ROTHAMSTED RESEARCH

Yields of the Field Experiments 1992

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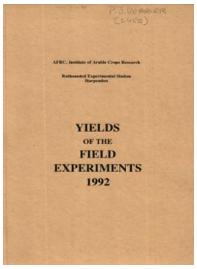

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Harpenden

YIELDS
OF THE
FIELD
EXPERIMENTS
1992

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YIELDS of the FIELD EXPERIMENTS 1992

This report is produced by members of the Statistics and Crop Management Departments. It includes only experiments conducted 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.

Price: Fifteen pounds.

Published 1993

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ERRATUM to 1991 edition

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In the treatments section change all references to July to June.

CONVENTIONS 1992

For each experiment current treatments are shown, together 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) Yields of the Field Experiments' - (t) indicates a year when treatments were described. Since 1973 treatments have been described annually for all experiments and (t) is not used for these years.

For the classical and some long-term experiments reference is made to 'Details' - separate publications, giving full descriptions of treatments until 1967 & 1973, with full titles 'Details of the Classical and Long Term Experiments up to 1967' 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 seed rates, rates of application of fertilizers, sprays etc. are per hectare.

All yields and plant numbers are per hectare.

The following abbreviations are used in variate headings:

Wheat, barley, oats, beans etc.

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

Sugar beet

Roots:	Roots (washed)
Sugar %:	Sugar percentage of washed roots

All crops

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

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

'Nitro-Chalk' contains 27% N and 'Nitram' 34.5% N.

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

'Dolomite' means magnesian limestone.

Compound fertilizers indicated thus - (20:10:10) = compound fertilizer (20% N, 10% P205, 10% K20), granular unless otherwise stated.

Treatment of cereal seed with organomercury and/or gamma HCH should be assumed in this report, exceptions are noted.

Harvest areas for cereals

On most of those cereal experiments which are harvested by combine the 'blank-row' technique is used to distinguish the areas taken for yield from the discard areas. For example when seed is drilled in 3 m wide plots in rows 12 cm apart appropriate coulters are prevented from sowing and 17 central rows are left for yield between pairs of blank rows. If the row-spacing is other than 12 cm a similar arrangement is used but with a different number of rows.

The ends of plots are separated from each other or from headlands by 1m fallow paths made after the crop has established.

The 'Area harvested' in the 'Yields', when the blank-row technique is used, is the product:-

number of rows harvested x distance between rows x length of rows.

If no rows are left blank and the plot is wider than the combine harvester so that discards are left uncut, the 'Area harvested' is the product:-

width of cutter bar x length of rows.

If the plot is narrower than the combine so that the whole area between paths is cut, the 'Area harvested' is the product:-

number of rows x distance between rows x length of rows.

We do not apply the adjustment used by some workers who take the harvested areas as width x length where each is measured to the centre of 'paths' up to a maximum of about 50 cm.

Tables of means

Tables of means are presented directly from computer output. Both factor and level names are presented in upper case characters. Vertical and horizontal lines are omitted e.g.:-

FACTOR C	LEVEL C1		LEVEL C2		LEVEL C3	
FACTOR B	LEVEL B1	LEVEL B2	LEVEL B1	LEVEL B2	LEVEL B1	LEVEL B2
FACTOR A						
LEVEL A1	*	*	*	*	*	*
LEVEL A2	*	*	*	*	*	*

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.

PESTICIDES USED

The following list of pesticides is based on The UK Pesticide Guide 1992, C. A. B. International British Crop Protection Council. Published by University Press, Cambridge.

KEY TO ABBREVIATIONS

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

TRADE NAME	FUNCTION	ACTIVE INGREDIENT
Actipron	AD	97% highly refined mineral oil
Agral	AD	900 g/l alkyl phenol ethylene oxide
Ally	H	20% w/w metsulfuron-methyl
Alto 100 SL	F	100 g/l cyproconazole
Aphox	I	50% w/w pirimicarb
Arelon WDG	H	82.5% w/w isoproturon
Asset	H	50:125:62.5 g/l benazolin + bromoxynil + ioxynil
Barclay Gallup	H	360 g/l glyphosate
Basagran	H	480 g/l bentazone
Bavistin FL	F	500 g/l carbendazim
Bayleton	F	25% w/w triadimefon
Bayleton BM	F	12.5% w/w triadimefon + 25% w/w carbendazim
Baytan	F	3:25% w/w fuberidazole + triadimenol
Benazalox	H	30:5% w/w benazolin + clopyralid
Benlate	F	50% benomyl
Butisan S	H	500 g/l metazachlor
Calirus	F	50% w/w benodanil
Calixin	F	750 g/l tridemorph
Carbetamex	H	70% w/w carbetamide
Challenge	H	150 g/l glufosinate-ammonium
Chiltern Chlorothalonil 500	F	500 g/l chlorothalonil
Chiltern Cropspray 11E	AD	99% highly refined mineral oil
Chiltern Manex	F	480:11 g/l maneb + zinc oxide
Chiltern Olé	F	500 g/l chlorothalonil
Chiltern Super-Tin 4L	F	480 g/l fentin hydroxide
Compass	F	167:167 g/l iprodione + thiophanate-methyl
Decis	I	25 g/l deltamethrin
Deloxil	H	190:190 g/l bromoxynil + ioxynil
Delsene M Flowable	F	50:320 g/l carbendazim + maneb
Dorin	F	125:375 g/l triadimenol + tridemorph
Draza	M,I	4% w/w methiocarb
Duplosan New System CMPP	H	600 g/l mecoprop-P
Farmon Blue	AD	900 g/l alkyl phenol ethylene oxide
Folimat	I	575 g/l omethoate
Fonofos Seed Treatment	I	433 g/l fonofos

TRADE NAME	FUNCTION	ACTIVE INGREDIENT
Fortrol	H	500 g/l cyanazine
Fusilade 5	H	125 g/l fluazifop-P-butyl
Glytex	H	3.4:70% w/w isoxaben + methabenzthiazuron
Gramoxone 100	H	200 g/l paraquat
Halo	F	375:47 g/l chlorothalonil + flutriafol
Harmony M	H	68:7% w/w metsulfuron-methyl + thifensulfuron-methyl
High Trees Mixture B	AD	Non-ionic wetter/spreader
Hydraguard	I,F	615:230 g/l gamma-HCH + thiram
Impact Excel	F	300:47 g/l chlorothalonil + flutriafol
Kerb 50 W	H	50% w/w propyzamide
Laser	H	200 g/l cycloxydim
Lentagran 45WP	H	45% w/w pyridate
Lindex-Plus FS	F,I	43:545:73 g/l fenpropimorph + gamma-HCH + thiram
Metasystox 55	I	580 g/l demeton-S-methyl
Mistral	F	750 g/l fenpropimorph
New 5C Cycocel	GR	645:32 g/l chlormequat + choline chloride
Nu Film P	AD	poly-1-P-menthene
Opogard 500 FW	H	150:350 g/l terbuthylazine + terbutryn
Pilot	H	500 g/l quizalofop-ethyl
Pinnacle	H	300:553 g/l imazamethabenz-methyl-isoproturon
Power Dimethoate	I	400 g/l dimethoate
Prelude 20LF	F	500 g/l prochloraz
Radar	F	250 g/l propiconazole
Reglone	H,D	200 g/l diquat
Ringer	F	750 g/l tridemorph
Ripcord	I	100 g/l cypermethrin
Rotalin	H	300 g/l linuron
Roundup	H	360 g/l glyphosate
Rovral Flo	F	250 g/l iprodione
Rovral WP	F	50% w/w iprodione
Sportak 45	F	450 g/l prochloraz
Starane 2	H	200 g/l fluroxypyr
Stefes IPU	H	500 g/l isoproturon
Sting CT	H	120 g/l glyphosate
Stomp 400	H	400 g/l pendimethalin
Team	AD	800 g/l ethoxylated tallow amine
Terpal	GR	155:305 g/l 2-chloroethylphosphonic acid + mepiquat chloride
Treflan	H	480 g/l trifluralin
Trifolex-Tra	H	34:216 g/l MCPA+MCPB
Tripart Brevis	GR	700 g/l chlormequat
Tripart Defensor FL	F	500 g/l carbendazim (MBC)
Tripart Ludorum	H	500 g/l chlorotoluron
Vassgro Spreader	AD	nonyl phenol ethylene oxide condensates
Vindex	H	240:50 g/l bromoxynil + clopyralid
Yaltox	I,N	5% w/w carbofuran

92/R/BK/1

BROADBALK

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

The 149th year, w. wheat, fallow, potatoes.

For previous years see 'Details' 1967 and 1973, Station Report for 1966, pp. 229-231, Station Report for 1968, Part 2, Station Report for 1982, Part 2, pp. 5-44 and 74-91/R/BK/1.

Areas harvested:

Wheat:	Section	
	0	0.00311
	1	0.00572
	4,5,6 and 7	0.00473
	8 and 9	0.00497
Potatoes:	3	0.00348

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 1/2(P K (Na) Mg)	N1+3 1/2(PK Mg)+
18N0+3FH	18	P K Na Mg(A)	N2 1/2(P K (Na) Mg)	N0+3 1/2(PK Mg)+
19C	19	C	C	C
20NKMG	20	N2 K Na Mg	N2 K (Na) Mg	N2 K Mg

(A) Alternating

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\+ This change since 1980. Treatments shown are those to w. wheat; autumn N alternates. Potatoes receive N3 1/2 (PK Mg) on both Plots 17 and 18.

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 'Nitram' 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 single superphosphate until 1987, triple superphosphate in 1974 and since 1988

K: 90 kg K as sulphate of potash

Na: 55 kg Na as sulphate of soda

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

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

D: Farmyard manure at 35 tonnes

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

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

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

SECTION	Section	68	69	70, 73, and 76	71, 74, and 77	72, 75, and 78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
0/W41	0*	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
1/W26	1	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
-	2	BE	W	P	BE	W	F	P	W	F	P	W	W	W	F	P	W	W	W	F
POTATOES	3	W	W	F	W	W	F	W	W	W	W	W	W	F	P	W	W	W	F	P
4/W2	4	W	P	BE	W	P	P	W	F	P	W	F	P	W	W	W	F	P	W	W
5/W1	5	W	F	W	W	F	W	W	W	W	W	W	F	P	W	W	W	F	P	W
6/W15	6**	F	W	W	F	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
7/W3	7	P	BE	W	P	BE	W	F	P	W	F	P	W	W	W	F	P	W	W	W
8/W4	8+	W	W	W	W	W	W	W	F	W	W	W	W	W	W	F	W	W	W	W
9/W34	9	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W

W = w. wheat, P = potatoes, BE = s. beans, F = fallow

* Straw incorporated since 1987. ** No sprays except weedkillers since 1985. + No weedkillers.

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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. Since autumn 1988 a five year cycle has been 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.

Experimental diary:

All Sections:
30-Sep-91 : T : P applied.
07-Oct-91 : T : K, Na and Mg applied.
09-Oct-91 : T : FYM applied.
11-Oct-91 : B : Ploughed and furrow pressed.
14-Oct-91 : B : Rotary harrowed.

Cropped Sections:

W. wheat:
31-Aug-91 : T : Straw chopped (section 0).
09-Oct-91 : T : Chalk applied at 2.9 t (sections 4 and 6)
10-Oct-91 : T : Autumn N treatments applied.
15-Oct-91 : T : Rotary harrowed, Apollo, dressed Fonofos Seed Treatment, drilled at 200 kg.
16-Oct-91 : T : Rolled.
06-Dec-91 : T : Stomp 400 at 3.3 l and Stefes IPU at 2.5 l in 200 l (except section 8).
10-Apr-92 : T : Spring N treatments applied.
14-May-92 : T : Sportak 45 at 0.90 l, Calixin at 0.50 l and Tripart Brevis at 2.25 l in 200 l (except section 6).
09-Jun-92 : T : Chiltern Olé at 2.0 l and Mistral at 1.0 l in 200 l (except section 6).
23-Jun-92 : T : Radar at 0.50 l and Mistral at 0.50 l in 200 l (except section 6).
28-Jun-92 : T : Roundup at 6.0 l with High Trees Mixture B at 2.9 l in 150 l (except section 8).
06-Aug-92 : T : Combine harvested.

Potatoes:
15-Jan-92 : T : Chisel ploughed.
10-Apr-92 : T : N treatments applied.
13-Apr-92 : T : Heavy spring-tine cultivated.
23-Apr-92 : T : Rotary harrowed, planted Pentland Crown Elite 2.
13-May-92 : T : Rotalin at 5.5 l in 400 l.
22-Jun-92 : T : Manex at 2.0 l with Nu Film P at 0.18 l in 200 l.
08-Jul-92 : T : Manex at 2.0 l and Aphox at 0.28 kg with Nu Film P at 0.18 l in 200 l.
16-Jul-92 : T : Manex at 2.0 l with Nu Film P at 0.18 l in 200 l.
28-Jul-92 : T : Manex at 2.5 l with Nu Film P at 0.18 l in 200 l.
17-Aug-92 : T : Chiltern Super-Tin 4L at 0.56 l with Nu Film P at 0.18 l in 200 l.
29-Aug-92 : T : Chiltern Super-Tin 4L at 0.56 l with Nu Film P at 0.18 l in 200 l.
10-Sep-92 : T : Reglone at 4.0 l in 200 l.
22-Sep-92 : T : Haulm mechanically destroyed.
02-Oct-92 : T : Lifted.

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Experimental diary:
Fallow:
15-Jan-92 : **T** : Chisel ploughed.
13-Apr-92 : **T** : Heavy spring-tine cultivated.
18-May-92 : **T** : Heavy spring-tine cultivated.
25-Jun-92 : **T** : Cultivated by rotary grubber.

NOTE: Samples of grain and straw from Sections 1 and 5 and samples of potato tubers from Section 3 were taken for chemical analysis.

W. WHEAT

GRAIN TONNES/HECTARE

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

SECTION / **PLOT**	5/W1	4/W2	7/W3	8/W4	6/W15	1/W26	9/W34	0/W41
01DN4PK	7.54	8.12	6.97	*	4.81	*	*	*
21DN2	8.38	9.18	8.31	4.93	6.67	8.52	8.03	8.59
22D	9.37	4.74	6.82	4.29	6.46	7.16	8.18	6.18
030	1.99	0.81	0.70	1.94	1.41	1.21	0.72	1.16
05F	1.92	1.06	0.93	2.39	1.57	1.81	1.59	1.49
06N1F	6.07	2.92	3.11	2.78	3.93	4.18	4.26	4.57
07N2F	8.75	4.89	3.94	3.67	5.03	5.68	6.07	5.39
08N3F	9.62	7.01	5.66	4.69	6.45	7.00	7.83	6.81
09N4F	9.03	7.81	7.52	5.10	6.51	7.08	8.07	7.64
10N2	7.44	2.91	2.40	2.24	3.39	3.39	2.90	2.96
11N2P	4.66	5.28	3.22	3.51	3.49	5.02	2.39	5.00
12N2PNA	5.96	5.08	3.21	3.02	5.11	3.67	3.37	5.66
13N2PK	8.05	4.15	3.37	2.87	5.34	5.31	6.55	5.35
14N2PKMG	8.29	4.08	3.59	2.84	5.30	5.55	6.59	5.99
15N5F	8.58	8.29	7.34	4.53	5.50	8.04	8.32	7.87
16N6F	8.32	7.96	7.72	4.79	4.85	7.59	8.00	7.64
17N1+3FN	9.09	7.48	7.22	3.43	6.41	7.52	8.21	7.62
18N0+3FN	9.44	7.27	6.64	2.67	6.71	7.34	8.03	7.57
19C	5.69	1.15	1.06	3.12	2.65	2.27	2.64	2.59
20NKMG	*	*	*	*	*	3.08	*	3.77

GRAIN MEAN DM% 87.5

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STRAW TONNES/HECTARE

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

SECTION / PLOT	5/W1	1/W26
01DN4PK	8.26	*
21DN2	8.08	7.01
22D	9.37	3.95
030	0.96	0.16
05F	0.64	0.24
06N1F	3.51	1.52
07N2F	5.55	2.52
08N3F	5.48	3.43
09N4F	4.94	2.65
10N2	2.59	2.06
11N2P	1.74	2.13
12N2PNA	2.60	1.42
13N2PK	4.16	2.30
14N2PKMG	4.50	2.20
15N5F	4.77	3.52
16N6F	5.23	4.07
17N1+3FN	5.17	3.41
18N0+3FN	5.02	3.10
19C	2.95	0.40
20NKMG	*	1.67

STRAW MEAN DM% 82.4

CLEAN GRAIN TONNES/HECTARE, AFTER REMOVING WEED SEEDS

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

SECTION / PLOT	8/W4
01DN4PK	*
21DN2	4.82
22D	3.82
030	1.57
05F	1.46
06N1F	2.50
07N2F	3.37
08N3F	4.52
09N4F	4.95
10N2	2.15
11N2P	3.42
12N2PNA	2.96
13N2PK	2.47
14N2PKMG	2.10
15N5F	4.41
16N6F	4.60
17N1+3FN	2.69
18N0+3FN	1.81
19C	2.80
20NKMG	*

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92/R/BK/1 POTATOES

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

PLOT	TOTAL TUBERS TONNES/ HECTARE	% WARE 3.81 CM (1.5 INCH) RIDDLE
01DN4PK	54.0	97.7
21DN2	62.1	97.6
22D	56.5	98.7
030	10.6	92.7
05F	23.8	97.6
06N1F	25.1	95.7
07N2F	31.3	94.8
08N3F	34.1	96.9
09N4F	42.4	98.1
10N2	7.3	78.8
11N2P	7.3	78.2
12N2PNA	8.2	84.9
13N2PK	15.5	97.2
14N2PKMG	32.4	95.7
15N5F	36.5	97.0
16N6F	46.2	97.7
17N3FH	32.5	97.0
18N3FH	28.0	95.6
19C	15.1	95.1

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92/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 the experiment reverted to continuous s. barley.

The 141st year, s. barley.

For previous years see 'Details' 1967 and 1973, Station Report for 1966 and 74-91/R/HB/2.

Treatments: All combinations of:-

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

	Form of N 1852-1966	Additional treatments 1852-1979	Changes since 1980
---	None	-	-
-P-	None	P	-
--K	None	K(Na)Mg	-
-PK	None	PK(Na)Mg	-
A--	A	-	-
AP-	A	P	-
A-K	A	K(Na)Mg	-
APK	A	PK(Na)Mg	-
N----	N	-	-
NP---	N	P	-
N-K--	N	K(Na)Mg	-
NPK--	N	PK(Na)Mg	-
N--S-	N	Si	Si omitted
NP-S-	N	P Si	"
N-KS-	N	K(Na)MgSi	"
NPKS-	N	PK(Na)MgSi	"
N---S	N	-	Si added
NP--S	N	P	"
N-K-S	N	K(Na)Mg	"
NPK-S	N	PK(Na)Mg	"
N--SS	N	Si	-
NP-SS	N	P Si	-
N-KSS	N	K(Na)MgSi	-
NPKSS	N	PK(Na)MgSi	-
C(--)	C	-	PKMg omitted
C(P-)	C	P	"
C(-K)	C	K(Na)Mg	"
C(PK)	C	PK(Na)Mg	"
D	None	D	-
(D)	(D)	-	-
(A)	(Ashes)	-	-
-	None	-	-

https://doi.org/10.23637/ERADOC-1-47

92/R/HB/2

Form of N: A, sulphate of ammonia: N, nitrate of soda - each to supply 48 kg N: C, castor meal to supply 96 kg N
P: 35 kg P as triple superphosphate (triple superphosphate in 1974, 1988, 1989 and 1991, single superphosphate in other years)
K: 90 kg K as sulphate of potash
(Na): 16 kg Na as sulphate of soda until 1973
Mg: 35 kg Mg, as kieserite every third year since 1974 (sulphate of magnesia annually until 1973)
Si: Silicate of soda at 450 kg
D: Farmyard manure at 35 tonnes. (D): until 1871 only
(Ashes): Weed ash 1852-1916, furnace ash 1917-1932, none since

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:-

1. **MANURE** Fertilizers other than magnesium:

551AN2PK	Plot 551 AN2PK
561--PK	Plot 561 --PK
571NN2--	Plot 571 NN2
581NN2--	Plot 581 NN2

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

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

0
35

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

Experimental diary:

15-Oct-91 : B : Chalk applied at 2.9 t.
07-Dec-91 : B : Sting CT at 2.0 l in 200 l.
11-Dec-91 : **T** : Silicate of soda and kieserite applied.
12-Dec-91 : **T** : P and K applied.
06-Jan-92 : **T** : FYM applied.
13-Jan-92 : B : Ploughed.
25-Feb-92 : B : Spring-tine cultivated.
26-Feb-92 : B : Rotary harrowed, Alexis, dressed Baytan, drilled at 150 kg, rolled.
06-May-92 : **T** : N applied.

https://doi.org/10.23637/ERADOC-1-47

92/R/HB/2

Experimental diary:

15-May-92 : B : Deloxil at 1.0 l, Duplosan New System CMPP at 2.0 l and Calixin at 0.70 l in 200 l.
09-Jun-92 : B : Calixin at 0.50 l and Radar at 0.50 l in 200 l.
05-Aug-92 : B : Combine harvested.

