foam at 50 ml in 200 l.
27-Sep-00	B		Combine harvested.

Previous crops: Maize and molasses grass 1998, set-aside 1999.

NOTE: Radiation interception measurements were taken weekly. Canopy structure was assessed regularly, pod numbers were counted weekly from flowering to harvest. Components of yield were measured at harvest.

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00/R/LP/4

GRAIN TONNES/HECTARE

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

GENOTYPE	
20	3.11
108	3.58
Mean	3.35

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

GENOTYPE
0.145

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	4	0.229	6.8

GRAIN MEAN DM% 61.5

PLOT AREA HARVESTED 0.00206

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00/R/LP/5

LUPINS

PESTS AND DISEASES

Object: To test methods of bean seed fly control and to identify possible causes of blindness - Highfield IV/Road Piece East.

Sponsors: I.F. Shield, G. Bateman, H.J. Stevenson and J.V. Ethridge.

Design: 3 blocks of 10 plots.

Whole plot dimensions: 2.0 x 9.0.

Treatments:

PESTCONT	Pest Control:
-	None
SS	Stale seedbed
C	Chlorpyrifos
CI	Chlorpyrifos incorporated
G1	Imidacloprid low rate seed dressing
G2	Imidacloprid high rate seed dressing
DC	Deltamethrin 2-4 leaf stage
DM	Dimethoate 2-4 leaf stage

Experimental diary:

13-Aug-99	B		Ploughing started.
14-Aug-99	B		Ploughing completed.
26-Aug-99	**T**	SS	Rotary harrowed.
13-Sep-99	**T**	CI	Dursban 4 at 1.5 l in 220 l. Rotary harrowed.
14-Sep-99	**T**	C	Dursban 4 at 1.5 l in 220 l.
	B		Drilled, DTN 20, dressed as treatment at 40 seeds/m^2 with the Oyjord drill. Rolled.
15-Sep-99	B		Draza at 5.0 kg.
21-Sep-99	B		Stomp 400 SC at 5.0 l in 200 l.
12-Oct-99	**T**	DC	Decis at 350 ml in 220 l.
	T	DM	BASF Dimethoate 40 at 850 ml in 220 l.
12-Nov-99	B		tm) Alpha Simazine 50 SC at 2.3 l in 200 l.
	B		tm) Carbetamex at 3.0 kg in 200 l.
28-Apr-00	B		tm) Bravo 500 at 1.5 l in 200 l.
	B		tm) Folicur at 0.5 l in 200 l.
04-Jul-00	B		tm) Folicur at 0.5 l in 200 l.
	B		tm) Aphox at 280 g in 200 l.
	B		tm) Enhance Low Foam at 50 ml in 200 l.
14-Sep-00	B		Combine harvested.

Previous crops: W. wheat 1998, w. barley 1999.

NOTE: Plant counts were done monthly from emergence to mid-winter and in April. Pest damage was assessed regularly including root damage in November.

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00/R/LP/5

GRAIN TONNES/HECTARE

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

PESTCONT

-	3.79
SS	4.09
C	4.14
CI	4.16
G1	3.70
G2	3.70
DC	4.08
DM	4.17
Mean	3.94

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

PESTCONT

0.339	min.rep
0.277	max-min

PESTCONT

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	20	0.415	10.5

GRAIN MEAN DM% 53.0

PLOT AREA HARVESTED 0.00216

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00/R/LP/6

LUPINS

SEED RATES AND SOWING DATES

Object: To define the optimum crop structure for DETN 20, a model genotype of the dwarf determinate plant type - Highfield IV/Road Piece East.

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

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

Plot dimensions: 9.0 x 9.0.