NOTES: (1) No yields were taken from the plots **MANURE** --- and A-- owing to poor early growth and subsequent damage from rabbit grazing.
(2) Samples of grain and straw were taken for chemical analysis.

MAIN PLOTS

GRAIN TONNES/HECTARE

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

N / MANURE	0	48	96	144	Mean
---	0.00	0.00	0.00	0.00	0.00
-P-	1.86	2.93	3.35	3.92	3.01
--K	0.67	1.56	1.41	1.99	1.40
-PK	1.66	4.02	5.11	5.41	4.05
A--	0.00	0.00	0.00	0.00	0.00
AP-	2.32	3.03	2.16	2.04	2.39
A-K	0.63	0.55	0.82	0.86	0.71
APK	1.90	4.16	4.67	4.97	3.93
N----	0.58	0.39	0.32	0.63	0.48
NP---	2.32	4.19	2.83	4.34	3.42
N-K--	1.34	0.96	0.62	1.40	1.08
NPK--	2.01	4.32	4.91	5.85	4.27
N--S-	1.46	1.04	1.22	1.85	1.39
NP-S-	2.45	3.53	4.02	4.34	3.59
N-KS-	2.10	2.20	3.52	2.27	2.52
NPKS-	1.94	4.82	5.86	5.76	4.60
N---S	1.15	1.34	0.95	0.96	1.10
NP--S	2.81	4.42	3.83	4.33	3.85
N-K-S	1.09	2.80	1.94	1.65	1.87
NPK-S	2.27	4.46	5.24	5.53	4.38
N--SS	0.70	1.31	1.01	1.96	1.25
NP-SS	3.01	3.83	4.22	3.84	3.72
N-KSS	2.05	2.84	2.57	2.17	2.41
NPKSS	2.26	3.93	5.38	5.99	4.39
C(--)	1.58	2.21	2.32	3.42	2.38
C(P-)	2.22	3.74	4.29	4.56	3.70
C(-K)	2.12	3.25	3.63	4.84	3.46
C(PK)	2.11	4.22	4.92	5.05	4.08
D	6.87	7.15	7.15	7.12	7.07
(D)	2.88	2.35	2.84	3.04	2.78
(A)	1.39	1.47	1.77	3.08	1.93
-	0.52	1.13	1.57	1.26	1.12
Mean	1.82	2.75	2.95	3.26	2.70

GRAIN MEAN DM% 79.3

https://doi.org/10.23637/ERADOC-1-47

92/R/HB/2

STRAW TONNES/HECTARE

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

N	0	48	96	144	Mean
MANURE					
---	0.00	0.00	0.00	0.00	0.00
-P-	0.40	1.18	2.11	2.12	1.45
--K	0.14	0.46	0.60	0.72	0.48
-PK	0.64	1.66	2.31	2.62	1.81
A--	0.00	0.00	0.00	0.00	0.00
AP-	0.81	1.82	1.59	1.86	1.52
A-K	0.22	0.17	0.22	0.29	0.23
APK	0.52	1.84	2.14	2.75	1.81
D	4.37	5.38	5.06	5.06	4.96
(D)	1.10	1.07	1.79	1.49	1.36
(A)	0.36	0.43	0.68	1.29	0.69
-	0.13	0.38	0.87	0.39	0.44
Mean	0.72	1.20	1.45	1.55	1.23

STRAW MEAN DM% 57.6

PLOT AREA HARVESTED 0.00154

EXTRA PLOTS

GRAIN TONNES/HECTARE

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

MANURE	551AN2PK	561--PK	571NN2--	581NN2--	Mean
MGNESIUM					
0	4.70	1.10	2.85	0.53	2.29
35	5.28	0.97	1.70	0.56	2.13
Mean	4.99	1.04	2.27	0.55	2.21

GRAIN MEAN DM% 84.7

PLOT AREA HARVESTED 0.00329

https://doi.org/10.23637/ERADOC-1-47

92/R/WF/3

WHEAT AND FALLOW

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

The 137th year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-91/R/WF/3.

Whole plot dimensions: 9.0 x 211.

Treatments:
Each year there are two plots, one is sown to w. wheat, one is fallow; they alternate in successive years.

Experimental diary:
Wheat plot:
15-Oct-91 : **T** : Rotary harrowed twice, Apollo, dressed Fonofos Seed Treatment, drilled at 200 kg.
17-Oct-91 : **T** : Rolled.
30-Jul-92 : **T** : Combine harvested.
Fallow plot:
20-Sep-91 : **T** : Ploughed, spring-tine cultivated, rolled.
15-Jan-92 : **T** : Chisel ploughed.
18-May-92 : **T** : Heavy spring-tine cultivated.
25-Jun-92 : **T** : Cultivated by rotary grubber.

GRAIN AND STRAW TONNES/HECTARE

	GRAIN	STRAW
YIELD	1.19	1.08
MEAN DM%	85.5	86.4
PLOT AREA HARVESTED	0.04304	

https://doi.org/10.23637/ERADOC-1-47

92/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 in 1992 - Hoosfield.

The 137th year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-91/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 tonnes
	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**	Phosphate applied annually from 1986 as superphosphate until 1987, triple superphosphate since:
	O	None
	P1	44 kg P
	P2	87 kg P
	P3	131 kg P

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 tonnes
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:

18-Sep-91 : **T** : P applied as triple superphosphate to treatment plots.
: **T** : Muriate of potash at 170 kg.

Residual N test:

18-Sep-91 : **T** : Triple superphosphate at 1420 kg.
23-Sep-91 : **T** : Triple superphosphate at 710 kg.

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92/R/EX/4

Experimental diary:
All plots:
19-Sep-91 : B : Sting CT at 1.5 l in 200 l.
20-Sep-91 : B : Ploughed, spring-tine cultivated, rolled.
23-Sep-91 : B : Rotary harrowed, Mercia drilled at 160 kg, rolled.
14-Apr-92 : B : 34.5% N applied at 560 kg.
23-Jun-92 : B : Radar at 0.50 l and Mistral at 0.50 l in 200 l.
31-Jul-92 : B : Combine harvested.

NOTES: (1) Yields presented for **K TEST** are means of four plots.
(2) Grain and straw samples were taken for chemical analysis.

P TEST

GRAIN TONNES/HECTARE

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

P	0	P1	P2	P3	Mean
OLD RES					
0	2.70	7.97	8.17	7.96	6.70
D	6.85	8.21	8.03	8.11	7.80
N	2.43	7.94	7.92	8.11	6.60
P	5.08	7.46	7.26	7.63	6.86
NPKNAMG	4.69	7.70	7.90	7.84	7.03
Mean	4.35	7.86	7.86	7.93	7.00

GRAIN MEAN DM% 87.5

STRAW TONNES/HECTARE

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

P	0	P1	P2	P3	Mean
OLD RES					
0	1.71	6.39	6.96	6.79	5.46
D	4.72	6.60	7.21	6.43	6.24
N	1.87	6.62	7.50	7.18	5.79
P	4.27	6.03	8.13	7.60	6.51
NPKNAMG	3.82	6.39	7.20	6.91	6.08
Mean	3.28	6.41	7.40	6.98	6.02

STRAW MEAN DM% 85.1

PLOT AREA HARVESTED 0.00589

https://doi.org/10.23637/ERADOC-1-47

92/R/EX/4

K TEST

GRAIN TONNES/HECTARE

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

OLD RES	O	D	N*	PK	N*PK	Mean
	5.70	7.35	5.25	4.96	5.69	5.79

GRAIN MEAN DM% 87.8

STRAW TONNES/HECTARE

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

OLD RES	O	D	N*	PK	N*PK	Mean
	5.24	5.70	4.90	5.55	5.19	5.32

STRAW MEAN DM% 91.6

PLOT AREA HARVESTED 0.00589

https://doi.org/10.23637/ERADOC-1-47

92/R/PG/5

PARK GRASS

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

The 137th year, hay.

For previous years see 'Details' 1967 and 1973 and 74-91/R/PG/5.

Treatments: Combinations of:-

Whole plots

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

N1	Plot 1	N1
O(D)	Plot 2	None (D until 1863)
O/PLOT3	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/PLOT12	Plot 12	None
D/F	Plot 13	D/F
MN(N2*14)	Plot 14/1	P K Na Mg (N2* until 1989)
N2*MN	Plot 14/2	N2* P K Na Mg
MN(N2*15)	Plot 15	P K Na Mg (N2* until 1875)
N1*MN	Plot 16	N1* P K Na Mg
N1*	Plot 17	N1*
N2KNAMG	Plot 18	N2 K Na Mg
D	Plot 19	D
D/N*PK	Plot 20	D/N*P K

N1, N2, N3:	48, 96, 144 kg N as sulphate of ammonia
N1*, N2*:	48, 96 kg N as nitrate of soda (30 kg N to Plot 20, only in years with no farmyard manure)
P:	35 kg P (15 kg P to Plot 20, only in years with no farmyard manure) as single superphosphate until 1986, triple superphosphate in 1974, and since 1987
K:	225 kg K (45 kg K to Plot 20, only in years with no farmyard manure) as sulphate of potash
Na:	15 kg Na as sulphate of soda
Mg:	10 kg Mg as sulphate of magnesia
Si:	Silicate of soda at 450 kg
D:	Farmyard manure at 35 tonnes every fourth year
F:	Fish meal every fourth year to supply 63 kg N
MN:	P K Na Mg

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92/R/PG/5

Sub plots

2. **LIME** Liming:

A	a Ground chalk applied as necessary to achieve pH7
B	b Ground chalk applied as necessary to achieve pH6
C	c Ground chalk applied as necessary to achieve pH5
D	d None

NOTE: Lime was applied regularly, and at the same rate, to all 'a' and 'b' sub plots of Plots 1 to 17 (except 12) from 1924. Differential liming started in 1965 on certain 'b' and 'c' sub plots (except on Plot 12) and in 1976 on certain 'a' sub plots (including Plot 12) and 12b. Liming ceased on plots 9/1 and 14/1 after 1989. Lime last applied in 1990.

Additional sub plots (Plots 18, 19 and 20 only) (tonnes CaCO3 applied every fourth year 1920-1964):

N2KNAMG0	18-1	None
N2KNAMG2	18-2	13.5
N2KNAMG1	18-3	7.9
DO	19-1	None
D2	19-2	6.3
D1	19-3	1.1
D/N*PK0	20-1	None
D/N*PK2	20-2	5.6
D/N*PK1	20-3	1.1

Since 1965 Plot 18-1 has been split into two for treatments 'c' and 'd' above and Plot 18-3 split into two for treatments 'a' and 'b'. Plots 19 and 20 received no further chalk after 1968; plot 18/2 no further chalk after 1972.

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

Experimental diary:

28-Nov-91	**T**	P applied.
15-Jan-92	**T**	K, Na, Mg and Si applied.
07-May-92	**T**	N applied.
16-Jun-92	**T**	First sample cut, herbage removed. Remaining area cut for hay.
17-Jun-92	B	Hay turned twice with tedder.
18-Jun-92	B	Hay turned with tedder, rowed up.
22-Jun-92	B	Hay turned twice with tedder.
23 Jun-92	B	Hay rowed up and baled
13-Nov-92	B	Second sample cut, herbage removed.
14-Dec-92	B	Remaining area cut, herbage removed.

NOTES: (1) On sub plots 'a' and 'd' of plots 03, 9/2, 11/1, 12, 14/2 and 16 hay was made, weighed and sampled on the area of the sub plots remaining after the silage cut has been removed.
(2) After the second sample cut wet weather delayed the cutting and removal of herbage on the non-yield area.

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92/R/PG/5

1ST CUT (16/6/92) DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	2.66	2.83	2.38	0.92	2.20
O(D)	2.15	2.80	1.75	1.63	2.08
O/PLOT3	2.06	2.78	1.47	1.58	1.97
P	2.72	3.73	2.53	2.41	2.85
N2P	2.88	3.00	3.00	2.04	2.73
N1MN	5.37	4.78			5.07
MN	5.21	5.53	4.25	3.61	4.65
PNAMG	2.67	3.03	2.52	2.32	2.64
MN(N2)	3.56	2.95	2.38	3.96	3.21
N2MN	4.89	4.34	2.77	3.48	3.87
N2PNAMG	3.50	3.61	3.29	2.68	3.27
N3MN	5.14	4.66	4.90	4.34	4.76
N3MNSI	4.43	4.34	3.99	4.07	4.21
O/PLOT12	2.13	1.88	1.24	1.39	1.66
D/F	4.29	4.89	3.67	3.16	4.00
MN(N2*14)	4.29	3.83	3.96	3.75	3.96
N2*MN	4.07	6.43	5.38	5.93	5.45
MN(N2*15)	5.11	5.23	5.30	4.06	4.93
N1*MN	4.89	5.15	4.56	4.21	4.70
N1*	3.35	3.27	2.76	2.75	3.03
N2KNAMG0			1.99	1.42	1.70
N2KNAMG2	2.96				2.96
N2KNAMG1	3.15	2.54			2.84
D0	3.72				3.72
D2	4.55				4.55
D1	3.83				3.83
D/N*PK0	4.75				4.75
D/N*PK2	4.81				4.81
D/N*PK1	4.39				4.39

1ST CUT MEAN DM% 24.2

https://doi.org/10.23637/ERADOC-1-47

92/R/PG/5

2ND CUT (13/11/92) DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	3.32	3.18	3.46	1.63	2.89
O(D)	1.96	2.45	2.48	2.70	2.40
O/PLOT3	1.90	2.56	2.65	3.93	2.76
P	2.62	2.20	2.37	2.63	2.45
N2P	3.53	3.33	2.82	2.27	2.99
N1MN	3.44	3.60			3.52
MN	3.46	3.26	3.54	2.82	3.27
PNAMG	2.79	2.41	3.82	4.02	3.26
MN(N2)	2.23	2.18	2.03	2.74	2.30
N2MN	2.80	2.82	3.07	3.01	2.92
N2PNAMG	2.67	3.55	3.12	3.13	3.12
N3MN	3.43	3.28	3.71	3.91	3.58
N3MNSI	3.65	3.10	3.13	3.74	3.41
O/PLOT12	1.85	1.86	2.28	2.45	2.11
D/F	3.21	3.40	4.50	3.83	3.73
MN(N2*14)	3.47	3.49	1.51	1.73	2.55
N2*MN	3.07	2.67	1.97	1.51	2.31
MN(N2*15)	2.82	2.91	3.22	2.81	2.94
N1*MN	2.91	2.48	2.97	2.40	2.69
N1*	2.49	2.27	2.55	2.68	2.50
N2KNAMG0			3.33	5.83	4.58
N2KNAMG2	2.27				2.27
N2KNAMG1	4.82	3.89			4.36
D0	5.39				5.39
D2	3.88				3.88
D1	3.85				3.85
D/N*PK0	4.39				4.39
D/N*PK2	3.29				3.29
D/N*PK1	3.42				3.42

2ND CUT MEAN DM% 28.2

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92/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	5.98	6.01	5.84	2.54	5.09
O(D)	4.11	5.25	4.23	4.33	4.48
O/PLOT3	3.96	5.34	4.12	5.51	4.73
P	5.33	5.93	4.89	5.05	5.30
N2P	6.41	6.33	5.82	4.31	5.72
N1MN	8.80	8.38			8.59
MN	8.67	8.79	7.78	6.43	7.92
PNAMG	5.47	5.44	6.34	6.34	5.90
MN(N2)	5.79	5.13	4.40	6.70	5.51
N2MN	7.69	7.16	5.83	6.49	6.79
N2PNAMG	6.17	7.16	6.41	5.82	6.39
N3MN	8.57	7.94	8.61	8.24	8.34
N3MNSI	8.08	7.44	7.12	7.81	7.61
O/PLOT12	3.98	3.74	3.52	3.84	3.77
D/F	7.49	8.29	8.17	6.99	7.73
MN(N2*14)	7.76	7.31	5.47	5.48	6.51
N2*MN	7.15	9.10	7.35	7.45	7.76
MN(N2*15)	7.93	8.14	8.52	6.87	7.87
N1*MN	7.80	7.64	7.53	6.61	7.39
N1*	5.84	5.54	5.30	5.43	5.53
N2KNAMG0			5.32	7.25	6.28
N2KNAMG2	5.24				5.24
N2KNAMG1	7.97	6.43			7.20
D0	9.11				9.11
D2	8.43				8.43
D1	7.68				7.68
D/N*PK0	9.14				9.14
D/N*PK2	8.09				8.09
D/N*PK1	7.81				7.81

TOTAL OF 2 CUTS MEAN DM% 26.2

PLOT AREA HARVESTED 0.00002

https://doi.org/10.23637/ERADOC-1-47

92/R/BN/7

BARNFIELD

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

Sections 1 and 2 the ninth year of grass/clover. The 18th year of grass on the rest of the experiment.

For previous years see 'Details' 1967 and 1973 and 74-91/R/BN/7.

Plot dimensions: 10.7 x 55.9.

Treatments to grass: All combinations of:-

Whole plots

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

D	D
DPK	D P K
PKMG	P K (Na) Mg
P	P
PK	P K
PMG	P (Na) Mg
0	0

P: 35 kg P as single superphosphate until 1987, triple superphosphate since and in 1974
K: 225 kg K as sulphate of potash
(Na): 90 kg Na as sodium chloride until 1973
Mg: 90 kg Mg as kieserite every fourth year since 1974 (sulphate of magnesia until 1973)
D: Farmyard manure at 35 tonnes (until 1975).

Quarter plots

2. **N PERCUT** Nitrogen fertilizer in 1992 (kg N per cut) as 'Nitram', 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

Castor meal last applied 1961, nitrate of soda and sulphate of ammonia until 1959.

Plus one plot **MANURE** KMG 100

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92/R/BN/7

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

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

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

Experimental diary:
All sections:
13-Nov-91 : **T** : P applied.
14-Nov-91 : **T** : K applied.
10-Jun-92 : B : First cut.
10-Nov-92 : B : Second cut.
Grass (Sections 3, 4, 5 and 6 only):
13-Mar-92 : **T** : N applied.
18-Jun-92 : **T** : N applied.

NOTE: Herbage samples were taken for chemical analysis.

GRASS

1ST CUT (10/6/92) DRY MATTER TONNES/HECTARE

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

N PERCUT / **MANURE**	75	100	125	150	Mean
D	6.52	6.33	4.93	5.38	5.79
DPK	6.95	7.04	7.58	6.23	6.95
PKMG	5.50	6.82	5.51	6.09	5.98
P	2.74	2.13	1.55	1.25	1.92
PK	6.30	5.66	6.02	5.49	5.87
PMG	3.09	2.35	2.07	1.13	2.16
0	2.60	2.54	1.78	1.60	2.13
Mean	4.82	4.70	4.20	3.88	4.40

MANURE KMG 100 6.41

Grand mean 4.47

1ST CUT MEAN DM% 24.6

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92/R/BN/7

GRASS

2ND CUT (10/11/92) DRY MATTER TONNES/HECTARE

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

N PERCUT / MANURE	75	100	125	150	Mean
D	5.54	5.26	5.43	6.17	5.60
DPK	5.02	5.33	4.67	5.38	5.10
PKMG	4.10	5.01	5.01	4.54	4.66
P	1.75	1.28	2.45	1.86	1.83
PK	3.87	4.83	5.03	4.00	4.43
PMG	2.38	0.85	1.74	2.58	1.89
0	1.95	1.66	2.21	2.64	2.12
Mean	3.52	3.46	3.79	3.88	3.66

MANURE KMG 100 5.28

Grand mean 3.72

2ND CUT MEAN DM% 19.8

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

N PERCUT / MANURE	75	100	125	150	Mean
D	12.06	11.59	10.36	11.55	11.39
DPK	11.98	12.36	12.25	11.61	12.05
PKMG	9.60	11.83	10.52	10.63	10.65
P	4.49	3.41	4.00	3.11	3.75
PK	10.18	10.49	11.05	9.48	10.30
PMG	5.48	3.20	3.81	3.71	4.05
0	4.55	4.19	3.99	4.24	4.24
Mean	8.33	8.15	8.00	7.76	8.06

MANURE KMG 100 11.69

Grand mean 8.19

TOTAL OF 2 CUTS MEAN DM% 22.2

PLOT AREA HARVESTED 0.00155

https://doi.org/10.23637/ERADOC-1-47

92/R/BN/7

GRASS/CLOVER

1ST CUT (10/6/92) DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	Mean
	3.31	3.81	3.32	2.84	3.10	3.06	2.29	3.10

1ST CUT MEAN DM% 13.9

2ND CUT (10/11/92) DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	Mean
	2.53	2.28	1.27	2.10	1.88	1.67	1.39	1.87

2ND CUT MEAN DM% 13.0

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	Mean
	5.83	6.09	4.59	4.94	4.97	4.73	3.69	4.98

TOTAL OF 2 CUTS MEAN DM% 13.4

PLOT AREA HARVESTED 0.00568

https://doi.org/10.23637/ERADOC-1-47 *pp 35*

92/R/GC/8

GARDEN CLOVER

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

The 139th year, red clover.

For previous years see 'Details' 1967 and 1973, and 74-91/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.

NOTE: Hungaropoly, sown at 30 kg in 1990.

Experimental diary:

```
18-Oct-91 : B : Hand weeded.  Chalk at 1.25 t, PK as (0:18:36) at 420 kg
                and Epsom salts at 530 kg.
23-Apr-92 : B : Hand weeded.
10-Jun-92 : B : First cut.
11-Jun-92 : B : Muriate of potash at 380 kg.
30-Jul-92 : B : Second cut.
18-Aug-92 : B : Muriate of potash at 380 kg.
12-Oct-92 : B : Third cut.
```

NOTE: Plant samples were chemically analysed.

1ST CUT (10/6/92) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	7.29	6.09	6.69

1ST CUT MEAN DM% 17.1

2ND CUT (30/7/92) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	8.28	6.88	7.58

2ND CUT MEAN DM% 19.0

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92/R/GC/8

3RD CUT (12/10/92) DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	2.66	1.70	2.18

3RD CUT MEAN DM% 17.5

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

FUNG RES	NONE	BENOMYL	Mean
	18.23	14.66	16.45

TOTAL OF 3 CUTS MEAN DM% 17.9

PLOT AREA HARVESTED 0.00010

https://doi.org/10.23637/ERADOC-1-47

92/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 55th year, leys, w. beans, w. wheat, w. rye, s. barley.

For previous years see 'Details' 1967 & 1973 and 74-91/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) LN, LN, LN, W, R
LC 3	(Previous CLO) LC, LC, LC, W, R
AF	(Previous A) F, F, BE, W, R
AB	(Previous A H) B, B, BE, W, R

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

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92/W/RN/3

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

LLN	LN, LN, LN, LN, LN, LN, LN, LN, W, R
LLC	LC, LC, LC, LC, LC, LC, LC, LC, W, R

LLN1 to LLN8 = eight year grass ley with N, first year to eighth year, similarly for LLC

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

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

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

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

Whole plots

1. **ROTATION** Rotations:

   LN 8
   LN 3
   LC 8
   LC 3
   AF
   AB

1/2 plots

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

NONE	None
FYM	38 tonnes on each occasion

1/8 plots

3. **N** Nitrogen fertilizer (kg N) as 'Nitro-Chalk':

   0
   70
   140
   210

https://doi.org/10.23637/ERADOC-1-47

92/W/RN/3

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

Whole plots

1. **ROTATION** Rotations:

   LN 8
   LN 3
   LC 8
   LC 3
   AF
   AB

1/2 plots

2. **FYMRES65** Farmyard manure residues, last applied 1965:

   NONE None
   FYM 38 tonnes on each occasion

1/8 plots

3. **N** Nitrogen fertilizer (kg N) as 'Nitro-Chalk':

   0
   30
   60
   90

Treatments to leys:

   FYM RES Farmyard manure residues:

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

Corrective K dressings (kg K_2O) as muriate of potash, applied to first test crop w. wheat and long-term leys in the wheat block, applied: 17 Sep, 1991:

Continuous rotations	No FYM half plots	FYM half plots
LN	0	75
LC	0	0
AF	260	235
AB	260	230

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92/W/RN/3

Ex-alternating rotations

LN 8 ploughed for w. wheat	45	40
LN 8 not ploughed	75	30
LC 8 ploughed for w. wheat	0	0
LC 8 not ploughed	0	0

Experimental diary:

Treatment Crops:

NOTE: Fourth year leys were treated with herbicide in error and were re-sown without cultivations as follows:

Grass ley and clover/grass ley, 4th year (**ROTATION** LLN4 and LLC4):

02-Sep-91 : **T** : Barclay Gallup at 4.0 l in 200 l in error.
25-Sep-91 : **T** : Direct drilled Climax timothy at 15 kg and meadow fescue 15 kg.
06-Mar-92 : **T** : PK as (0:16:36) at 470 kg. LLN4 only: NK as (25:0:16) at 300 kg. LLC4 only: Muriate of potash at 90 kg.
12-Jun-92 : **T** : LLC4 only: Topped.
18-Jun-92 : **T** : LLN4 only: 1st cut.
22-Jun-92 : **T** : LLN4 only: Produce removed.
23-Jun-92 : **T** : LLN4 only: NK as (25:0:16) at 300 kg.
29-Jun-92 : **T** : LLC4 only: Direct drilled Erecta timothy at 13.2 kg, meadow fescue at 13.2 kg and Huia white clover at 3.6 kg.
15-Sep-92 : **T** : LLN4 only: 2nd cut. LLC4 only: 1st cut.
16-Sep-92 : **T** : Produce removed.

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

04-Sep-91 : **T** : Ploughed, rolled.
06-Sep-91 : **T** : LN1 only: 34.5% N at 220 kg. Rotary harrowed, drilled Climax timothy at 15 kg and meadow fescue at 15 kg. Rolled.
LC1 only: 34.5% N at 145 kg. Rotary harrowed, drilled. Climax timothy at 14.4 kg, meadow fescue at 12.0 kg and Huia white clover at 3.6 kg. Rolled.
06-Mar-92 : **T** : PK as (0:16:36) at 470 kg. LN1 and LLN1 only: NK as (25:0:16) at 300 kg. LC1 and LLC1 only: Muriate of potash at 90 kg.
18-Jun-92 : **T** : 1st cut.
22-Jun-92 : **T** : Produce removed.
23-Jun-92 : **T** : LN1 and LLN1 only: NK as (25:0:16) at 300 kg. LC1 and LLC1 only: Muriate of potash at 90 kg.
15-Sep-92 : **T** : 2nd cut.
16-Sep-92 : **T** : Produce removed.

Grass leys, 2nd, 3rd, 5th, 6th, 7th and 8th years (**ROTATION** LN2-3, LLN2-3 and LLN5-8):

11-Oct-92 : **T** : LLN5 only: Dolomite at 5.0 t.
06-Mar-92 : **T** : PK as (0:16:36) at 470 kg. NK as (25:0:16) at 300 kg.
18-Jun-92 : **T** : 1st cut.

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Experimental diary:

22-Jun-92 : **T** : Produce removed.
23-Jun-92 : **T** : NK as (25:0:16) at 300 kg.
15-Sep-92 : **T** : 2nd cut.
17-Sep-92 : **T** : Produce removed.

Clover/grass leys, 2nd, 3rd, 5th, 6th, 7th and 8th years (**ROTATION** LC2-3, LLC2-3 and LLC5-8):

11-Oct-91 : **T** : LLC5 only: Dolomite at 5.0 t.
06-Mar-92 : **T** : PK as (0:16:36) at 470 kg. Muriate of potash at 90 kg.
18-Jun-92 : **T** : 1st Cut.
22-Jun-92 : **T** : Produce removed.
23-Jun-92 : **T** : Muriate of potash at 90 kg.
15-Sep-92 : **T** : 2nd Cut.
16-Sep-92 : **T** : Produce removed.

S. barley, 1st and 2nd treatment crops (**ROTATION** AB).

08-Oct-91 : **T** : Ploughed.
06-Mar-92 : **T** : NPK as (20:10:10) at 400 kg.
13-Mar-92 : **T** : Rotary cultivated with crumbler attached. Alexis, dressed Baytan, drilled at 157 kg.
20-May-92 : **T** : Deloxil at 1.0 l, Duplosan New System CMPP at 2.0 l and Calixin at 0.50 l in 200 l.
06-Aug-92 : **T** : Combine harvested.

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

30-Oct-91 : **T** : Punch broadcast at 163 kg, ploughed.
19-Feb-92 : **T** : Carbetamex at 3.0 kg in 200 l.
14-May-92 : **T** : Chiltern Olé at 2.0 l and Benlate at 1.0 kg with Vassgro Spreader at 0.03 l in 200 l.
15-May-92 : **T** : Decis at 0.30 l in 200 l.
04-Sep-92 : **T** : Combine harvested.

Fallow, 1st and 2nd treatment years (**ROTATION** AF):

08-Oct-92 : **T** : Ploughed.
05-May-92 : **T** : Rotary cultivated.

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

02-Oct-91 : **T** : Ploughed and rolled.
03-Oct-91 : **T** : PK as (0:24:24) at 260 kg. Yaltox at 150 kg. Rotary cultivated, drilled Mercia at 140 kg.
30-Oct-91 : **T** : Stomp 400 at 2.5 l, Arelon WDG at 0.50 kg and Decis at 0.20 l in 200 l.
13-Apr-92 : **T** : **N** 70, 140 and 210: Applied as 27% N.
03-May-92 : **T** : Dorin at 1.0 l in 300 l.
15-May-92 : **T** : Dorin at 1.0 l and Ally at 0.03 kg in 300 l.
09-Jun-92 : **T** : Impact Excel at 2.0 l in 200 l.
29-Jul-92 : **T** : Barclay Gallup at 2.0 l and Team at 0.30 l in 300 l.
29-Aug-92 : **T** : Combine harvested.

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92/W/RN/3

Experimental diary:
W. rye, 2nd test crop (R):
08-Oct-91 : **T** : Ploughed.
11-Oct-91 : **T** : Dolomite at 5.0 t. PK as (0:24:24) at 260 kg. Yaltox at 150 kg. Rotary cultivated, Amando drilled at 110 kg.
16-Jan-92 : **T** : Stomp 400 at 3.3 l in 200 l.
16-Apr-92 : **T** : **N** 30, 60 and 90: Applied as 27% N.
31-Jul-92 : **T** : Combine harvested.

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

LEYS

1ST CUTTING OCCASION (18/6/92) DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	2.67	3.11	2.89
LC2	4.33	4.72	4.53
LC3	6.34	5.23	5.79
LN1	4.71	5.52	5.12
LN2	6.71	7.16	6.94
LN3	6.53	7.19	6.86
LLC1	4.49	3.03	3.76
LLC2	6.39	7.30	6.84
LLC3	5.95	6.36	6.15
LLC4	*	*	*
LLC5	5.69	6.07	5.88
LLC6	4.06	3.07	3.56
LLC7	3.31	3.86	3.59
LLC8	6.54	5.13	5.83
LLN1	5.63	5.52	5.58
LLN2	6.85	5.92	6.39
LLN3	6.80	6.94	6.87
LLN4	3.51	4.97	4.24
LLN5	6.99	6.64	6.82
LLN6	4.18	4.99	4.59
LLN7	6.14	5.58	5.86
LLN8	5.20	5.80	5.50
Mean	5.38	5.43	5.41

1ST CUT MEAN DM% 24.6

https://doi.org/10.23637/ERADOC-1-47

92/W/RN/3

LEYS

2ND CUTTING OCCASION (15/9/92) DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	2.33	3.06	2.70
LC2	5.19	4.06	4.63
LC3	4.12	3.68	3.90
LN1	3.01	2.60	2.80
LN2	3.33	3.42	3.38
LN3	3.59	3.58	3.58
LLC1	3.15	3.03	3.09
LLC2	3.52	3.27	3.39
LLC3	3.24	3.44	3.34
LLC4	1.59*	1.54*	1.57*
LLC5	3.29	3.64	3.46
LLC6	2.70	2.57	2.63
LLC7	2.88	3.31	3.09
LLC8	3.15	3.82	3.49
LLN1	3.04	3.60	3.32
LLN2	4.19	3.57	3.88
LLN3	2.83	2.98	2.90
LLN4	2.03	2.91	2.47
LLN5	4.03	3.37	3.70
LLN6	2.42	2.63	2.52
LLN7	2.93	3.34	3.13
LLN8	4.18	4.76	4.47
Mean	3.22	3.28	3.25

2ND CUT MEAN DM% 23.5

NOTE: * First and only cut.

https://doi.org/10.23637/ERADOC-1-47

92/W/RN/3

LEYS

TOTAL OF 2 CUTTING OCCASIONS DRY MATTER TONNES/HECTARE

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

FYM RES LEY	NONE	FYM	Mean
LC1	5.00	6.17	5.59
LC2	9.52	8.79	9.15
LC3	10.47	8.91	9.69
LN1	7.73	8.11	7.92
LN2	10.04	10.58	10.31
LN3	10.11	10.77	10.44
LLC1	7.64	6.06	6.85
LLC2	9.91	10.56	10.23
LLC3	9.18	9.80	9.49
LLC4	1.59*	1.54*	1.57*
LLC5	8.98	9.70	9.34
LLC6	6.75	5.64	6.20
LLC7	6.19	7.17	6.68
LLC8	9.69	8.95	9.32
LLN1	8.68	9.11	8.90
LLN2	11.05	9.49	10.27
LLN3	9.63	9.92	9.77
LLN4	5.54	7.88	6.71
LLN5	11.02	10.01	10.52
LLN6	6.60	7.62	7.11
LLN7	9.06	8.93	8.99
LLN8	9.38	10.55	9.97
Mean	8.35	8.47	8.41

TOTAL OF 2 CUTS MEAN DM% 23.9

PLOT AREA HARVESTED 0.00204

NOTE: * One cut only

https://doi.org/10.23637/ERADOC-1-47

92/W/RN/3

W.WHEAT 1ST TEST CROP

GRAIN TONNES/HECTARE

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

FYMRES66	NONE	FYM	Mean
ROTATION			
LN 8	6.47	6.31	6.39
LN 3	5.70	6.27	5.99
LC 8	6.94	6.24	6.59
LC 3	6.46	5.91	6.19
AF	7.37	6.47	6.92
AB	6.71	7.38	7.04
Mean	6.61	6.43	6.52

N	0	70	140	210	Mean
ROTATION					
LN 8	4.19	7.17	7.54	6.67	6.39
LN 3	2.73	6.47	7.49	7.26	5.99
LC 8	7.11	6.65	6.45	6.14	6.59
LC 3	6.33	7.48	6.13	4.79	6.19
AF	3.82	8.05	8.21	7.59	6.92
AB	6.31	7.84	7.21	6.81	7.04
Mean	5.08	7.28	7.17	6.54	6.52

N	0	70	140	210	Mean
FYMRES66					
NONE	5.18	7.31	7.16	6.78	6.61
FYM	4.99	7.25	7.18	6.31	6.43
Mean	5.08	7.28	7.17	6.54	6.52

N	0	70	140	210
ROTATION	**FYMRES66**				
LN 8	NONE	4.14	7.18	7.22	7.33
	FYM	4.25	7.16	7.85	6.00
LN 3	NONE	2.27	6.10	6.86	7.57
	FYM	3.18	6.85	8.11	6.95
LC 8	NONE	7.12	7.05	6.95	6.62
	FYM	7.10	6.25	5.96	5.66
LC 3	NONE	6.75	7.65	6.34	5.09
	FYM	5.92	7.32	5.92	4.49
AF	NONE	4.38	8.22	8.36	8.52
	FYM	3.27	7.87	8.07	6.67
AB	NONE	6.40	7.63	7.23	5.56
	FYM	6.23	8.05	7.18	8.07

GRAIN MEAN DM% 81.7

PLOT AREA HARVESTED 0.00183

https://doi.org/10.23637/ERADOC-1-47

92/W/RN/3

W. RYE 2ND TEST CROP

GRAIN TONNES/HECTARE

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

FYMRES65	NONE	FYM	Mean
ROTATION			
LN 8	6.30	6.16	6.23
LN 3	7.24	6.47	6.86
LC 8	6.98	6.47	6.72
LC 3	6.07	7.03	6.55
AF	4.15	4.87	4.51
AB	5.05	5.68	5.36
Mean	5.96	6.11	6.04

N	0	30	60	90	Mean
ROTATION					
LN 8	3.97	5.71	7.81	7.43	6.23
LN 3	5.53	6.94	7.74	7.21	6.86
LC 8	5.52	6.99	6.56	7.82	6.72
LC 3	3.91	6.42	7.61	8.26	6.55
AF	1.60	4.37	5.59	6.48	4.51
AB	3.25	5.47	6.03	6.70	5.36
Mean	3.96	5.98	6.89	7.32	6.04

N	0	30	60	90	Mean
FYMRES65					
NONE	3.72	5.85	7.03	7.26	5.96
FYM	4.20	6.12	6.76	7.38	6.11
Mean	3.96	5.98	6.89	7.32	6.04

N		0	30	60	90
ROTATION	**FYMRES65**				
LN 8	NONE	4.13	5.37	8.08	7.64
	FYM	3.81	6.05	7.54	7.22
LN 3	NONE	6.01	7.52	7.45	7.96
	FYM	5.05	6.36	8.04	6.45
LC 8	NONE	5.44	6.88	7.75	7.85
	FYM	5.60	7.11	5.37	7.80
LC 3	NONE	3.10	5.94	7.60	7.63
	FYM	4.72	6.90	7.62	8.89
AF	NONE	1.12	3.83	5.46	6.17
	FYM	2.08	4.90	5.72	6.79
AB	NONE	2.52	5.55	5.81	6.30
	FYM	3.97	5.39	6.25	7.11

GRAIN MEAN DM% 87.4

PLOT AREA HARVESTED 0.00183

https://doi.org/10.23637/ERADOC-1-47

92/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 28th year, w. wheat.

For previous years see 'Details' 1973 and 74-91/W/RN/12.

Design: 4 blocks of 8 plots split into 6.

Whole plot dimensions: 8.0 x 30.5.

Treatments: From 1966 to 1971 the experiment had a preliminary period designed to build up organic matter, derived from different sources. An arable rotation was started on two blocks in 1972 and the remaining two blocks in 1973. After a period of testing the residues built up, a further period of accumulation was started; on two blocks (which included ley sown in 1979) in 1981 and on the other two (which included ley sown in 1980) in 1982. On the first pair leys were ploughed for 1st test crop in 1987, on the second pair for 1st test crop in 1988.

Whole blocks

1. **CROPSEQ**

WHEAT 1	1st wheat, after w. wheat 1988, potatoes 1989, w. wheat 1990, w. beans 1991
WHEAT 2	2nd wheat, after w. wheat 1987, potatoes 1988, w. wheat 1989, w. beans 1990

Whole plots

2. **TREATMNT** Previous treatments:

LC 8 GM	Eight-year clover/grass ley until 1987 (WHEAT 1) or 1986 (WHEAT 2), 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 1) or 1986 (WHEAT 2), 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 1) or 1985 (WHEAT 2) and in the preliminary period
STRAW	Straw in both periods
FERT-FYM	Fertilizers only in both periods, rates of P, K & Mg equivalent to amounts in FYM
FERT-STR	Fertilizers only in both periods, rates of P, K & Mg equivalent to amounts in straw (+P)

https://doi.org/10.23637/ERADOC-1-47 *pp 48*

92/W/RN/12

Sub plots

3. **N** Nitrogen fertilizer (kg N):

0
50
100
150
200
250

Experimental diary:

18-Sep-91 : **T** : **CROPSEQ** WHEAT 1: Bean straw baled and carted.
25-Sep-91 : B : Ploughed.
02-Oct-91 : B : Rolled.
03-Oct-91 : B : PK as (0:16:36) at 560 kg. Rotary harrowed, Mercia drilled at 140 kg.
30-Oct-91 : B : Stomp 400 at 2.5 l, Arelon WDG at 0.75 kg and Decis at 0.20 l in 200 l.
18-Mar-92 : B : Vytel Liquid Chelated Manganese (Chelated Mn as Mn EDTA in solution equivalent to 6.4% w/v Mn) at 2.5 l in 200 l.
01-Apr-92 : B : Duplosan New System CMPP at 1.5 l in 200 l.
09-Apr-92 : **T** : **N** 50, 100, 150, 200 and 250: Applied as 27% N.
03-May-92 : B : Dorin at 1.0 l in 300 l.
09-Jun-92 : B : Impact Excel at 2.0 l in 200 l.
01-Aug-92 : **T** : **CROPSEQ** WHEAT 2: Combine harvested.
01-Sep-92 : **T** : **CROPSEQ** WHEAT 1: Combine harvested.