Treatments: All combinations of:-

1. **SOW DATE** Sowing date:

E	01-Sep-99
L	22-Sep-99

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

R1	20
R2	40
R3	60
R4	80

EXTRA All sown at 40 seeds/m^2:

EIR	Early sown, irrigated
ESH	Early sown, shaded
LIR	Late sown, irrigated
LSH	Late sown, shaded

Experimental diary:

13-Aug-99	B		Ploughing started.
14-Aug-99	B		Ploughing completed.
31-Aug-99	B		Rolled.
	T	E,EIR,ESH	Spannit at 1.5 l in 200 l. Rotary harrowed.
01-Sep-99	**T**	E,EIR,ESH	Combination drilled, DTN 20, tr. Germipro, with the Accord drill. Rolled.
06-Sep-99	**T**	E,EIR,ESH	Stomp 400 SC at 5.0 l in 200 l.
15-Sep-99	B		Draza at 5.0 kg.
22-Sep-99	**T**	L,LIR,LSH	Dursban 4 at 1.5 l in 200 l.
	T	L,LIR,LSH	Combination drilled, DTN 20, tr. Germipro, with the Accord drill.
14-Oct-99	B		Cyperkill 10 at 250 ml in 200 l.
12-Nov-99	B		tm) Alpha Simazine 50 SC at 2.3 l in 200 l.
	B		tm) Carbetamex at 3.0 kg in 200 l.
	T	L,LIR,LSH	Stomp 400 SC at 5.0 l in 220 l.
28-Apr-00	B		tm) Bravo 500 at 1.5 l in 200 l.
	B		tm) Folicur at 0.5 l in 200 l.
09-May-00	**T**	ESH	Shading applied.
10-May-00	**T**	LSH	Shading applied.
19-Jun-00	**T**	EIR,LIR	Irrigated 12 mm.
29-Jun-00	**T**	EIR,LIR	Irrigated 12 mm.
04-Jul-00	B		tm) Folicur at 0.5 l in 200 l.

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00/R/LP/6

Experimental diary:

04-Jul-00	B		tm) Aphox at 280 g in 200 l.
	B		tm) Enhance Low Foam at 50 ml in 200 l.
22-Aug-00	**T**	ESH,LSH	Shading removed.
27-Sep-00	B		Combine harvested.

Previous crops: W. barley and w. wheat 1998, 1999.

NOTES: (1) Five plots were lost, one with treatment combination **SOW DATE** L and **SEED RATE** R1 because soil had been imported to fill a dell and one of each of the 4 **EXTRA** treatments were not applied. Estimated values were used in the analysis.

(2) Radiation interception was measured weekly through the growing season. Supplementary red light was applied to parts of three plots during flowering and pod filling. Leaf and pod photosynthesis was measured. Radiation spectral measurements also measured occasionally. Dry matter and partitioning was measured every three weeks. Pods were counted weekly from flowering to harvest. Pod and seeds were weighed weekly during maturation. Components of yield were assessed at harvest.

GRAIN TONNES/HECTARE

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

SEED RATE / **SOW DATE**	R1	R2	R3	R4	Mean
E	3.75	3.31	3.14	3.30	3.37
L	3.70	3.77	4.00	3.95	3.85
Mean	3.72	3.54	3.57	3.62	3.61

EXTRA	EIR	ESH	LIR	LSH	Mean
	3.17	2.05	4.18	1.99	2.85

Grand mean 3.36

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

SOW DATE	**SEED RATE**	**SOW DATE SEED RATE & EXTRA**
0.140	0.199	0.281

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	28	0.397	11.8

GRAIN MEAN DM% 47.1

PLOT AREA HARVESTED 0.00207 (mean)

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00/R/LP/9

LUPINS

SULPHUR AND LUPINS

Object: To determine the effect of foliar sulphur on pod retention by determinate lupin plants - Highfield IV /Road Piece East.

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

Design: 3 blocks of 7 plots.

Whole plot dimensions: 6.0 x 9.0.

Treatments:

SULPHUR	Kg S:
-	None
S1	15
S2	30
S3	45
S4	60
S5	75
SR	8 on four occasions (total 32)

Experimental diary:

13-Aug-99	B		Ploughing started.
14-Aug-99	B		Ploughing completed.
13-Sep-99	B		Dursban 4 at 1.5 l in 200 l.
	B		Combination drilled, DTN 20, tr. iprodione and carbendazim, at 40 seeds/m^2 with the Accord drill.
14-Sep-99	B		Rolled.
15-Sep-99	B		Draza at 5.0 kg.
21-Sep-99	B		Stomp 400 SC at 5.0 l in 200 l.
14-Oct-99	B		Cyperkill 10 at 250 ml in 200 l.
12-Nov-99	B		tm)Alpha Simazine 50 SC at 2.3 l in 200 l.
	B		tm)Carbetamex at 3.0 kg in 200 l.
14-Apr-00	**T**	S1,S2,S3,S4,S5,SR	Thiovit at 18.7, 37.4, 56.1, 74.8, 93.5 or 10.0 kg respectively in 1300 l.
28-Apr-00	B		tm)Bravo 500 at 1.5 l in 200 l.
	B		tm)Folicur at 0.5 l in 200 l.
10-May-00	**T**	SR	Thiovit at 10 kg in 1300 l.
01-Jun-00	**T**	SR	Thiovit at 10 kg in 1300 l.
20-Jun-00	**T**	SR	Thiovit at 10 kg in 2600 l.
04-Jul-00	B		tm)Folicur at 0.5 l in 200 l.
	B		tm)Aphox at 280 g in 200 l.
	B		tm)Enhance Low Foam at 50 ml in 200 l.
14-Sep-00	B		Combine harvested.

Previous crops: W. wheat 1998, w. barley 1999.

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00/R/LP/9

GRAIN TONNES/HECTARE

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

SULPHUR	
-	3.69
S1	3.67
S2	3.76
S3	3.41
S4	3.63
S5	3.45
SR	3.49
Mean	3.59

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

SULPHUR
0.213

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.261	7.3

GRAIN MEAN DM% 56.9

PLOT AREA HARVESTED 0.00216

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00/R/LP/11

LUPINS

YELLOW LUPINS

Object: To study the effects of sowing date and seed rate upon maturity date and seed yield of yellow lupin - Highfield IV/Road Piece East.

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

Design: 3 partially randomised blocks of 3 x 3 plots.

Whole plot dimensions: 3.0 x 9.0.

Treatments: All combinations of:-

1. **SOW DATE**

D1	Sown early
D2	Sown middle
D3	Sown late

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

S1	70
S2	100
S3	130

Experimental diary:

13-Aug-99	B		Ploughing started.
14-Aug-99	B		Ploughing completed.
24-Feb-00	B		PDQ at 4.0 l in 200 l.
07-Mar-00	B		Spring-tine cultivated.
08-Mar-00	**T**	D1	Combination drilled, Wodjil, recleaned, with the Accord drill.
17-Mar-00	**T**	D1	Stomp 400 SC at 3.0 l in 220 l.
28-Mar-00	**T**	D2	Combination drilled, Wodjil, recleaned, with the Accord drill.
31-Mar-00	**T**	D2	Stomp 400 SC at 3.0 l in 220 l.
02-May-00	**T**	D3	Combination drilled, Wodjil, recleaned, with the Accord drill.
08-May-00	**T**	D3	Stomp 400 SC at 3.0 l in 220 l.
02-Jun-00	B		Falcon at 1.0 l in 200 l.
30-Aug-00	B		tm) Enhance Low Foam at 400 ml in 400 l.
	B		tm) Reglone at 3.0 l in 400 l.
12-Sep-00	B		Combine harvested.

Previous crops: W. barley and w. wheat 1998, w. barley 1999.

NOTES: (1) The design was intended to be a randomised block experiment but treatment combination **SOW DATE** D2 **SEEDRATE** S1 was incorrectly drilled, so plots with the correct combination were sown at the edges of the experiment. The yields were analysed using covariates to remove block effects.

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00/R/LP/11

NOTES: (2) Apical dissections were made frequently between April and June. Plant densities were assessed in May, June and August. Flowering date was recorded. Branch and number of leaves were counted and plant height measured in July. Samples were taken in August from the first two sowings to assess components of yields.

GRAIN TONNES/HECTARE

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

SOW DATE / **SEED RATE**	D1	D2	D3	Mean
S1	1.30	1.41	0.78	1.16
S2	1.57	1.71	0.97	1.42
S3	1.82	1.74	1.41	1.66
Mean	1.56	1.62	1.05	1.41

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

SEED RATE	**SOW DATE**	**SEED RATE SOW DATE**
0.126	0.127	0.220

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	16	0.266	18.9

GRAIN MEAN DM% 79.6

PLOT AREA HARVESTED 0.00206 or 0.00216 (**SOW DATE** D3)

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00/W/LP/20

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 replicates of 4 plots fully randomised.