NOTES: (1) Straw weights were only recorded for **CROPSEQ** WHEAT 2.
(2) Grain and straw were chemically analysed.

CROPSEQ WHEAT 1

GRAIN TONNES/HECTARE

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

N	0	50	100	150	200	250	Mean
TREATMNT							
LC 8 GM	3.15	4.98	6.27	5.94	6.28	6.72	5.56
LC 8 PT	4.83	5.45	6.60	7.74	7.20	7.51	6.55
LC 6 LC	5.07	5.46	7.24	7.27	8.17	7.20	6.74
LC 6 LN	5.33	7.53	7.60	7.39	7.36	6.82	7.01
FYM	5.05	4.52	7.11	7.00	7.99	5.80	6.25
STRAW	4.34	5.11	7.59	7.77	7.74	7.86	6.73
FERT-FYM	1.95	3.34	5.34	5.63	4.98	5.09	4.39
FERT-STR	4.37	5.40	6.60	6.74	7.34	6.93	6.23
Mean	4.26	5.22	6.79	6.93	7.13	6.74	6.18

https://doi.org/10.23637/ERADOC-1-47

92/W/RN/12

CROPSEQ WHEAT 1

GRAIN TONNES/HECTARE

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

	TREATMNT	**N**	**TREATMNT N**
	1.199	0.362	1.520
Except when comparing means with the same level(s) of **TREATMNT**			1.023

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	7	1.199	19.4
BLOCK.WP.SP	40	1.023	16.6

GRAIN MEAN DM% 83.7

CROPSEQ WHEAT 2

GRAIN TONNES/HECTARE

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

N	0	50	100	150	200	250	Mean
TREATMNT							
LC 8 GM	1.28	2.10	4.42	5.15	5.49	4.93	3.90
LC 8 PT	1.03	3.02	4.49	4.27	4.87	5.22	3.82
LC 6 LC	0.71	3.18	5.02	5.84	5.54	5.54	4.30
LC 6 LN	1.32	3.94	4.94	5.67	6.64	6.40	4.82
FYM	1.94	4.21	6.37	5.95	6.02	6.27	5.13
STRAW	1.85	3.64	5.46	6.48	5.93	5.92	4.88
FERT-FYM	1.52	3.88	5.85	5.33	6.07	5.71	4.73
FERT-STR	1.28	3.25	5.03	4.97	4.88	5.76	4.20
Mean	1.37	3.40	5.20	5.46	5.68	5.72	4.47

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

	TREATMNT	**N**	**TREATMNT N**
	0.793	0.293	1.097
Except when comparing means with the same level(s) of **TREATMNT**			0.829

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	7	0.793	17.7
BLOCK.WP.SP	40	0.829	18.5

GRAIN MEAN DM% 87.7

https://doi.org/10.23637/ERADOC-1-47

92/W/RN/12

CROPSEQ WHEAT 2

STRAW TONNES/HECTARE

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

N	0	50	100	150	200	250	Mean
TREATMNT							
LC 8 GM	1.22	1.94	2.90	3.20	3.29	3.41	2.66
LC 8 PT	1.41	2.47	2.33	2.20	2.39	2.87	2.28
LC 6 LC	1.08	2.02	3.34	3.27	3.06	3.37	2.69
LC 6 LN	0.84	3.34	3.88	3.75	4.43	4.04	3.38
FYM	1.12	2.03	2.87	2.38	3.06	3.02	2.41
STRAW	1.09	1.43	2.13	3.22	2.76	2.91	2.26
FERT-FYM	0.80	1.38	2.48	1.92	2.27	1.80	1.77
FERT-STR	0.60	1.52	2.17	1.63	2.02	2.41	1.72
Mean	1.02	2.02	2.76	2.70	2.91	2.98	2.40

STRAW MEAN DM% 88.3

SUB PLOT AREA HARVESTED 0.00183

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/10 and 92/W/CS/10

LONG TERM LIMING

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

Sponsors: S.P. McGrath, P.B. Barraclough, G.F.J. Milford.

The 31st year, w. oilseed rape.

For previous years see 'Details' 1967, 1973 and 74-91/R&W/CS/10.

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

Whole plot dimensions: 5.8 x 16.1 (R), 5.6 x 16.1 (W).

Treatments: All combinations of:-

Whole plots

1. **CHALK** Residual effects of ground chalk (tonnes CaCO3) (total applied 1962-87):

		Rothamsted total		Woburn total	
R	W	1962-78	1982-87	1962-78	1982-87
0	0	0	0	0	0
15	9	7	8	6	3
24.5	25.5	15	9.5	14	11.5
52.5	45.5	30	22.5	23	22.5

2. **P** Residual effects of P fertilizer applied:

	Until 1978	1981	1982	1983		1988	
	R & W	R & W	R & W	R	W	R	W
0	0	0	0	0	0	0	0
P1	0	P1	P1	0	P2	P1	P1
P2	P	P1	0	P2	P2	P1	P1
P3	P	P3	P1	P2	P4	P3	P3

Rates 1981-83 and 1988 P1, P2, P3, P4 = 25, 50, 75, 100 kg P as superphosphate

Sub plots

3. **SULPHUR** Sulphur (kg S, as calcium sulphate):

0
30

NOTES: (1) Until 1978 test P was applied cumulatively, rates varied with crop, none in 1979 and 1980. K was also applied cumulatively, to P1 and P3 plots. Since 1981 K has been applied basally (none in 1986, 1987, 1989 and 1990).
(2) Test manganese was applied cumulatively, 1987-90.

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92/R/CS/10 and 92/W/CS/10

Experimental diary:

Sawyers I (R).

25-Aug-91 : B : Deep-tine cultivated with vibrating tines 60 cm apart, 45 cm deep.
26-Aug-91 : B : Ploughed, rolled.
04-Sep-91 : B : Rotary harrowed.
05-Sep-91 : B : Rotary harrowed, Libravo, dressed Hydraguard and Rovral WP, drilled at 6.1 kg, rolled.
06-Sep-91 : B : Butisan S at 2.5 l in 200 l.
24-Oct-91 : B : NK as (25:0:16) at 200 kg.
02-Dec-91 : B : Vytel Liquid Chelated Magnesium at 2.0 l in 200 l.
05-Mar-92 : **T** : **SULPHUR** 30: 30 kg S as gypsum.
05-Mar-92 : B : 34.5% N at 220 kg.
13-Apr-92 : B : Ploughed (crop failed).

Stackyard C (W).

03-Sep-91 : B : Ploughed.
06-Sep-91 : B : Rotary cultivated, Libravo, dressed Hydraguard and Rovral WP, drilled at 6.0 kg, rolled.
29-Oct-91 : B : NK as (25:0:16) at 200 kg.
15-Jan-92 : B : Benazalox at 1.25 kg in 200 l.
05-Mar-92 : **T** : **SULPHUR** 30: 30 kg S as gypsum.
06-Mar-92 : B : 34.5% N at 220 kg.
13-May-92 : B : Ploughed (crop failed).

NOTE: Owing to crop failure no yields were taken.

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/140

CHEMICAL REFERENCE PLOTS

Object: To study the persistence in soil of agricultural chemicals applied annually, singly and in combination, and their effects on soil microflora and on yield of continuous s. barley - Long Hoos V 3.

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

The 19th year, s. barley.

For previous years see 74-91/R/CS/140.

Design: Single replicate of 32 plots.

Whole plot dimensions: 4.06 x 4.57.

Treatments, applied cumulatively every year except as stated:

All combinations of:-

1.	**WEEDKLLR**	Weedkiller in autumn:
	NONE	None
	GLYPHOS	Glyphosate at 1.4 kg to barley stubble each autumn from 1979 to 1984, at 0.72 kg in 1985, at 0.54 kg in 1986, at 1.3 kg in 1987 and at 1.5 kg in 1988 to 1991.
2.	**FUNGCIDE[1]**	Fungicide in autumn:
	NONE	None
	TRIADIM	Triadimefon at 0.25 kg in autumn 1981, 1982, 1984 to 1991, 0.28 kg in autumn 1983
3.	**FUNGCIDE[2]**	Fungicide in spring:
	NONE	None
	BENOMYL	Benomyl at 4 kg to seedbed
4.	**INSCTCDE**	Insecticide:
	NONE	None
	CHLORFEN	Chlorfenvinphos at 2 kg to the seedbed
5.	**NEMACIDE**	Nematicide:
	NONE	None
	ALDICARB	Aldicarb at 6 kg to the seedbed

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/140

Experimental diary:

```
   06-Nov-91 : T : WEEDKLLR GLYPHOS: Glyphosate at 1.5 kg in 220 l.
             : T : FUNGCIDE[1] TRIADIM: Triadimefon at 0.25 kg in
                   220 l.
   03-Jan-92 : B : Ploughed.
   06-Mar-92 : B : Spring-tine cultivated.
   11-Mar-92 : T : FUNGCIDE[2] BENOMYL: Benomyl at 4.0 kg.
             : T : INSCTCDE CHLORFEN: Chlorfenvinphos at 2.0 kg.
             : T : NEMACIDE ALDICARB: Aldicarb at 6.0 kg.
   13-Mar-92 : B : 34.5% N at 440 kg.
   17-Mar-92 : B : Spring-tine cultivated twice, rotary harrowed.  Alexis,
                   undressed, drilled at 150 kg.  Rolled.
   20-May-92 : B : Vindex at 1.0 l and Duplosan New System CMPP at 2.0 l in
                   200 l.
   06-Aug-92 : B : Combine harvested.
```

GRAIN TONNES/HECTARE

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

FUNGCIDE[1]	NONE	TRIADIM	Mean
WEEDKLLR			
NONE	4.93	5.02	4.97
GLYPHOS	5.26	5.29	5.27
Mean	5.09	5.16	5.12

FUNGCIDE[2]	NONE	BENOMYL	Mean
WEEDKLLR			
NONE	5.00	4.94	4.97
GLYPHOS	5.17	5.38	5.27
Mean	5.09	5.16	5.12

FUNGCIDE[2]	NONE	BENOMYL	Mean
FUNGCIDE[1]			
NONE	5.17	5.01	5.09
TRIADIM	5.00	5.31	5.16
Mean	5.09	5.16	5.12

INSCTCDE	NONE	CHLORFEN	Mean
WEEDKLLR			
NONE	5.00	4.94	4.97
GLYPHOS	5.30	5.25	5.27
Mean	5.15	5.09	5.12

INSCTCDE	NONE	CHLORFEN	Mean
FUNGCIDE[1]			
NONE	5.05	5.14	5.09
TRIADIM	5.26	5.05	5.16
Mean	5.15	5.09	5.12

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/140

GRAIN TONNES/HECTARE

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

INSCTCDE	NONE	CHLORFEN	Mean
FUNGCIDE[2]			
NONE	5.00	5.17	5.09
BENOMYL	5.31	5.02	5.16
Mean	5.15	5.09	5.12

NEMACIDE	NONE	ALDICARB	Mean
WEEDKLLR			
NONE	4.91	5.03	4.97
GLYPHOS	5.14	5.41	5.27
Mean	5.02	5.22	5.12

NEMACIDE	NONE	ALDICARB	Mean
FUNGCIDE[1]			
NONE	5.03	5.15	5.09
TRIADIM	5.02	5.29	5.16
Mean	5.02	5.22	5.12

NEMACIDE	NONE	ALDICARB	Mean
FUNGCIDE[2]			
NONE	4.98	5.19	5.09
BENOMYL	5.06	5.26	5.16
Mean	5.02	5.22	5.12

NEMACIDE	NONE	ALDICARB	Mean
INSCTCDE			
NONE	5.05	5.26	5.15
CHLORFEN	5.00	5.19	5.09
Mean	5.02	5.22	5.12

FUNGCIDE[1]	NONE		TRIADIM	
WEEDKLLR **FUNGCIDE[2]**	NONE	BENOMYL	NONE	BENOMYL
NONE	5.05	4.80	4.95	5.08
GLYPHOS	5.28	5.23	5.05	5.53

FUNGCIDE[1]	NONE		TRIADIM	
WEEDKLLR **INSCTCDE**	NONE	CHLORFEN	NONE	CHLORFEN
NONE	4.84	5.02	5.17	4.86
GLYPHOS	5.25	5.26	5.35	5.24

FUNGCIDE[2]	NONE		BENOMYL	
WEEDKLLR **INSCTCDE**	NONE	CHLORFEN	NONE	CHLORFEN
NONE	4.90	5.10	5.11	4.77
GLYPHOS	5.10	5.24	5.50	5.26

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/140

GRAIN TONNES/HECTARE

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

	FUNGCIDE[2]	NONE		BENOMYL	
FUNGCIDE[1]	INSCTCDE	NONE	CHLORFEN	NONE	CHLORFEN
NONE		5.03	5.30	5.06	4.97
TRIADIM		4.97	5.04	5.55	5.06

	FUNGCIDE[1]	NONE		TRIADIM	
WEEDKLLR	NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
NONE		4.86	4.99	4.95	5.08
GLYPHOS		5.20	5.31	5.08	5.51

	FUNGCIDE[2]	NONE		BENOMYL	
WEEDKLLR	NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
NONE		4.95	5.05	4.86	5.02
GLYPHOS		5.02	5.32	5.26	5.50

	FUNGCIDE[2]	NONE		BENOMYL	
FUNGCIDE[1]	NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
NONE		5.13	5.21	4.93	5.09
TRIADIM		4.84	5.17	5.19	5.42

	INSCTCDE	NONE		CHLORFEN	
WEEDKLLR	NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
NONE		4.97	5.04	4.85	5.02
GLYPHOS		5.13	5.47	5.15	5.35

	INSCTCDE	NONE		CHLORFEN	
FUNGCIDE[1]	NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
NONE		5.07	5.02	4.99	5.28
TRIADIM		5.02	5.50	5.01	5.09

	INSCTCDE	NONE		CHLORFEN	
FUNGCIDE[2]	NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
NONE		4.76	5.24	5.21	5.13
BENOMYL		5.34	5.27	4.79	5.24

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

Margins of two factor tables	0.099
Two factor tables	0.140
Three factor tables	0.198

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

Stratum	d.f.	s.e.	cv%
WP	6	0.280	5.5

GRAIN MEAN DM% 86.9 PLOT AREA HARVESTED 0.00069

https://doi.org/10.23637/ERADOC-1-47

92/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 eighth year, w. wheat.

For previous years see 85-91/R/CS/302.

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

Whole plot dimensions: 12.0 x 24.0.

Treatments: All combinations of:-

Whole plots

1. **FUNGCIDE** Fungicides applied cumulatively 1985-92:

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

Sub plots

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

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

NOTE: The eyespot inoculum was colonised on oat seed and this was broadcast in October, 1984.

Experimental diary:

28-Aug-91 : B : Straw chopped.
03-Sep-91 : B : PK as(0:16:36) at 1040 kg.
06-Sep-91 : B : Dolomite at 5.0 t.
24-Sep-91 : B : Ploughed, furrow pressed.
26-Sep-91 : B : Rotary harrowed. Mercia drilled at 160 kg, rolled.
16-Nov-91 : B : Pinnacle at 5.0 l in 200 l.
21-Nov-91 : **T** : **FUNGCIDE** CARB: Bavistin FL at 0.50 l in 200 l.
: **T** : **FUNGCIDE** PRO: Sportak 45 at 0.90 l in 200 l.
: **T** : **FUNGCIDE** CARB+PRO: Bavistin FL at 0.50 l in 200 l and Sportak 45 at 0.90 l in 200 l, applied separately.
27-Feb-92 : B : 34.5% N at 120 kg.

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92/R/CS/302

Experimental diary:

```
   06-Apr-92 : B : 34.5% N at 460 kg.
   20-Apr-92 : B : Harmony M at 0.06 kg and Starane 2 at 0.75 l in 200 l.
   05-May-92 : T : FUNGCIDE CARB: Bavistin FL at 0.50 l in 200 l.
             : T : FUNGCIDE PRO: Sportak 45 at 0.90 l in 200 l.
             : T : FUNGCIDE CARB+PRO: Bavistin FL at 0.50 l in 200 l and
                   Sportak 45 at 0.90 l in 200 l, applied separately.
   29-Jul-92 : B : Combine harvested.
```

NOTE: Eyespot and sharp eyespot were assessed on plants sampled in early July on the **EYE INOC** NATURAL plots. Isolates of the eyespot fungus were identified by type (W and R) and assessed for resistance to carbendazim and prochloraz.

GRAIN TONNES/HECTARE

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

EYE INOC / FUNGCIDE	NATURAL	W 19R 1S	W 1R 19S	R 19R 1S	R 1R 19S	Mean
NONE	5.86	5.91	5.91	6.18	5.45	5.86
CARB	5.52	5.91	5.63	5.38	5.64	5.60
PRO	6.02	5.98	5.96	5.93	6.59	6.09
CARB+PRO	7.16	6.99	6.81	6.83	6.79	6.95
Mean	6.14	6.20	6.08	6.08	6.12	6.13

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

EYE INOC	FUNGCIDE* EYE INOC	
0.167	0.335	min.rep
0.145	0.290	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	3	0.412	6.7
BLOCK.WP.SP	24	0.335	5.5

GRAIN MEAN DM% 88.8

SUB PLOT AREA HARVESTED 0.00138

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/309 and 92/W/CS/309

LONG-TERM STRAW INCORPORATION

Object: To study the effects of mixing and depths of incorporation of straw on straw decomposition, soil nitrogen content, soil physical condition, pests, diseases and on the establishment, growth and yield of w. wheat - Rothamsted (R) Great Knott III and Woburn (W) Far Field I.

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

Associate sponsor: D.S. Powlson.

The eighth year, w. rape.

For previous years see 85-91/R&W/CS/309.

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

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

Treatments, applied cumulatively in successive years: All combinations of:-

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

BURNT	Burnt
CHOPPED	Chopped and spread (duplicated)

2. **CULTIVTN** Cultivations:

TINE 10	Cultivated to 10 cm depth
TN10PL20	Cultivated to 10 cm depth, ploughed to 20 cm
TN10TN20	Cultivated to 10 cm depth and again to 20 cm
PLOUGH20	Ploughed to 20 cm depth

Experimental diary:
Great Knott III (R):

28-Aug-91	T	**STRAW** CHOPPED: Straw chopped and spread.
30-Aug-91	T	**STRAW** BURNT: Straw burnt.
31-Aug-91	T	**STRAW** BURNT: Disced to 10 cm.
04-Sep-91	T	**CULTIVTN** TINE 10: Cultivated by rotary grubber to 10 cm.
	T	**CULTIVTN** TN10PL20: Cultivated by rotary grubber to 10 cm and ploughed to 20 cm.
	T	**CULTIVTN** TN10TN20: Cultivated by rotary grubber to 10 cm and chisel ploughed to 20 cm.
	T	**CULTIVTN** PLOUGH20: Ploughed to 20 cm.
05-Sep-91	B	Rotary harrowed, Falcon, dressed Lindex-Plus FS, drilled at 8.0 kg, rolled.
06-Sep-91	B	Butisan S at 2.5 l in 200 l.
13-Oct-91	B	Pilot at 0.15 l with Cropspray 11 E at 2.5 l in 200 l.
19-Feb-92	B	34.5% N at 220 kg.
25-Mar-92	B	34.5% N at 290 kg.

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92/R/CS/309 and 92/W/CS/309

Experimental diary:

Great Knott III (R):

09-Apr-92 : B : Sportak 45 at 1.1 l in 200 l.
15-Jul-92 : B : Reglone at 3.0 l with Farmon Blue at 0.26 l in 260 l.
22-Jul-92 : B : Combine harvested.

Far Field I (W):

25-Aug-91 : T : **STRAW** CHOPPED: Straw chopped and spread.
30-Aug-91 : T : **STRAW** BURNT : Straw burnt.
: T : **CULTIVTN** TINE 10: Heavy spring-tine cultivated to 10 cm.
: T : **CULTIVTN** TN10PL20: Heavy spring-tine cultivated to 10 cm and ploughed to 20 cm.
: T : **CULTIVTN** TN10TN20: Heavy spring-tine cultivated to 10 cm and again to 20 cm.
: T : **CULTIVTN** PLOUGH20: Ploughed to 20 cm.
02-Sep-91 : T : **CULTIVTN** TINE 10, TN10TN20: Disced to 10 cm.
02-Sep-91 : B : Rolled.
05-Sep-91 : B : Rotary harrowed, Falcon, dressed Lindex-Plus FS, drilled at 7.0 kg.
12-Oct-91 : B : Pilot at 0.15 l with Cropspray 11 E at 2.0 l in 200 l.
06-Jan-92 : B : PK as (0:16:36) at 740 kg.
15-Jan-92 : B : Benazolox at 1.0 kg in 200 l.
16-Jan-92 : B : PK as (0:16:36) at 300 kg.
21-Feb-92 : B : 34.5% N at 220 kg.
31-Mar-92 : B : 34.5% N at 290 kg.
03-May-92 : B : Sportak at 1.25 l in 200 l.
16-Jul-92 : B : Reglone at 3.0 l with Agral at 0.40 l in 400 l.
26-Jul-92 : B : Combine harvested.

NOTES: (1) From 1985 to 1991 effects were tested on w. wheat. In 1992 w. rape was grown in order to control grass weeds.
(2) Number of plants and dry weights were estimated in autumn and spring. Individual seed weight and oil content were measured at harvest.

https://doi.org/10.23637/ERADOC-1-47

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

GRAIN TONNES/HECTARE

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

CULTIVTN / STRAW	TINE 10	TN10PL20	TN10TN20	PLOUGH20	Mean
BURNT	3.86	3.72	3.78	3.64	3.75
CHOPPED	4.07	3.96	4.21	3.83	4.02
Mean	4.00	3.88	4.07	3.76	3.93

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

STRAW	CULTIVTN	STRAW CULTIVTN	
		0.189	min.rep
0.082	0.109	0.164	max-min
		0.134	max.rep

	STRAW
min.rep	BURNT only
max-min	BURNT v CHOPPED
max.rep	CHOPPED only

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	37	0.267	6.8

GRAIN MEAN DM% 87.0

PLOT AREA HARVESTED 0.00644

https://doi.org/10.23637/ERADOC-1-47

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

GRAIN TONNES/HECTARE

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

CULTIVTN / STRAW	TINE 10	TN10PL20	TN10TN20	PLOUGH20	Mean
BURNT	2.55	2.21	2.75	2.75	2.56
CHOPPED	2.14	2.58	2.02	2.90	2.41
Mean	2.28	2.45	2.26	2.85	2.46

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

STRAW	CULTIVTN	STRAW CULTIVTN	
		0.579	min.rep
0.251	0.334	0.501	max-min
		0.409	max.rep

	STRAW
min.rep	BURNT only
max-min	BURNT v CHOPPED
max.rep	CHOPPED only

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	0.579	23.5

GRAIN MEAN DM% 87.5

PLOT AREA HARVESTED 0.00638

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/311

EFFECTS OF SHALLOW STRAW INCORPORATION

Object: To study the effects of shallow straw incorporation on pests and diseases and on the establishment, growth and yield of winter wheat - West Barnfield I.

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

The eighth year, w. wheat.

For previous years see 85-91/R/CS/311.

Design: Single replicate of 3 x 2 x 2 x 2 x 2.

Whole plot dimensions: 9.0 x 57.0.

Treatments: Combinations of:-

Whole plots

1. **STRAW**		Treatments to straw of previous wheat:
	BURNT	Burnt
	BALED	Baled and removed
	CHOPPED	Chopped
2. **CULTTIME**		Time of cultivation, to 10 cm depth:
	EARLY	As soon as possible after harvest
	LATER	At least 14 days after EARLY

Sub plots

3. **FUNGCIDE**		Fungicides:
	0	None
	FULL	Full programme:- Triadimefon and carbendazim in winter, prochloraz in spring plus propiconazole alone and with chlorothalonil in summer
4. **INSCTCDE**		Insecticides:
	0	None
	CYP+PIR	Cypermethrin in autumn and pirimicarb in summer
5. **MOLLCIDE**		Molluscicide:
	0	None
	METHCARB	Methiocarb after drilling

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/311

Experimental Diary:

```
   22-Aug-91 : T : STRAW BALED: Straw baled and removed.
   27-Aug-91 : T : STRAW BURNT: Straw burnt.
             : T : STRAW CHOPPED: Straw chopped with trailed straw chopper.
   28-Aug-91 : T : STRAW BURNT: Disced.
             : T : CULTTIME EARLY: Cultivated by rotary grubber.
   23-Sep-91 : B : (0:16:36) at 1040 kg.
   11-Oct-91 : T : CULTTIME LATER: Cultivated by rotary grubber.
   12-Oct-91 : B : Rotary harrowed, Haven drilled at 220 kg, rolled.
   18-Oct-91 : T : MOLLCIDE METHCARB: Draza at 5.5 kg.
   12-Nov-91 : T : INSCTCDE CYP+PIR: Ripcord at 0.20 l in 200 l.
   27-Nov-91 : B : Stefes IPU at 2.5 l and Stomp 400 at 3.3 l in 200 l.
   14-Jan-92 : T : FUNGCIDE FULL: Bayleton BM at 1.0 kg in 200 l.
   25-Feb-92 : B : 34.5% N at 120 kg.
   14-Apr-92 : B : 34.5% N at 580 kg.
   15-May-92 : T : FUNGCIDE FULL: Sportak 45 at 0.90 l in 200 l.
   20-May-92 : B : Terpal at 2.0 l with Farmon Blue at 0.80 l in 200 l.
   04-Jun-92 : T : FUNGCIDE FULL: Radar at 0.50 l in 200 l.
   22-Jun-92 : T : FUNGCIDE FULL: Radar at 0.50 l and Chiltern
                   Chlorothalonil 500 at 1.0 l in 200 l.
             : T : INSCTCDE CYP+PIR: Aphox at 0.28 kg in 200 l.
   28-Jul-92 : B : Roundup at 4.0 l in 200 l.
   19-Aug-92 : B : Combine harvested.
```

NOTE: Growth was measured and incidence of diseases assessed at intervals during the season. Incidence of stem-borers was assessed in spring. Ears of volunteers were counted prior to harvest and components of yield were measured.

GRAIN TONNES/HECTARE

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

CULTTIME	EARLY	LATER	Mean
STRAW			
BURNT	8.62	8.58	8.60
BALED	8.24	8.57	8.40
CHOPPED	8.23	8.56	8.39
Mean	8.36	8.57	8.47

FUNGCIDE	0	FULL	Mean
STRAW			
BURNT	7.79	9.40	8.60
BALED	7.54	9.26	8.40
CHOPPED	7.52	9.27	8.39
Mean	7.62	9.31	8.47

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/311

GRAIN TONNES/HECTARE

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

FUNGCIDE	O	FULL	Mean
CULTTIME			
EARLY	7.53	9.20	8.36
LATER	7.71	9.42	8.57
Mean	7.62	9.31	8.47

INSCTCDE	O	CYP+PIR	Mean
STRAW			
BURNT	8.46	8.73	8.60
BALED	8.43	8.38	8.40
CHOPPED	8.39	8.40	8.39
Mean	8.43	8.50	8.47

INSCTCDE	O	CYP+PIR	Mean
CULTTIME			
EARLY	8.34	8.38	8.36
LATER	8.52	8.62	8.57
Mean	8.43	8.50	8.47

INSCTCDE	O	CYP+PIR	Mean
FUNGCIDE			
O	7.62	7.62	7.62
FULL	9.24	9.38	9.31
Mean	8.43	8.50	8.47

MOLLCIDE	O	METHCARB	Mean
STRAW			
BURNT	8.59	8.61	8.60
BALED	8.39	8.41	8.40
CHOPPED	8.43	8.35	8.39
Mean	8.47	8.46	8.47

MOLLCIDE	O	METHCARB	Mean
CULTTIME			
EARLY	8.37	8.36	8.36
LATER	8.58	8.56	8.57
Mean	8.47	8.46	8.47

MOLLCIDE	O	METHCARB	Mean
FUNGCIDE			
O	7.63	7.61	7.62
FULL	9.31	9.31	9.31
Mean	8.47	8.46	8.47

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/311

GRAIN TONNES/HECTARE

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

MOLLCIDE	O	METHCARB	Mean
INSCTCDE			
O	8.50	8.36	8.43
CYP+PIR	8.45	8.55	8.50
Mean	8.47	8.46	8.47

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

FUNGCIDE	INSCTCDE	MOLLCIDE	STRAW* FUNGCIDE
0.084	0.084	0.084	0.145

CULTTIME* FUNGCIDE	STRAW INSCTCDE	CULTTIME INSCTCDE	FUNGCIDE INSCTCDE
0.119	0.145	0.119	0.119

STRAW* MOLLCIDE	CULTTIME* MOLLCIDE	FUNGCIDE MOLLCIDE	INSCTCDE MOLLCIDE
0.145	0.119	0.119	0.119

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

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

Stratum	d.f.	s.e.	cv%
WP.SP	27	0.291	3.4

GRAIN MEAN DM% 87.0

SUB PLOT AREA HARVESTED 0.00276

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/323

CEREAL SEQUENCES AND TAKE-ALL

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

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

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

For previous years see 88-91/R/CS/323

Design: 3 randomised blocks of 26 plots.

Whole plot dimensions: 3.0 x 10.0.

CROPSEQ	Crop sequences (1988, 1989, 1990, 1991 and 1992 respectively):
W W S S S	W. wheat, w. wheat, s. barley, s. barley, s. barley
B B B B B	W. barley, w. barley, w. barley, w. barley, w. barley
O B B B O	W. oats, w. barley, w. barley, w. barley, w. oats
B O B B B	W. barley, w. oats, w. barley, w. barley, w. barley
B B O B B	W. barley, w. barley, w. oats, w. barley, w. barley
S B S B S	S. barley, w. barley, s. barley, w. barley, s. barley
T T B B B	W. triticale, w. triticale, w. barley, w. barley, w. barley
T B T B T	W. triticale, w. barley, w. triticale, w. barley, w. triticale
W B W B W	W. wheat, w. barley, w. wheat, w. barley, w. wheat
W W B B B	W. wheat, w. wheat, w. barley, w. barley, w. barley
B B B O B	W. barley, w. barley, w. barley, w. oats, w. barley
T T T O T	W. triticale, w. triticale, w. triticale, w. oats, w. triticale
W W W O W	W. wheat, w. wheat, w. wheat, w. oats, w. wheat
T T T T T	W. triticale, w. triticale, w. triticale, w. triticale, w. triticale
B B T T T	W. barley, w. barley, w. triticale, w. triticale, w. triticale
O T T T O	W. oats, w. triticale, w. triticale, w. triticale, w. oats
T O T T T	W. triticale, w. oats, w. triticale, w. triticale, w. triticale
T T O T T	W. triticale, w. triticale, w. oats, w. triticale, w. triticale
W W T T T	W. wheat, w. wheat, w. triticale, w. triticale, w. triticale
W T W T W	W. wheat, w. triticale, w. wheat, w. triticale, w. wheat
W W W W W	W. wheat, w. wheat, w. wheat w. wheat, w. wheat
B B W W W	W. barley, w. barley, w. wheat, w. wheat, w. wheat
O W W W O	W. oats, w. wheat, w. wheat, w. wheat, w. oats
W O W W W	W. wheat, w. oats, w. wheat, w. wheat, w. wheat
W W O W W	W. wheat, w. wheat, w. oats, w. wheat, w. wheat
T T W W W	W. triticale, w. triticale, w. wheat, w. wheat, w. wheat

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/323

Experimental Diary:

05-Sep-91	B	Straw baled and removed.
12-Sep-91	B	Sting CT at 1.5 l in 200 l.
16-Sep-91	B	PK as (0:16:36) at 300 kg.
18-Sep-91	B	Ploughed and furrow pressed.
19-Sep-91	T	W. barley plots: Rotary harrowed, Magie drilled at 140 kg.
	T	W. oats plots: Rotary harrowed, Image drilled at 124 kg.
	T	W. triticale plots: Rotary harrowed, Cumulus drilled at 154 kg.
	T	W. wheat plots: Rotary harrowed, Mercia drilled at 161 kg.
20-Sep-91	B	Rolled.
20-Sep-91	T	W. barley, w. triticale and w. wheat plots: Stefes IPU at 2.5 l and Stomp 400 at 2.5 l in 200 l.
	T	W. oats plots: Glytex at 2.25 kg in 200 l.
25-Feb-92	T	W. barley, w. triticale, w.wheat and w.oats plots: 34.5% N at 87 kg.
05-Mar-92	T	S. barley plots: 34.5% N at 348 kg.
	T	S. barley plots: Rotary harrowed, Klaxon drilled at 136 kg.
14-Apr-92	T	W. triticale and w.oats plots: 34.5% N at 348 kg.
	T	W. barley plots: 34.5% N at 435 kg.
	T	W. wheat plots: 34.5% N at 493 kg.
03-May-92	B	Starane 2 at 1.0 l and Radar at 0.50 l in 260 l.
24-Jul-92	T	W. barley plots: Combine harvested.
30-Jul-92	T	W. wheat, w. triticale and s. barley plots: Combine harvested.
29-Aug-92	T	W. oats plots: Combine harvested.

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

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/323

GRAIN TONNES/HECTARE

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

CROPSEQ	
W W S S S	6.10
B B B B B	7.10
O B B B O	3.60
B O B B B	7.76
B B O B B	8.08
S B S B S	5.91
T T B B B	7.22
T B T B T	6.16
W B W B W	6.22
W W B B B	7.60
B B B O B	7.53
T T T O T	7.62
W W W O W	7.05
T T T T T	6.96
B B T T T	5.99
O T T T O	4.06
T O T T T	6.70
T T O T T	6.94
W W T T T	7.65
W T W T W	6.40
W W W W W	6.79
B B W W W	6.35
O W W W O	3.65
W O W W W	5.56
W W O W W	6.51
T T W W W	6.07
Mean	6.44

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

CROPSEQ
0.367

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	50	0.450	7.0

GRAIN MEAN DM% 85.4

PLOT AREA HARVESTED 0.00230

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/326 and 92/W/CS/326

AMOUNTS OF STRAW

Object: To study the effects of a range of amounts of straw incorporated into the soil on w.wheat - Rothamsted (R) Great Knott III, Woburn (W) Far Field I.

Sponsors: R.D. Prew, D.G. Christian, J.F. Jenkyn, E.T.G. Bacon.

The sixth year, w. rape.

For previous years see 87-91/R&W/CS/326.

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

Whole plot dimensions: 3.0 x 13.5 (R).
3.0 x 14.5 (W).

Treatments:

STRAW Amounts of straw incorporated into seedbed (t per ha 85% DM), cumulative to previous annual dressings:

		R	W
NONE	None	-	-
NORMAL	Normal	2.5	4.2
2 NORMAL	Twice normal	5.0	8.4
4 NORMAL	Four times normal	10.0	16.8

Experimental diary:

Great Knott III (R)

27-Aug-91 : **T** : **STRAW** NORMAL, 2 NORMAL and 4 NORMAL: Straw applied.
28-Aug-91 : B : Straw and stubble chopped.
04-Sep-91 : B : Ploughed.
05-Sep-91 : B : Rotary harrowed, Falcon, dressed Lindex-Plus FS, drilled at 8.0 kg. Rolled.
06-Sep-91 : B : Butisan S at 2.5 l in 200 l.
13-Oct-91 : B : Pilot at 0.15 l with Cropspray 11 E at 2.5 l in 200 l.
19-Feb-92 : B : 34.5% N at 220 kg.
25-Mar-92 : B : 34.5% N at 290 kg.
09-Apr-92 : B : Sportak 45 at 1.1 l in 200 l.
15-Jul-92 : B : Reglone at 3.0 l with Farmon Blue at 0.26 l in 260 l.
22-Jul-92 : B : Combine harvested.

Far Field I (W)

28-Aug-91 : **T** : **STRAW** NORMAL, 2 NORMAL and 4 NORMAL: Straw applied.
30-Aug-91 : B : Straw and stubble chopped.
02-Sep-91 : B : Disced four times to 10 cm. Rolled.
05-Sep-91 : B : Rotary harrowed, Falcon, dressed Lindex-Plus FS, drilled at 7.0 kg.
12-Oct-91 : B : Pilot at 0.15 l with Cropspray 11 E at 2.0 l in 200 l.
06-Jan-92 : B : PK as (0:16:36) at 740 kg.
15-Jan-92 : B : Benazalox at 1.0 kg in 200 l.
16-Jan-92 : B : PK as (0:16:36) at 300 kg.
21-Feb-92 : B : 34.5% N at 220 kg.

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92/R/CS/326 and 92/W/CS/326

Experimental diary:
Far Field I (W)
31-Mar-92 : B : 34.5% N at 290 kg.
01-Apr-92 : B : Lentagran 45 WP at 2.0 kg in 200 l.
03-May-92 : B : Sportak at 1.2 l in 200 l.
16-Jul-92 : B : Reglone at 3.0 l with Agral at 0.46 l in 400 l.
26-Jul-92 : B : Combine harvested.

NOTES: (1) From 1987 to 1991 effects were tested on w. wheat. In 1992 w. rape was grown in order to control grass weeds.
(2) Number of plants was estimated in autumn and spring. Dry weights were measured in spring. Individual seed weight and oil content were measured at harvest.

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

GRAIN TONNES/HECTARE

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

STRAW	
NONE	4.04
NORMAL	4.03
2 NORMAL	3.91
4 NORMAL	3.90
Mean	3.97

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

STRAW
0.108

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	9	0.153	3.9

GRAIN MEAN DM% 85.9

PLOT AREA HARVESTED 0.00307

https://doi.org/10.23637/ERADOC-1-47

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

GRAIN TONNES/HECTARE

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

	STRAW
NONE	3.29
NORMAL	3.32
2 NORMAL	3.11
4 NORMAL	3.46
Mean	3.29

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

STRAW
0.293

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	6	0.359	10.9

GRAIN MEAN DM% 85.9

PLOT AREA HARVESTED 0.00317

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/331

TAKE-ALL INOCULATION

Object: To compare a range of methods of artificially inoculating take-all (Gaeumannomyces graminis) and to relate amounts of disease established to the yield and grain quality of w. wheat - Great Harpenden I.

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

The fourth year, w. wheat, w.oats.

For previous years see 89-91/R/CS/331

Design: 4 randomised blocks of 9 plots.

Whole plot dimensions: 3.0 x 22.0.

Treatments:

INOCMETH	Methods of inoculating take-all to w. wheat in the first year (1989), none since:
NONE O W	None (w. oats 1992, alternating with w. wheat)
NONE W O	None (w. wheat 1992, alternating with w. oats)
NONE W W	None (continuous w. wheat)
I PRE PL	Infective inoculum applied to soil surface pre-ploughing
N PRE PL	Non-infective inoculum applied to soil surface pre-ploughing
I PRE SO	Infective inoculum applied by fertilizer drill to 10 cm depth before rotary harrowing and sowing wheat
N PRE SO	Non-infective inoculum applied as above
I CD	Infective inoculum drilled with the seed
N CD	Non-infective inoculum combine drilled with the seed

Experimental diary:

17-Sep-91 : B : Ploughed and furrow pressed.
18-Sep-91 : **T** : **INOCMETH** NONE OW: Rotary harrowed, Image drilled at 120 kg.
: **T** : All treatments except **INOCMETH** NONE OW: Rotary harrowed. Mercia drilled at 160 kg.
18-Sep-91 : B : Rolled.
27-Nov-91 : B : Stefes IPU at 2.5 l and Stomp 400 at 3.3 l in 200 l.
02-Apr-92 : B : 34.5% N at 580 kg.
04-May-92 : B : Dorin at 1.0 l and Chiltern Olé at 1.0 l in 200 l.
23-Jun-92 : B : Mistral at 0.50 l and Radar at 0.50 l in 200 l.
29-Aug-92 : B : Combine harvested.

NOTE: Plant samples were taken on five occasions between March and July to assess take-all on roots. Take-all patches and lodging were assessed in July. Take-all inoculation was measured by bioassay of soil cores taken after harvest.

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92/R/CS/331

GRAIN TONNES/HECTARE

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

INOCMETH	
NONE W O	7.50
NONE W W	7.54
I PRE PL	7.56
N PRE PL	7.63
I PRE SO	7.35
N PRE SO	7.22
I CD	7.44
N CD	7.49
Mean	7.47

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

INOCMETH
0.281

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	21	0.397	5.3

GRAIN MEAN DM% 76.0

PLOT AREA HARVESTED 0.00506

https://doi.org/10.23637/ERADOC-1-47

92/W/CS/346

SET-ASIDE STUDY

Object: To compare different treatments of land temporarily withdrawn from arable cropping and to study their effects on nitrate leaching and on subsequent wheat crops - Woburn, White Horse.