Whole plot dimensions: 4.0 x 9.0.

Treatments:

DENSITY	Seeds/m^2:
20	
40	
60	
80	

Experimental diary:

10-Sep-99	: B :	:	Ploughed.
14-Sep-99	: **T** :	:	Rotary harrowed. Drilled, DTN 20, as treatment with the Accord drill.
	: B :	:	Spannit at 1.5 l in 200 l.
17-Sep-99	: B :	:	Stomp 400 SC at 5.0 l in 200 l.
04-Oct-99	: B :	:	Draza at 5.5 kg.
30-Nov-99	: B :	:	tm)Carbetamex at 3.0 kg in 220 l.
	: B :	:	tm)Alpha Simazine 50 SC at 2.3 l in 220 l.
27-Sep-00	: B :	:	Hand harvested.

Previous crops: W. wheat 1998 and 1999.

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00/W/LP/20

GRAIN TONNES/HECTARE

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

DENSITY	
20	0.31
40	0.58
60	0.78
80	0.80
Mean	0.62

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

DENSITY
0.262

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

Stratum	d.f.	s.e.	cv%
WP	8	0.321	51.9

GRAIN MEAN DM% 70.1

PLOT AREA HARVESTED 0.00216

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00/R/M/4

EFFECTS OF BEHAVIOUR MODIFYING CHEMICALS

Object: To continue to develop manipulation strategies of insect pests in oilseed rape - Great Harpenden I.

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

Design: 6 x 6 quasi-complete Latin square.

Whole plot dimensions: 9.0 x 9.0.

Treatments:

CRP CHEM	Crop with or without semiochemical:
-	Rape, untreated, duplicated in each column and row
S	Rape with semiochemical, duplicated in each column and row
T	Turnip rape, untreated, duplicated in each column and row

Experimental diary:

08-Aug-99	B		Ploughing and furrow pressing started.
12-Aug-99	B		Ploughing and furrow pressing completed.
28-Aug-99	**T**	-,S	Combination drilled, Apex, untreated, at 170 seeds/m^2, with the Accord drill.
	T	T	Combination drilled, Salut, untreated, at 170 seeds/m^2 with the Accord drill.
	B		Rolled.
29-Aug-99	B		tm)Alpha Trifluralin 48 EC at 2.0 l in 200 l.
	B		tm)Katamaran at 2.0 l in 200 l.
30-Aug-99	B		PBI Slug Pellets at 8.0 kg.
13-Oct-99	B		Punch C at 0.4 l in 200 l.
19-Oct-99	B		34.5% N at 87 kg.
02-Dec-99	B		Punch C at 0.4 l in 200 l.
09-Feb-00	B		Sulphan (30.0% N, 7.6% S) at 166 kg.
17-Mar-00	B		Sulphan (30.0% N, 7.6% S) at 433 kg.
14-Apr-00	**T**	S	Azatin at 1.5 l in 10 l.
15-May-00	B		Bavistin FL at 1.0 l in 200 l.
12-Jul-00	B		Azural at 4.0 l in 200 l.
23-Jul-00	B		Combine harvested.

Previous crops: W. rape and turnip rape 1998, w. wheat 1999.

NOTE: Pollen beetles and seed weevil adults were counted at regular intervals. Raceme samples were taken in April to assess pollen beetle eggs and larvae. Pod samples were taken in May and June to assess seed weevil and pod midge larval infestations.