Sponsors: R.D. Prew, E.T.G. Bacon, M.V. Hewitt, D.P. Yeoman, J.F. Jenkyn, R.J. Gutteridge, W. Powell, J. Ashby.

Associate sponsors: D.L.O. Smith, I. Shield, M.D. Helps.

The third year, w. wheat.

For previous years see 90-91/W/CS/346.

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

Whole plot dimensions: 10.0 x 24.0.

Treatments: All combinations of:-

Whole plots

1. **LAND TRT[90]** Land treatment in 1990, after w. wheat 1989 (all treatments ploughed autumn 1990 before w. wheat):

CA WW	Cultivated in autumn, sown to w. wheat
CA RA	Cultivated in autumn, sown to ryegrass in autumn, topped in spring
SA CA FA	Straw chopped and spread in autumn, cultivated in autumn, sown to forage rape in autumn, topped in spring
CA CS	Cultivated in autumn, cultivated in spring
SA CS	Straw chopped and spread in autumn, cultivated in spring
WT	Weeds topped
WT CS TS	Weeds topped, cultivated in spring, trefoil sown in spring, topped

Sub plots

2. **N RES** Residues of nitrogen fertilizer (kg N) to w. wheat in 1991:

(0)
(80)
(120)
(160)
(200)
(240)
(280)

NOTE: An additional fallow sub plot was present, systematically arranged on one side of each whole plot.

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Experimental diary:

```
21-Sep-91 : B : Ploughed.
25-Sep-91 : B : Rolled.
02-Oct-91 : B : Rotary cultivated.
02-Oct-91 : T : On wheat plots Mercia drilled at 140 kg.
09-Mar-92 : T : 34.5% N at 116 kg to wheat plots.
01-Apr-92 : B : Duplosan New System CMPP at 2.0 l and Asset at 2.0 l in
                200 l.
23-Apr-92 : T : 34.5% N at 464 kg to wheat plots.
15-May-92 : T : Dorin at 1.0 l and Ally at 30 g in 300 l to wheat plots.
08-Jun-92 : T : Halo at 2.0 l in 200 l to wheat plots.
29-Aug-92 : T : Combine harvested.
```

NOTE: Soil N was measured in autumn and spring. Foliar diseases and foot and root rots were assessed in spring and summer.

GRAIN TONNES/HECTARE

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

N RES / LAND TRT[90]	(0)	(80)	(120)	(160)	(200)	(240)	(280)	Mean
CA WW	6.75	6.23	5.78	6.35	6.05	5.51	6.26	6.13
CA RA	7.25	6.92	6.09	6.36	5.06	6.34	5.56	6.23
SA CA FA	6.60	6.61	5.87	5.84	5.22	5.66	6.26	6.01
CA CS	6.19	6.37	6.45	5.64	5.46	6.11	5.38	5.94
SA CS	5.72	4.98	5.10	4.75	5.73	5.21	5.04	5.22
WT	6.18	4.97	5.84	5.37	4.89	5.15	4.67	5.29
WT CS TS	6.10	5.32	5.83	4.49	5.34	4.67	5.01	5.25
Mean	6.40	5.91	5.85	5.54	5.39	5.52	5.45	5.72

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

LAND TRT[90]	N RES	LAND TRT[90] N RES
0.526	0.259	0.823

Except when comparing means with the same level(s) of LAND TRT[90]: 0.684

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.644	11.3
BLOCK.WP.SP	84	0.838	14.6

GRAIN MEAN DM% 79.9

SUB PLOT AREA HARVESTED 0.00199

https://doi.org/10.23637/ERADOC-1-47

92/W/CS/347

GREEN CROPS FOR SET-ASIDE

Object: To obtain information on the establishment and maintenance of sown crops and unsown vegetation in a long-term, up to five-year, set-aside area given no chemical inputs. Effects on soil nitrate and leaching after ploughing are also studied - Woburn, Horsepool Lane Close II.

Sponsors: R.D. Prew, E.T.G. Bacon, M.V. Hewitt, D.P. Yeoman.

Design: 6 randomised blocks of 6 plots.

Whole plot dimensions: 6.5 x 26.0.

The third year, w. oats, ryegrass, clover, tumbledown.

For previous years see 90-91/W/CS/347.

Treatments:

CROPS	Crops, cumulative since 1990:
RY LF	Ryegrass, cuttings left in situ
RY+CL LF	Ryegrass + clover, cuttings left in situ
RY+CL RE	Ryegrass + clover, cuttings removed
RY+N RE	Ryegrass given 100 kg N in spring, cuttings removed
TU LF	Tumbledown, natural regrowth, cuttings left in situ
W OATS	Winter oats

NOTES: (1) Yields were taken from the w. oats and from the ley plots, from which cuttings were removed.
(2) Ryegrass and clover were sown in 1989.

Experimental diary:

18-Sep-91 : **T** : **CROPS** W OATS: Ploughed.
21-Sep-91 : **T** : **CROPS** W OATS: Rolled.
25-Sep-91 : **T** : **CROPS** W OATS: Rotary cultivated, Image drilled at 152 kg rolled.
20-Mar-92 : **T** : **CROPS** RY+CL RE: 21 kg P_2O_5 and 84 kg K_2O to balance PK in crop removed last year.
RY+N RE: 53 kg P_2O_5 and 264 kg K_2O to balance PK in crop removed last year.
10-Apr-92 : **T** : **CROPS** W OATS: 34.5% N at 290 kg.
15-May-92 : **T** : **CROPS** W OATS: Dorin at 1.0 l and Ally at 30 g in 300 l.
27-May-92 : **T** : **CROPS** RY LF, RY+CL LF, RY+CL RE and RY+N RE: Cut.
28-May-92 : **T** : **CROPS** TU LF: Cut.
02-Jun-92 : **T** : **CROPS** RY+CL RE and RY+N RE: Cuttings removed.
15-Jul-92 : **T** : **CROPS** RY LF, RY+CL LF, RY+CL RE, RY+N RE and TU LF: Cut.
15-Jul-92 : **T** : **CROPS** RY+CL RE and RY+N RE: Cuttings removed.
31-Jul-92 : **T** : **CROPS** W OATS: Combine harvested.
15-Sep-92 : **T** : **CROPS** RY LF, RY+CL LF, RY+CL RE and RY+N RE: Cut.
16-Sep-92 : **T** : **CROPS** TU LF: Cut.
16-Sep-92 : **T** : **CROPS** RY+CL RE and RY+N RE: Cuttings removed.

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NOTE: Soil nitrogen was measured in autumn 1991 and spring 1992. Ground cover, plant numbers, plant height and growth stages were estimated in spring and autumn 1992. Soil seedbank samples were taken in autumn 1992.

GRASS

1ST CUT (27/5/92) DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	1.44	4.27	2.85

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

CROPS
0.280

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	5	0.484	17.0

1ST CUT MEAN DM% 23.3

2ND CUT (15/7/92) DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	1.22	0.37	0.79

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

CROPS
0.116

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	5	0.201	25.3

2ND CUT MEAN DM% 23.3

https://doi.org/10.23637/ERADOC-1-47

92/W/CS/347

GRASS

3RD CUT (15/9/92) DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	2.02	0.75	1.38

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

CROPS
0.170

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	5	0.295	21.3

3RD CUT MEAN DM% 27.4

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

CROPS	RY+CL RE	RY+N RE	Mean
	4.67	5.38	5.03

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

CROPS
0.478

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	5	0.828	16.5

TOTAL OF 3 CUTS MEAN DM% 24.7

PLOT AREA HARVESTED 0.00264

W. OATS

GRAIN TONNES/HECTARE 4.65

GRAIN MEAN DM% 86.5

PLOT AREA HARVESTED 0.00572

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/354

SOWING DATES AND TAKE-ALL

Object: To study the effects of sequences of sowing dates and volunteers on take-all (Gaeumannomyces graminis) and yield of winter wheat - Little Knott I.

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

The second year, w. wheat.

For first year see 91/R/CS/354

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

SOW SEQ	Sequences of sowing date in 1991 and 1992, and level of volunteers in 1992:
ERL ERL	Early in 1991 and 1992
ERL LATE	Early in 1991 and late in 1992
ERL LT V	Early in 1991 and late in 1992, when volunteers encouraged
LATE ERL	Late in 1991 and early in 1992
LT LT NV	Late in 1991 and late in 1992, when volunteers controlled

NOTE: On ERL LT V volunteers simulated by sowing 50 kg wheat seed after cultivations on 12 Sept.

Experimental diary:

30-Aug-91 : B : Straw baled.
07-Sep-91 : B : Ploughed and furrow pressed.
11-Sep-91 : B : Rotary harrowed.
12-Sep-91 : **T** : **SOW SEQ** ERL ERL and LATE ERL: Rotary harrowed, Mercia drilled at 161 kg.
12-Sep-91 : B : Rolled.
08-Oct-91 : **T** : **SOW SEQ** LT LT NV: Sting CT at 2.0 l in 200 l.
14-Oct-91 : **T** : **SOW SEQ** ERL LATE, ERL LT V and LT LT NV: Rotary harrowed, Mercia drilled at 161 kg.
15-Oct-91 : B : Rolled.
16-Nov-91 : B : Stefes IPU at 1.0 l, Stomp 400 at 2.5 l and Decis at 0.20 l in 200 l.
06-Mar-92 : B : 34.5% N at 120 kg.
02-Apr-92 : B : 34.5% N at 460 kg.
20-May-92 : B : Dorin at 1.0 l and Chiltern Olé at 1.5 l in 200 l.
23-Jun-92 : B : Mistral at 0.50 l and Radar at 0.50 l in 200 l.
03-Aug-92 : B : Combine harvested.

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

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92/R/CS/354

GRAIN TONNES/HECTARE

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

SOW SEQ	
ERL ERL	7.31
ERL LATE	7.02
ERL LT V	7.21
LATE ERL	7.62
LT LT NV	6.95
Mean	7.22

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

SOW SEQ
0.289

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.409	5.7

GRAIN MEAN DM% 86.6

PLOT AREA HARVESTED 0.00226

https://doi.org/10.23637/ERADOC-1-47

92/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 second year, w. wheat.

For first year see 91/R/CS/355.

Design: 3 randomised blocks of 7 plots.

Whole plot dimensions: 21.0 x 23.0.

Treatments:

N	Nitrogen fertilizer (kg N) as 'Nitram':
0	
50	
100	
150	
200	
250	
300	

Experimental diary:

27-Aug-91 : B : Straw chopped.
03-Sep-91 : B : PK as (0:16:36) at 1040 kg.
02-Oct-91 : B : Ploughed and furrow pressed.
04-Oct-91 : B : Disced.
07-Oct-91 : B : Disced.
08-Oct-91 : B : Rotary harrowed.
09-Oct-91 : B : Rotary harrowed, Mercia drilled at 160 kg.
11-Oct-91 : B : Rolled.
27-Nov-91 : B : Tripart Ludorum at 3.0 l and Stomp 400 at 3.3 l in 200 l.
13-Apr-92 : **T** : **N** 50: 34.5% N at 145 kg.
: **T** : **N** 100: 34.5% N at 290 kg.
: **T** : **N** 150: 34.5% N at 435 kg.
: **T** : **N** 200: 34.5% N at 580 kg.
: **T** : **N** 250: 34.5% N at 725 kg.
: **T** : **N** 300: 34.5% N at 870 kg.
19-May-92 : B : Starane 2 at 1.0 l and Dorin at 1.0 l in 200 l.
23-Jun-92 : B : Mistral at 0.50 l and Radar at 0.50 l in 200 l.
26-Aug-92 : B : Combine harvested.

NOTE: Samples were taken before combine harvest to measure straw and stubble yields. Grain, straw and stubble samples were taken for chemical analysis.

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/355

GRAIN TONNES/HECTARE

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

N	
0	3.40
50	4.80
100	5.76
150	6.77
200	6.69
250	6.67
300	6.48
Mean	5.79

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

N
0.368

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.451	7.8

GRAIN MEAN DM% 78.6

PLOT AREA HARVESTED 0.00483

https://doi.org/10.23637/ERADOC-1-47

92/W/CS/356

SET-ASIDE STUDY

Object: To compare different treatments of land temporarily withdrawn from arable cropping and to study their effects on nitrate leaching and on subsequent wheat crops - Woburn, Horsepool Lane Close I.

Sponsors: R.D. Prew, E.T.G. Bacon, M.V. Hewitt, D.P. Yeoman, J.F. Jenkyn, R.J. Gutteridge, W. Powell, J. Ashby.

Associate sponsors: D.L.O. Smith, I. Shield, M.D. Helps.

The second year, w. wheat.

For first year see 91/W/CS/356.

Design: 3 randomised blocks of 7 plots split into 8.

Whole plot dimensions: 10.0 x 24.0.

Treatments: All combinations of:-

Whole plot

1. **LAND TRT[91]** Land treatment in 1991, after w. wheat 1990 (all treatments ploughed autumn 1991 before w. wheat):

CA WW	Cultivated in autumn, sown to w. wheat
CA RA	Cultivated in autumn, sown to ryegrass in autumn, topped in spring
SA CA FA	Straw chopped and spread in autumn, cultivated in autumn, sown to forage rape in autumn, topped in spring
CA CS	Cultivated in autumn, cultivated in spring
SA CS	Straw chopped and spread in autumn, cultivated in spring
WT	Weeds topped
WT CS TS	Weeds topped, cultivated in spring, trefoil sown in spring, topped

Sub plots

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

0
80
120
160
200
240
280

NOTE: An additional fallow sub plot was present, systematically arranged on one side of each whole plot.

https://doi.org/10.23637/ERADOC-1-47

92/W/CS/356

Experimental diary.

W. wheat:

18-Sep-91	: B	:	Ploughed.
25-Sep-91	: T	:	Rolled.
02-Oct-91	: T	:	Rotary cultivated, Mercia drilled at 140 kg.
18-Mar-92	: T	:	Folimat at 1.12 l in 200 l.
01-Apr-92	: T	:	Duplosan New System CMPP at 2.0 l and Asset at 2.0 l in 200 l.
09-Apr-92	: T	:	N 80, 120, 160, 200, 240 and 280: Applied as 27% N.
15-May-92	: T	:	Dorin at 1.0 l and Ally at 0.03 kg in 300 l.
08-Jun-92	: T	:	Halo at 2.0 l in 200 l.
29-Jul-92	: T	:	Barclay Gallup at 2.0 l with Team at 0.30 l in 300 l.
01-Sep-92	: T	:	Combine harvested.

Fallow:

18-Sep-91	: B	:	Ploughed.
25-Apr-92	: T	:	Rotary cultivated.

NOTE: Amounts of soil nitrogen and plant dry matter were measured in autumn and spring. Assessment of plant cover was made in spring. Diseases were assessed in spring and summer.

GRAIN TONNES/HECTARE

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

N / LAND TRT[91]	0	80	120	160	200	240	280	Mean
CA WW	5.37	6.65	6.24	6.25	6.21	7.27	6.46	6.35
CA RA	4.26	6.53	6.86	6.91	7.29	7.42	7.47	6.68
SA CA FA	5.08	6.19	7.35	7.31	7.39	6.35	6.76	6.63
CA CS	7.62	7.56	7.61	7.08	7.30	6.58	6.46	7.17
SA CS	6.45	7.90	7.50	7.64	7.27	7.75	7.14	7.38
WT	5.88	7.16	6.74	7.35	7.43	7.69	7.70	7.13
WT CS TS	7.56	7.18	7.39	7.30	6.62	6.34	5.16	6.79
Mean	6.03	7.02	7.10	7.12	7.07	7.06	6.74	6.88

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

LAND TRT[91]	N	LAND TRT[91] N
0.262	0.273	0.718

Except when comparing means with the same level(s) of LAND TRT[91] 0.722

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.321	4.7
BLOCK.WP.SP	84	0.884	12.9

GRAIN MEAN DM% 83.0 SUB PLOT AREA HARVESTED 0.00199

https://doi.org/10.23637/ERADOC-1-47

92/W/CS/357

COVER CROPS

Object: To compare a range of cover crops for their ability to take up nitrogen during the autumn, to measure rates of mineralization of nitrogen after incorporating them in spring and to measure their effects on the yield of a subsequent spring barley crop in the first year and a winter barley crop in the second year - Woburn, Lansome III.

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

The second year, w. barley.

For first year see 91/W/CS/357.

Design: 3 randomised blocks of 15 plots split into 2 sub plots.

Whole plot dimensions: 6.0 x 25.0.

Treatments: All combinations of:-

Whole plots

1. **CROP RES** — Cover crops, sown 1990, re-sown to s. barley 1991:

FO RA SB	Forage rape
PH TA SB	Phacelia tanacetifolia
RY GR SB	Perennial ryegrass
RYE SB	Rye
WH MU SB	White mustard
WM+RY SB	White mustard + rye

2. **CC SOWDT** — Sowing dates of cover crops:

24 AUG	24 August, 1990
24 SEPT	24 September

Sub plots

3. **N RES** — Nitrogen fertilizer (kg N) in 1991:

(0)
(50)

plus three extra treatments:

1. **EXTRA**

CULT FAL	Cultivated fallow sown to s. barley in 1991
TUMBDOWN	Tumbledown fallow, no weed control until sown to s. barley in 1991
W BARLEY	W. barley sown in 1990, taken to maturity in 1991

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Sub plots

2. **N EXTRA** Nitrogen fertilizer, (kg N) in 1991:

(O)
(APPLIED) 50 (CULT FAL and TUMBDOWN) or 100 (W BARLEY)

Experimental diary:
11-Sep-91 : B : Ploughed and rolled.
25-Sep-91 : B : Rotary cultivated, Puffin drilled at 120 kg. Rolled.
31-Jan-92 : B : Stomp 400 at 2.5 l and Stefes IPU at 1.0 l in 200 l.
10-Mar-92 : B : 34.5% N at 116 kg.
01-Apr-92 : B : Bayleton at 0.50 kg and Ringer at 0.35 l in 200 l.
02-Apr-92 : B : 34.5% N at 348 kg.
03-May-92 : B : Bayleton at 0.50 kg and Ringer at 0.50 kg in 300 l.
24-Jul-92 : B : Combine harvested.

GRAIN TONNES/HECTARE

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

CC SOWDT	24 AUG	24 SEPT	Mean
CROP RES			
FO RA SB	5.32	5.47	5.39
PH TA SB	6.00	5.12	5.56
RY GR SB	5.74	5.65	5.70
RYE SB	5.40	6.20	5.80
WH MU SB	5.36	5.92	5.64
WM+RY SB	6.05	6.11	6.08
Mean	5.65	5.75	5.70

N RES	(0)	(50)	Mean
CROP RES			
FO RA SB	5.51	5.28	5.39
PH TA SB	5.50	5.61	5.56
RY GR SB	5.92	5.48	5.70
RYE SB	6.02	5.59	5.80
WH MU SB	5.53	5.75	5.64
WM+RY SB	6.30	5.86	6.08
Mean	5.80	5.60	5.70

N RES	(0)	(50)	Mean
CC SOWDT			
24 AUG	5.69	5.60	5.65
24 SEPT	5.90	5.59	5.75
Mean	5.80	5.60	5.70

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GRAIN TONNES/HECTARE

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

	N RES	(0)	(50)
CROP RES	CC SOWDT		
FO RA SB	24 AUG	5.31	5.34
	24 SEPT	5.71	5.22
PH TA SB	24 AUG	5.96	6.04
	24 SEPT	5.04	5.19
RY GR SB	24 AUG	5.74	5.74
	24 SEPT	6.09	5.21
RYE SB	24 AUG	5.69	5.11
	24 SEPT	6.35	6.06
WH MU SB	24 AUG	5.19	5.53
	24 SEPT	5.87	5.98
WM+RY SB	24 AUG	6.26	5.84
	24 SEPT	6.35	5.88

N EXTRA	(0)	(APPLIED)	Mean
EXTRA			
CULT FAL	5.21	5.31	5.26
TUMBDOWN	6.02	5.65	5.84
Mean	5.61	5.48	5.55

GRAND MEAN 5.68

WINTER BARLEY

N EXTRA	(0)	(APPLIED)	Mean
	5.80	5.30	5.55

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

CROP RES	CC SOWDT	N RES	CROP RES CC SOWDT
0.347	0.200	0.083	0.491

CROP RES N RES	CC SOWDT N RES	CROP RES CC SOWDT N RES	N EXTRA
0.376	0.217	0.531	0.203

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

CROP RES	0.203	
CC SOWDT		0.117
CROP RES.CC SOWDT		0.288

EXTRA	N EXTRA EXTRA
0.491	0.531

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

EXTRA	0.288

NOTE: Do not use SED for comparisons involving Winter Barley means.

https://doi.org/10.23637/ERADOC-1-47

92/W/CS/357

GRAIN TONNES/HECTARE

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	26	0.601	10.6
BLOCK.WP.SP	28	0.352	6.2

GRAIN MEAN DM% 88.3

STRAW TONNES/HECTARE

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

CC SOWDT	24 AUG	24 SEPT	Mean
CROP RES			
FO RA SB	2.32	2.51	2.42
PH TA SB	2.97	2.06	2.51
RY GR SB	2.20	2.43	2.31
RYE SB	2.57	2.72	2.65
WH MU SB	2.10	2.76	2.43
WM+RY SB	2.50	2.87	2.68
Mean	2.44	2.56	2.50

N RES	(0)	(50)	Mean
CROP RES			
FO RA SB	2.51	2.32	2.42
PH TA SB	2.38	2.64	2.51
RY GR SB	2.49	2.13	2.31
RYE SB	2.50	2.79	2.65
WH MU SB	2.49	2.37	2.43
WM+RY SB	2.73	2.64	2.68
Mean	2.52	2.48	2.50

N RES	(0)	(50)	Mean
CC SOWDT			
24 AUG	2.45	2.43	2.44
24 SEPT	2.58	2.53	2.56
Mean	2.52	2.48	2.50

https://doi.org/10.23637/ERADOC-1-47

92/W/CS/357

STRAW TONNES/HECTARE

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

CROP RES	N RES CC SOWDT	(0)	(50)
FO RA SB	24 AUG	2.61	2.04
	24 SEPT	2.42	2.60
PH TA SB	24 AUG	2.85	3.08
	24 SEPT	1.92	2.20
RY GR SB	24 AUG	2.09	2.31
	24 SEPT	2.89	1.96
RYE SB	24 AUG	2.55	2.59
	24 SEPT	2.45	3.00
WH MU SB	24 AUG	2.17	2.02
	24 SEPT	2.81	2.71
WM+RY SB	24 AUG	2.44	2.56
	24 SEPT	3.01	2.72

N EXTRA	(0)	(APPLIED)	Mean
EXTRA			
CULT FAL	2.44	2.70	2.57
TUMBDOWN	2.99	2.77	2.88
Mean	2.72	2.74	2.73

GRAND MEAN 2.53

WINTER BARLEY

N EXTRA	(0)	(APPLIED)	Mean
	2.54	2.00	2.27

STRAW MEAN DM% 93.6

PLOT AREA HARVESTED 0.00264

https://doi.org/10.23637/ERADOC-1-47 *pp 91*

92/W/CS/375

TAKE-ALL EPIDEMICS

Object: To determine whether severe take-all (Gaeumannomyces graminis) can be caused by artificial inoculum in winter wheat and to determine the distribution of such infection within the crop - Woburn, Butt Close I.

Sponsors: G. L. Bateman, D. Hornby.

The first year, w. wheat

Design: 3 randomised blocks of 6 x 2, plus 2 extra plots.

Whole plot dimensions: 6.0 x 2.50.

Treatments: All combinations of:-

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

E	Early
L	Late (4 weeks later)

2. **INOCULTN** Weight (kg) of inoculated oat seed applied by combine drill in autumn and spring:

	Autumn (E)	Autumn (L)	Spring
0	Nil	Nil	-
1	Nil	200	-
2	200	200	-
3	400	200	-
30	400	200	Nil
3S	400	200	500

plus 2 extra plots, systematically arranged with treatments 0 and 2:

NOTE: INOCULTN 0, 1, 30: Nil occurs where empty drill drawn across plots.

Experimental diary:

19-Sep-91 : B : Sub-soiled and ploughed.
23-Sep-91 : B : Rotary harrowed.
: **T** : **INOCULTN** 0 and 1: Empty drill drawn across plots.
INOCULTN 2, 3, 30 and 3S: Inoculated oat seed applied by combine drill.
: **T** : **SOW DATE** E: Mercia, undressed, drilled at 180 kg.
14-Oct-91 : **T** : **SOW DATE** L: Rotary harrowed.
: **T** : **INOCULTN** 0: Empty drill drawn across plots.
INOCULTN 1, 2, 3, 30 and 3S: Inoculated oat seed applied by combine drill.
: **T** : **SOW DATE** L: Mercia, undressed, drilled at 180 kg.
06-Jan-92 : B : PK as (0:16:36) at 740 kg.
31-Jan-92 : B : Stomp 400 at 2.5 l and Stefes IPU at 1.0 l in 200 l.
10-Mar-92 : B : 34.5% N at 116 kg.
25-Mar-92 : **T** : **INOCULTN** 30: Empty drill drawn across plots.
INOCULTN 3S: Inoculated oat seed applied by combine drill.

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92/W/CS/375

Experimental diary:
22-Apr-92 : B : 34.5% N at 464 kg.
09-Jun-92 : B : Impact Excel at 2.0 l in 200 l.
29-Aug-92 : B : Combine harvested.

Previous crops: Potatoes 1990, navy beans 1991.

NOTE: Plant samples were taken for take-all assessment in autumn, spring and summer. Extra plots were sampled throughout the growing season to measure take-all and plant growth in relation to growth stage.

GRAIN TONNES/HECTARE

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

INOCULTN	0	1	2	3	30	3S	Mean
SOW DATE							
E	4.27	2.77	2.81	2.50	1.38	2.61	2.72
L	3.75	2.40	2.08	1.04	1.24	1.63	2.03
Mean	4.01	2.59	2.45	1.77	1.31	2.12	2.37

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

SOW DATE	**INOCULTN**	**SOW DATE INOCULTN**
0.342	0.592	0.837

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	22	1.025	43.2

GRAIN MEAN DM% 81.7

PLOT AREA HARVESTED 0.00132

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/380

COVER CROPS AND 15N

Object: To assess how effectively cover crops take up nitrogen and to assess how much of that nitrogen is subsequently available to the following crop - Webbs.

Sponsors: P.R. Poulton, D.G. Christian, A.J. Macdonald.

The first year, forage rape, rye, tumbledown, w. and s. barley.

Design: 3 blocks of 5 plots split into 2.

Whole plot dimensions: 6.0 x 12.0.

Treatments: All combinations of:-

Whole plots

1. **LAND TRT** Cover crops, sown in autumn, tumbledown and fallow. All plots ploughed in spring and sown to s. barley:

FO RA SB	Forage rape
RYE SB	Rye
TUMDN SB	Tumbledown
FALLOWSB	Fallow

Sub plots

2. **N** Nitrogen fertilizer (kg N) to s. barley:

0
75

plus one extra treatment

Whole plot

1. **EXTRA**

W BARLEY	W. barley sown in autumn, taken to maturity

Sub plot

2. **N EXTRA** Nitrogen fertilizer (kg N) to w. barley:

0
150

NOTE: The tumbledown fallow was given 50 kg of seed from the previous s. barley crop to ensure volunteers.

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/380

Experimental diary:

15-Aug-91	: B	:	Straw baled.
21-Aug-91	: B	:	Dolomite at 5.0 t.
	: T	:	**LAND TRT** FO RA SB, RYE SB, TUMDN SB: Shallow cultivated twice with Bomford Dynadrive.
	: T	:	**LAND TRT** FO RA SB: Giant broadcast at 30 kg.
	: T	:	**LAND TRT** RYE SB: Halo broadcast at 180 kg.
	: T	:	**LAND TRT** TUMDN SB: S. barley (cv. Alexis) broadcast at 50 kg.
	: T	:	**LAND TRT** FO RA SB, RYE SB, TUMDN SB: Harrowed and rolled.
12-Sep-91	: T	:	**LAND TRT** FO RA SB: Fusilade 5 at 1.0 l with Vassgro Spreader at 0.22 l in 220 l.
13-Sep-91	: T	:	**EXTRA** W BARLEY: Ploughed.
	: T	:	**EXTRA** W BARLEY: Rotary harrowed twice.
			EXTRA W BARLEY: Rotary harrowed, Magie drilled at 144 kg, rolled.
19-Sep-91	: T	:	**LAND TRT** FALLOWSB: Ploughed and heavy spring-tine cultivated.
25-Sep-91	: T	:	**LAND TRT** FALLOWSB: Rolled.
14-Nov-91	: T	:	**LAND TRT** FO RA SB: Pilot at 0.075 l with Actipron at 2.0 l in 220 l.
03-Dec-91	: T	:	**LAND TRT** FALLOWSB: Gramoxone 100 at 3.0 l in 220 l.
	: T	:	**EXTRA** W BARLEY: Stefes IPU at 2.5 l and Stomp 400 at 3.3 l in 220 l.
03-Mar-92	: T	:	**LAND TRT** FO RA SB, RYE SB, TUMDN SB, FALLOWSB: Ploughed.
06-Mar-92	: T	:	**LAND TRT** FO RA SB, RYE SB, TUMDN SB, FALLOWSB: Rotary harrowed. Alexis, dressed Baytan, drilled at 146 kg.
09-Mar-92	: B	:	Rolled
24-Apr-92	: T	:	**N** 75: 27% N at 278 kg.
	: T	:	**N EXTRA** 150: as 27% N at 556 kg.
22-May-92	: T	:	**LAND TRT** FO RA SB, RYE SB, TUMDN SB, FALLOWSB: Duplosan New System CMPP at 2.0 l, Vindex at 1.0 l and Calixin at 0.70 l in 220 l.
30-Jul-92	: B	:	Hand harvested.

Previous crops: W. barley 1990, s. barley 1991.

NOTE: Main plots were labelled with 15N in autumn 1991. Recovery of 15N by each level of **LAND TRT**, **EXTRA** W BARLEY and the subsequent s. barley was measured.

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/380

S. BARLEY

GRAIN TONNES/HECTARE

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

N	0	75	Mean
LAND TRT			
FO RA SB	4.02	4.85	4.44
RYE SB	2.92	4.36	3.64
TUMDN SB	2.73	4.73	3.73
FALLOWSB	5.17	5.72	5.45
Mean	3.71	4.91	4.31

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

LAND TRT	N	LAND TRT N
0.239	0.288	0.472

Except when comparing means with the same level(s) of
LAND TRT 0.576

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	6	0.293	6.8
BLOCK.WP.SP	8	0.705	16.3

EXTRA W BARLEY

N EXTRA	0	150	Mean
	3.79	6.05	4.92

GRAIN MEAN DM% 37.2

PLOT AREA HARVESTED 0.00008

https://doi.org/10.23637/ERADOC-1-47 *pp 96*

92/W/CS/381

N UPTAKE AND COVER CROPS

Object: To assess how effectively cover crops take up nitrogen and assess how much of that nitrogen is subsequently available to the following crop - Woburn, Road Piece.

Sponsor: D.G. Christian.

The first year, forage rape, rye and linseed.

Design: 3 blocks of 5 plots plus a single replicate of 3 extra plots, split into 2.

Whole plot dimensions: 9.0 x 12.0.

Treatments: All combinations of:-

Whole plots

1. **LANDTRT** Land treatments over winter, ploughed and conventionally drilled to linseed in spring:

FO RA LN	Forage rape
RYE LN	Rye
TUMDN LN	Tumbledown plus w. barley
FALLW LN	Fallow
STUBL LN	Stubble

Sub plots

2. **N** Nitrogen fertilizer (kg N) in spring to linseed:

0
75

plus three extra unreplicated treatments, direct drilled to linseed in spring and split for N:

1. **EXTRA**

EX FR LN	Forage rape
EX RY LN	Rye
EX TD LN	Tumbledown plus w. barley

NOTE: W. barley seed from previous crop was drilled into TUMDN LN plots to ensure volunteers.

https://doi.org/10.23637/ERADOC-1-47

92/W/CS/381

Experimental diary:

19-Aug-91 : **T** : **LANDTRT** FO RA LN, RYE LN and TUMDN LN and **EXTRA**: Disc harrowed to 5 cm depth.
: **T** : **LANDTRT** FO RA LN and **EXTRA** EX FR LN: Ember drilled at 30 kg.
: **T** : **LANDTRT** TUMDN LN and **EXTRA** EX TD LN: Magie drilled at 50 kg.
: **T** : **LANDTRT** RYE LN and **EXTRA** EX RY LN: Amando drilled at 180 kg.
20-Aug-91 : **T** : **LANDTRT** FO RA LN, RYE LN, TUMDN LN and **EXTRA**: Harrowed and rolled.
12-Sep-91 : **T** : **LANDTRT** FO RA LN and FALLW LN and **EXTRA** EX FR LN: Pilot at 0.15 l in 200 l.
08-Oct-91 : **T** : **LANDTRT** FALLW LN: Ploughed.
01-Apr-92 : **T** : **EXTRA**: Gramoxone 100 at 4.0 l in 200 l.
13-Apr-92 : **T** : **EXTRA**: Antares, dressed Prelude 20LF, direct drilled at 52 kg.
: **T** : **LANDTRT**: FO RA LN, RYE LN, TUMBDN LN, STUBL LN: Ploughed.
14-Apr-92 : **T** : **LANDTRT**: Rotary cultivated with crumbler attached. Antares, dressed Prelude 20LF, drilled at 52 kg.
22-Apr-92 : B : Harrowed lightly.
18-May-92 : **T** : **N**: 75. Applied as 27% N.
08-Jun-92 : B : Ally at 0.03 kg in 200 l.
29-Aug-92 : B : Reglone at 3.0 l with Vassgro Spreader at 0.30 l in 300 l.
29-Sep-92 : B : Combine harvested.

Previous crops: 1990 s. barley, 1991 w. barley.

NOTE: Plant samples of cover crops were taken for growth analysis in autumn and spring. Linseed was sampled for growth analysis and disease incidence.

https://doi.org/10.23637/ERADOC-1-47

92/W/CS/381

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

N	0	75	Mean
LANDTRT			
FO RA LN	0.77	1.12	0.94
RYE LN	0.77	1.34	1.06
TUMDN LN	0.54	1.08	0.81
FALLW LN	0.70	1.15	0.92
STUBL LN	0.89	1.23	1.06
Mean	0.73	1.18	0.96

N	0	75	Mean
EXTRA			
EX FR LN	0.70	1.51	1.10
EX RY LN	0.81	1.47	1.14
EX TD LN	0.91	1.17	1.04
Mean	0.80	1.38	1.09

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

LANDTRT	**N**	**LANDTRT N**
0.166	0.078	0.207

Except when comparing means with the same level(s) of **LANDTRT** 0.175

NOTE: Do not use SED for comparisons involving **EXTRA**

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	8	0.204	21.2
BLOCK.WP.SP	10	0.214	22.4

GRAIN MEAN DM% 85.9

SUB PLOT AREA HARVESTED 0.00082

https://doi.org/10.23637/ERADOC-1-47

92/W/CS/388

SULPHUR AND NITROGEN

Object: To test the crop response to sulphur and whether nitrogen affects this response - Woburn, Butt Close W.

Sponsors: S.P. McGrath, G.F.J. Milford, J. Fieldsend.

The first year, w. rape.

Design: 3 blocks of 3 x 4 plots.

Plot dimensions: 4.0 x 10.0.

Treatments: All combinations of:-

1. **S** Sulphur (kg S) in spring as calcium sulphate:

S0	0
S1	10
S2	20
S4	40

2. **N** Nitrogen (kg N) in spring as 27% N:

N0	0
N1	180
N2	230

NOTES: (1) Nitrogen treatments were applied in two split applications.
(2) Because of poor growth nitrogen was applied at 50 kg N to the N0 plots on 23 Apr, 1992.
(3) Sulphur was applied as gypsum (17.5% S).

Experimental diary:

27-Aug-91 : B : Ploughed,
04-Sep-91 : B : Rolled, rotary harrowed, Falcon drilled at 7.0 kg.
07-Sep-91 : B : Rolled.
29-Oct-91 : B : 27% N at 145 kg.
06-Jan-92 : B : PK as (0:16:36) at 740 kg.
15-Jan-92 : B : Benazalox at 1.25 kg in 200 l.
13-Feb-92 : **T** : **N** N1 and N2: 27% N at 185 kg.
S S1, S2 and S4: Gypsum applied.
01-Apr-92 : **T** : **N** N1 and N2: 27% N at 481 kg and 667 kg respectively.
23-Apr-92 : **T** : **N** N0: 27% N at 185 kg.
20-Jul-92 : B : Reglone at 3.0 l with Agral at 0.40 l in 400 l.
26-Jul-92 : B : Combine harvested.

Previous crops: W. wheat 1990 and 1991.

NOTE: Soil samples were taken for chemical analysis in autumn, late winter and spring. Plant samples were taken in winter, spring and summer for chemical analysis of crop components.

https://doi.org/10.23637/ERADOC-1-47 *pp 100*

92/W/CS/388

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

N S	N0	N1	N2	Mean
S0	0.56	0.89	1.03	0.83
S1	0.77	1.29	1.40	1.15
S2	0.52	1.52	1.45	1.17
S3	0.55	1.55	1.70	1.27
Mean	0.60	1.31	1.40	1.10

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

S	N	S N
0.113	0.098	0.195

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	22	0.239	21.6

GRAIN MEAN DM% 77.2

STRAW (AT 90% DRY MATTER) TONNES/HECTARE

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

N S	N0	N1	N2	Mean
S0	1.16	1.46	1.46	1.36
S1	1.07	1.64	2.29	1.66
S2	2.06	2.32	1.93	2.10
S3	1.04	2.17	2.07	1.76
Mean	1.33	1.90	1.93	1.72

STRAW MEAN DM% 71.1

PLOT AREA HARVESTED 0.00132

https://doi.org/10.23637/ERADOC-1-47

92/R/CS/392

ALTERNARIA & FUNGICIDES

Object: To study the epidemiology and changes in the population of Alternaria linicola under different fungicide treatments - Long Hoos IV 4.

Sponsors: I. Vloutoglou, B.D.L. Fitt.

The first year, linseed.

Design: 5 randomised blocks of 4 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

FUNGCIDE	Fungicides:
NONE	None
IPRODION	Iprodione
CHLORTHL	Chlorothalonil
PROCHLOR	Prochloraz

Experimental diary:

14-Apr-92 : B : Heavy spring-tine cultivated.
21-Apr-92 : B : Rotary harrowed.
21-Apr-92 : B : Rotary harrowed. Antares, undressed, drilled at 50 kg.
23-Apr-92 : B : Rolled.
13-May-92 : B : 34.5% N at 220 kg.
02-Jun-92 : B : Basagran at 2.0 l and Vindex at 1.0 l in 200 l.
18-Jun-92 : B : Irrigation: 8 mm applied.
24-Jun-92 : **T** : **FUNGCIDE** IPRODION: Rovral Flo at 1.0 l in 220 l.
: **T** : **FUNGCIDE** CHLORTHL: Chiltern Chlorothalonil 500 at 0.50 l in 220 l.
: **T** : **FUNGCIDE** PROCHLOR: Sportak 45 at 0.35 l in 220 l.
26-Jun-92 : B : Irrigation: 12mm applied.
29-Jun-92 : B : Irrigation: 12mm applied.
08-Jul-92 : **T** : **FUNGCIDE**: All applications as 24-Jun-92.
22-Jul-92 : **T** : **FUNGCIDE**: All applications as 24-Jun-92.
28-Jul-92 : B : Irrigation: 12mm applied.
06-Aug-92 : **T** : **FUNGCIDE**: All applications as 24-Jun-92.
19-Aug-92 : **T** : **FUNGCIDE**: All applications as 24-Jun-92.
10-Sep-92 : **T** : **FUNGCIDE**: All applications as 24-Jun-92.
16-Sep-92 : B : Roundup at 3.0 l in 200 l.
17-Sep-92 : B : Combine harvested.

Previous crops: W. wheat 1990, linseed 1991.

NOTE: Plant samples were taken at fortnightly intervals from mid-June until mid-September for assessment of infection by Alternaria linicola.

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92/R/CS/392

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

FUNGCIDE	
NONE	0.96
IPRODION	0.93
CHLORTHL	1.06
PROCHLOR	1.18
Mean	1.03

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

FUNGCIDE
0.086

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.136	13.2

GRAIN MEAN DM% 86.0

PLOT AREA HARVESTED 0.00230

https://doi.org/10.23637/ERADOC-1-47

92/R/WW/1

WINTER WHEAT

EYESPOT TYPES AND YIELD

Object: To compare the effects of eyespot (Pseudocercosporella herpotrichoides) caused by the R- and the W-type of the fungus on the yield of w. wheat - Great Field I/II.