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00/R/M/4

GRAIN TONNES/HECTARE

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

CRP	CHEM
-	4.88
S	5.03
T	3.01
Mean	4.31

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

CRP	CHEM
0.108	

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

Stratum	d.f.	s.e.	cv%
ROW.COL	23	0.264	6.1

GRAIN MEAN DM% 87.5

PLOT AREA HARVESTED 0.00216

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METEOROLOGICAL RECORDS 2000 - 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	70	(+18)	4.4	(+1.4)	2.9	4.8	6.8
FEB	103	(+38)	5.9	(+2.7)	3.4	5.8	6.6
MAR	119	(+16)	7.2	(+1.9)	4.5	7.3	7.3
APR	126	(-12)	7.8	(+0.2)	5.7	8.5	8.0
MAY	180	(-7)	12.0	(+1.1)	9.1	13.4	11.0
JUN	177	(-15)	15.2	(+1.4)	12.0	16.0	13.4
JUL	158	(-30)	15.3	(-0.6)	11.6	16.5	14.7
AUG	201	(+23)	17.1	(+1.3)	13.8	17.4	15.7
SEP	124	(-12)	15.0	(+1.4)	12.4	15.7	15.3
OCT	96	(-8)	10.4	(0.0)	8.4	12.4	13.5
NOV	62	(-3)	6.6	(+0.6)	4.7	8.0	10.5
DEC	50	(+3)	5.5	(+1.5)	4.3	7.1	9.0
YEAR*	1466	(+4)	10.2	(+1.0)	7.7	11.1	11.0

MONTH	Ground frosts (2)	Total rain:mm 12.7cm (5 in) gauge		Rain days (3)	Drainage through 50.8cm (20 in) soil:mm	Wind km per hour (4)
JAN	17	25	(-40)	14	20	9.6
FEB	14	75	(+27)	17	43	11.3
MAR	16	13	(-39)	8	7	10.1
APR	9	132	(+79)	23	79	8.2
MAY	0	90	(+38)	20	39	7.8
JUN	0	13	(-45)	4	1	6.1
JUL	0	48	(+2)	12	12	5.8
AUG	0	73	(+19)	12	23	5.7
SEP	0	91	(+39)	16	46	6.3
OCT	2	167	(+101)	21	132	9.2
NOV	12	139	(+74)	24	117	9.7
DEC	12	108	(+39)	18	95	11.4
YEAR*	82	974	(+286)	189	614	8.4

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 rain was 0.2 mm or more

(4) At 2 metres above ground level

*Mean or total

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METEOROLOGICAL RECORDS 2000 - WOBURN

(Departure from 30-year means in brackets)

MONTH	Total sunshine: hours		Mean temperature: °C Air(1)		Dew point	In ground under grass 30 cm	100 cm	Ground frosts (2)	Total rain:mm 25.4 cm tipping bucket gauge		Rain days (3)	Wind km per hour (4)
JAN	83	(+34)	4.5	(+1.1)	2.8	5.0	6.8	19	29	(-24)	18	10.1
FEB	117	(+58)	6.1	(+2.7)	3.5	6.3	6.8	10	74	(+34)	21	12.8
MAR	131	(+28)	7.0	(+1.6)	4.5	7.7	7.4	8	25	(-26)	15	9.6
APR	153	(+23)	7.8	(+0.2)	6.1	9.0	8.0	5	138	(+88)	25	6.9
MAY	189	(+10)	12.0	(+1.0)	9.3	13.2	10.6	0	96	(+43)	21	7.3
JUN	195	(+12)	15.7	(+1.7)	13.4	15.9	12.9	0	21	(-34)	8	7.1
JUL	161	(-20)	15.3	(-0.7)	12.3	16.1	14.1	0	43	(-6)	13	5.2
AUG	214	(+45)	17.2	(+1.5)	14.2	17.4	15.1	0	67	(+8)	17	6.2
SEP	129	(-7)	15.2	(+1.6)	13.6	15.9	15.1	0	84	(+32)	17	6.8
OCT	97	(-4)	10.6	(+0.2)	8.3	12.1	13.3	0	137	(+81)	25	10.5
NOV	67	(+2)	7.0	(+0.7)	5.1	8.3	10.5	8	86	(+21)	24	10.8
DEC	49	(+7)	5.5	(+1.2)	4.2	7.6	9.2	9	70	(+12)	20	9.9
YEAR*	1585	(+192)	10.3	(+1.1)	8.1	11.2	10.8	59	870	(+238)	224	8.6

NOTE: Records were taken by an automatic data logger at Woburn.

https://doi.org/10.23637/ERADOC-1-55 *pp 188*