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

Design: 4 randomised blocks of 14 plots.

Whole plot dimensions: 3.0 x 12.0.

Treatments: All combinations of:

1. **EYE TYPE** Eyespot types:

RYE	Rye
WHEAT	Wheat

2. **INOCDATE** Dates of inoculation of eyespot types:

AUTUMN	Autumn
SPRING	Spring
AUT+SPR	Autumn and spring

3. **FUNGCIDE** Prochloraz in spring:

NONE	None
PROCHLOR	Prochloraz

plus two extra treatments:

NO INOC No inoculation, prochloraz in spring:

NONE EX	None
PROCH EX	Prochloraz

Experimental diary:

```
06-Aug-91 : B : Straw chopped.
05-Sep-91 : B : Gramoxone 100 at 3.0 l in 200 l.
18-Sep-91 : B : Heavy spring-tine cultivated.
20-Sep-91 : B : Heavy spring-tine cultivated.
25-Sep-91 : B : Disced, rotary harrowed, Talon drilled at 240 kg,
                rolled.
29-Nov-91 : B : Stefes IPU at 1.0 l and Stomp 400 at 2.5 l in 200 l.
          : B : Draza at 5.5 kg.
18-Feb-92 : B : PK as (0:18:36) at 940 kg.
01-Apr-92 : T : FUNGCIDE PROCHLOR and PROCH EX: Sportak 45 at 0.90 l in
                200 l.
09-Apr-92 : B : New 5C Cycocel at 2.3 l in 200 l.
13-Apr-92 : B : 34.5% N at 440 kg.
01-Sep-92 : B : Combine harvested.
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https://doi.org/10.23637/ERADOC-1-47

92/R/WW/1

Previous crops: W. oilseed rape 1990 and 1991.

NOTE: Plant samples were taken in July and assessed for eyespot and sharp eyespot. The eyespot was cultured and identified as the R-type or W-type of the fungus.

GRAIN TONNES/HECTARE

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

EYE TYPE	RYE	WHEAT	Mean
FUNGCIDE			
NONE	7.42	7.19	7.30
PROCHLOR	7.67	7.77	7.72
Mean	7.54	7.48	7.51

INOCDATE	AUTUMN	SPRING	AUT+SPR	Mean
FUNGCIDE				
NONE	7.24	7.39	7.29	7.30
PROCHLOR	7.65	7.28	8.23	7.72
Mean	7.44	7.33	7.76	7.51

INOCDATE	AUTUMN	SPRING	AUT+SPR	Mean
EYE TYPE				
RYE	7.24	7.61	7.78	7.54
WHEAT	7.65	7.05	7.74	7.48
Mean	7.44	7.33	7.76	7.51

INOCDATE	AUTUMN	SPRING	AUT+SPR
FUNGCIDE **EYE TYPE**			
NONE RYE	7.33	7.47	7.45
NONE WHEAT	7.15	7.30	7.12
PROCHLOR RYE	7.15	7.75	8.11
PROCHLOR WHEAT	8.14	6.81	8.35

NO INOC	NONE EX	PROCH EX	Mean
	7.98	8.12	8.05

GRAND MEAN 7.59

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

FUNGCIDE	**EYE TYPE**	**INOCDATE**	**FUNGCIDE EYE TYPE**
0.241	0.241	0.295	0.341

FUNGCIDE INOCDATE	**EYE TYPE INOCDATE**	**FUNGCIDE EYE TYPE INOCDATE**	**NO INOC**
0.417	0.417	0.590	0.590

https://doi.org/10.23637/ERADOC-1-47

92/R/WW/1

GRAIN TONNES/HECTARE

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	39	0.834	11.0

MEAN DM% 76.0

PLOT AREA HARVESTED 0.00136

https://doi.org/10.23637/ERADOC-1-47 *pp 106*

92/R/WW/2

WINTER WHEAT

SUMMER PYRETHROIDS

Object: To assess the effect of a summer application of pyrethroids on populations of non-target beneficial insects and any subsequent consequences on summer aphid populations - Bones Close.

Sponsor: N. Carter.

Design: 4 randomised blocks of 4 plots.

Whole plot dimensions: 9.0 X 15.0.

Treatments:

INSCTCDE	Insecticides applied at GS 61:
NONE	None
DELTFULL	Deltamethrin at full standard rate
DELTHALF	Deltamethrin at half standard rate
DIMETH	Dimethoate

Experimental diary:

14-Aug-91 : B : Straw chopped.
15-Aug-91 : B : PK as (0:16:36) at 1040 kg.
23-Aug-91 : B : Deep tine cultivated with vibrating tines, 60 cm apart and 45 cm deep.
26-Aug-91 : B : Ploughed and rolled.
12-Sep-91 : B : Sting CT at 1.5 l in 200 l.
26-Sep-91 : B : Rotary harrowed twice, Mercia drilled at 160 kg.
28-Oct-91 : B : Stefes IPU at 1.0 l and Stomp 400 at 2.5 l in 200 l.
06-Mar-92 : B : 34.5% N at 120 kg.
02-Apr-92 : B : 34.5% N at 460 kg.
20-May-92 : B : Dorin at 1.0 l and Chiltern Olé at 1.5 l in 200 l.
22-Jun-92 : **T** : **INSCTCDE** DELTFULL: Decis at 0.25 l in 260 l.
: **T** : **INSCTCDE** DELTHALF: Decis at 0.125 l in 260 l.
: **T** : **INSCTCDE** DIMETH: Power Dimethoate at 0.84 l in 520 l.
07-Aug-92 : B : Combine harvested.

Previous crops: W. beans 1990, w. barley 1991.

https://doi.org/10.23637/ERADOC-1-47 *pp 107*

92/R/WW/2

GRAIN TONNES/HECTARE

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

INSCTCDE	
NONE	5.01
DELTFULL	5.38
DELTHALF	5.06
DIMETH	5.41
Mean	5.21

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

INSCTCDE
0.190

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	9	0.269	5.2

GRAIN MEAN DM% 87.4

PLOT AREA HARVESTED 0.00345

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92/R/WW/3

WINTER WHEAT

N AND CROP PHYSIOLOGY

Object: To study the relationship between N supply to crops of different size and their nitrate contents, N uptakes, growth rates and yield - Fosters West.

Sponsor: R.J. Darby.

Design: 3 randomised blocks of 16 plots.

Whole plot dimensions: 3.0 x 17.0.

Treatments: All combinations of:-

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

EARLY	Second week in September
LATE	Third week in October

2. **AUT N** Autumn nitrogen:

NONE	None
50	50 kg N

3. **SPRING N** Spring nitrogen:

NONE	None
N1	Half optimum N
N2	Optimum N
N2L	Optimum N three weeks later

Experimental diary:

06-Sep-91 : B : Ploughed and furrow pressed.
12-Sep-91 : B : Rotary harrowed.
12-Sep-91 : **T** : **SOW DATE** EARLY: Rotary harrowed, Mercia, drilled at 160 kg. Rolled.
14-Oct-91 : **T** : **SOW DATE** LATE: Rotary harrowed, Mercia, drilled at 160 kg.
15-Oct-91 : B : Rolled.
29-Oct-91 : **T** : **AUT N** 50: 46% N (as urea) at 109 kg.
27-Nov-91 : B : Stefes IPU at 2.5 l and Stomp 400 at 3.3 l in 300 l.
16-Mar-92 : **T** : **SPRING N** N1: 27% N at 111 kg.
N2: 27% N at 222 kg.
09-Apr-92 : **T** : **SPRING N** N1: 27% N at 304 kg.
N2: 27% N at 607 kg.
N2L: 27% N at 222 kg.
29-Apr-92 : **T** : **SPRING N** N2L: 27% N at 607 kg.
19-May-92 : B : Dorin at 1.0 l and Chiltern Olé at 1.5 l in 300 l.
22-Jun-92 : B : Mistral at 0.50 l and Radar at 0.50 l in 300 l.
04-Aug-92 : B : Combine harvested.

Previous crops: Potatoes 1990, s. wheat 1991.

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92/R/WW/3

NOTE: Soils were sampled to 90 cm depth for ammonium and nitrate contents on three occasions between mid-October and late February. Stem nitrate concentrations were measured at fortnightly intervals from November to April. Lodging was assessed in June and July. Components of yield were measured after hand harvesting in late July.

GRAIN TONNES/HECTARE

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

AUT N	NONE	50	Mean
SOW DATE			
EARLY	7.24	7.35	7.29
LATE	6.96	6.47	6.72
Mean	7.10	6.91	7.01

SPRING N	NONE	N1	N2	N2L	Mean
SOW DATE					
EARLY	6.07	7.79	6.99	8.31	7.29
LATE	5.54	7.44	6.40	7.51	6.72
Mean	5.80	7.62	6.69	7.91	7.01

SPRING N	NONE	N1	N2	N2L	Mean
AUT N					
NONE	5.10	7.76	7.22	8.32	7.10
50	6.51	7.47	6.17	7.49	6.91
Mean	5.80	7.62	6.69	7.91	7.01

SOW DATE	**AUT N**	**SPRING N**	NONE	N1	N2	N2L
EARLY	NONE		5.12	7.77	7.56	8.50
	50		7.03	7.82	6.42	8.12
LATE	NONE		5.08	7.76	6.88	8.14
	50		6.00	7.11	5.92	6.87

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

SOW DATE	**AUT N**	**SPRING N**	**SOW DATE AUT N**
0.095	0.095	0.134	0.134

SOW DATE SPRING N	**AUT N SPRING N**	**SOW DATE AUT N SPRING N**
0.189	0.189	0.268

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	30	0.328	4.7

GRAIN MEAN DM% 86.1

https://doi.org/10.23637/ERADOC-1-47

92/R/WW/3

STRAW TONNES/HECTARE

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

AUT N	NONE	50	Mean
SOW DATE			
EARLY	6.91	8.40	7.66
LATE	6.66	7.46	7.06
Mean	6.78	7.93	7.36

SPRING N	NONE	N1	N2	N2L	Mean
SOW DATE					
EARLY	5.70	8.28	8.78	7.87	7.66
LATE	4.70	7.64	7.97	7.93	7.06
Mean	5.20	7.96	8.37	7.90	7.36

SPRING N	NONE	N1	N2	N2L	Mean
AUT N					
NONE	3.88	7.58	8.39	7.28	6.78
50	6.51	8.35	8.35	8.52	7.93
Mean	5.20	7.96	8.37	7.90	7.36

SOW DATE	**AUT N**	**SPRING N**	NONE	N1	N2	N2L
EARLY	NONE		3.95	7.66	8.69	7.34
	50		7.44	8.91	8.87	8.40
LATE	NONE		3.81	7.50	8.10	7.23
	50		5.58	7.78	7.84	8.64

STRAW MEAN DM% 81.9

PLOT AREA HARVESTED 0.00322

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92/R/WW/4

WINTER WHEAT

APHID IMMIGRATION

Object: To determine the role of immigration of cereal aphids in relation to forecasting outbreaks in summer - Black Horse I N.

Sponsor: N. Carter.

Design 4 blocks of 4 plots, with external dummy plots and arranged to allow estimation of the effects of neighbouring plots.

Whole plot dimensions: 9.0 x 9.0.

Treatments:

1. **INSCTCDE** Time of insecticide application:

NONE	None
MAR	Late March
MARIMME	Late March and at 10 day intervals from start of immigration until early growth stage
MARIMML	Late March and at 10 day intervals from start of immigration until late growth stage

Experimental diary:

14-Aug-91	B	Straw chopped.
01-Sep-91	B	Deep-tine cultivated with vibrating tines, 60 cm apart and 45 cm deep.
16-Sep-91	B	Ploughed and furrow pressed.
25-Sep-91	B	Rotary harrowed, Mercia drilled at 160 kg.
26-Sep-91	B	Rolled.
03-Dec-91	B	Stefes IPU at 1.0 l and Stomp 400 at 2.5 l in 200 l.
17-Feb-92	B	PK as (0:18:36) at 940 kg.
27-Feb-92	B	34.5% N at 120 kg.
03-Apr-92	B	34.5% N at 320 kg.
09-Apr-92	**T**	**INSCTCDE** MAR, MARIMME, MARIMML: Aphox at 0.28 kg in 200 l.
20-May-92	B	Ally at 0.06 kg and Dorin at 1.0 l in 200 l.
20-May-92	**T**	**INSCTCDE** MARIMME, MARIMML: Aphox at 0.28 kg in 200 l.
04-Jun-92	**T**	**INSCTCDE** MARIMME, MARIMML: Aphox at 0.28 kg in 200 l.
22-Jun-92	**T**	**INSCTCDE** MARIMML: Aphox at 0.28 kg in 200 l.
23-Jun-92	B	Mistral at 0.50 l and Radar at 0.50 l in 200 l.
30-Jul-92	B	Combine harvested.

Previous crops: W. barley 1990, w. oilseed rape 1991.

NOTE: Plant samples were taken in spring and summer to assess aphid populations and in mid-July to count the number of ears.

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92/R/WW/4

GRAIN TONNES/HECTARE

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

INSCTCDE	
NONE	8.32
MAR	8.58
MARIMME	8.73
MARRIML	8.50
Mean	8.53

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

INSCTCDE
0.180

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	9	0.255	3.0

GRAIN MEAN DM% 85.1

PLOT AREA HARVESTED 0.00207

https://doi.org/10.23637/ERADOC-1-47

92/R/BW/1

WINTER BARLEY

COMPANION CROPPING

Object: To measure the effect of companion cropping on pests and diseases, growth, yield and nutrient uptake of cereals - Highfield IV/Road Piece E.

Sponsor: D.G. Christian.

Design: 3 randomised blocks of 5 plots.

Whole plot dimensions: 6.0 x 10.0.

Treatments:

COMPCROP	Companion crops sown by broadcasting:
NONE	None
WCLOVER	White clover at 20 kg after previous harvest, subsequently ploughed and w. barley drilled
WMUSTL	White mustard at 1.5 kg before drilling w. barley
WMUSTM	White mustard at 3.0 kg before drilling w. barley
OILRADSH	Oil radish at 1.5 kg before drilling w. barley

Experimental diary:

14-Aug-91	B	PK as (0:16:36) at 1040 kg.
21-Aug-91	**T**	**COMPCROP** WCLOVER: Rotary cultivated with Bomford Dynadrive, New Zealand white clover broadcast at 20 kg.
09-Sep-91	B	Ploughed and furrow pressed.
12-Sep-91	B	Rolled.
18-Sep-91	B	Rotary harrowed.
18-Sep-91	**T**	**COMPCROP** WMUSTL: White mustard (cv. Tilney) broadcast at 1.5 kg.
	T	**COMPCROP** WMUSTM: White mustard (cv. Tilney) broadcast at 3.0 kg.
	T	**COMPCROP** OILRADSH: Oil radish (cv. Trick) broadcast at 1.5 kg.
18-Sep-91	B	Rotary harrowed, Magie drilled at 140 kg, rolled.
06-Mar-92	B	34.5% N at 120 kg.
02-Apr-92	B	34.5% N at 340 kg.
19-Apr-92	B	Duplosan New System CMPP at 2.0 l and Vindex at 1.4 l in 200 l.
03-May-92	B	Calixin at 0.50 l and Radar at 0.50 l in 260 l.
23-Jul-92	B	Combine harvested.

Previous crops: W. barley 1990 and 1991.

NOTES: (1) Plant samples were taken in December for growth analysis.
(2) Subsequently in December severe frosts killed all the companion crops.

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92/R/BW/1

GRAIN TONNES/HECTARE

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

COMPCROP	
NONE	4.49
WCLOVER	4.69
WMUSTL	4.71
WMUSTM	4.52
OILRADSH	5.27
Mean	4.73

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

COMPCROP
0.874

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	8	1.071	22.6

GRAIN MEAN DM% 84.1

PLOT AREA HARVESTED 0.00230

https://doi.org/10.23637/ERADOC-1-47

92/R/BW/2

WINTER BARLEY

SOWING DATES, APHIDS AND BYDV

Object: To study the relationship of aphid numbers in suction trap samples to crop populations and the incidence of barley yellow dwarf virus (BYDV) on winter barley sown on a range of dates - Highfield IV.

Sponsors: G.M. Tatchell, R.T. Plumb.

Design: 4 randomised blocks of 10 plots.

Whole plot dimensions: 3.0 x 21.0.

Treatments: All combinations of:-

1. **SOWDATE** Dates of sowing:

ERLYSEPT	Early September
MIDSEPT	Mid September
LATESEPT	Late September
ERLYOCT	Early October
MIDOCT	Mid October

2. **APHICIDE** Aphicide in autumn:

NONE	None
CYPERMET	Cypermethrin

Experimental diary:

05-Aug-91 : B : Straw baled.
14-Aug-91 : B : PK as (0:16:36) at 1040 kg.
23-Aug-91 : B : Ploughed.
26-Aug-91 : B : Rolled.
02-Sep-91 : **T** : **SOWDATE** ERLYSEPT: Rotary harrowed, Magie drilled at 140 kg, rolled.
12-Sep-91 : **T** : **SOWDATE** MIDSEPT: Rotary harrowed, Magie drilled at 140 kg, rolled.
19-Sep-91 : **T** : **SOWDATE** LATESEPT, ERLYOCT, MIDOCT: Heavy spring-tine cultivated.
26-Sep-91 : **T** : **SOWDATE** LATESEPT: Rotary harrowed, Magie drilled at 141 kg.
10-Oct-91 : **T** : **SOWDATE** ERLYOCT: Rotary harrowed, Magie drilled at 141 kg.
24-Oct-91 : **T** : **SOWDATE** MIDOCT: Rotary harrowed, Magie drilled at 141 kg.
14-Nov-91 : **T** : **APHICIDE** CYPERMET: Ripcord at 0.25 l in 220 l.
22-Nov-91 : B : Stefes IPU at 1.0 l and Stomp 400 at 2.5 l in 220 l.
06-Mar-92 : B : 34.5% N at 120 kg.
02-Apr-92 : B : 34.5% N at 340 kg.
19-Apr-92 : B : Duplosan New System CMPP at 2.0 l and Vindex at 1.4 l in 200 l.
03-May-92 : B : Calixin at 0.50 l and Radar at 0.50 l in 260 l.
22-May-92 : B : Calirus at 2.0 kg and Calixin at 0.70 l in 200 l.

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92/R/BW/2

Experimental diary:
08-Jun-92 : B : Netted yield areas.
20-Jul-92 : B : Removed net from yield areas.
23-Jul-92 : B : Combine harvested.

Previous crops: W. barley 1990 and 1991.

NOTES: (1) Aphid numbers were counted at intervals between crop emergence and the beginning of the stem elongation. Leaf samples were collected for subsequent enzyme-linked immunosorbent assay to determine levels of BYDV infection.
(2) Plant height, thousand grain weights and number of grains per ear were determined at harvest.

GRAIN TONNES/HECTARE

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

APHICIDE / **SOWDATE**	NONE	CYPERMET	Mean
ERLYSEPT	6.59	7.19	6.89
MIDSEPT	7.10	7.34	7.22
LATESEPT	8.36	8.56	8.46
ERLYOCT	8.35	8.58	8.46
MIDOCT	8.02	7.99	8.00
Mean	7.68	7.93	7.81

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

SOWDATE	**APHICIDE**	**SOWDATE APHICIDE**
0.219	0.138	0.309

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	27	0.437	5.6

GRAIN MEAN DM% 84.4

PLOT AREA HARVESTED 0.00204 (0.00192 ERLYSEPT only)

https://doi.org/10.23637/ERADOC-1-47

92/R/BS/1

SPRING BARLEY

INSECTICIDES AND APHIDS

Object: To compare the effects of a range of insecticides on the control of aphids and barley yellow dwarf virus (BYDV) and on the yield of spring barley - Little Hoos.

Sponsors: N. Carter, R.T. Plumb.

Design: 4 blocks of 5 plots, with external dummy plots and arranged to allow estimation of the effects of neighbouring plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

INSCTCDE	Insecticides:
NONE	None
IMIDA SD	Imidacloprid seed dressing
DELTA SP	Deltamethrin spray
DEMET SP	Demeton-S-methyl spray
PIRIM SP	Pirimicarb spray

NOTE: Imidacloprid seed dressing applied as a 35% w/v formulation at 300 ml per 100 kg seed.

Experimental diary:

30-Aug-91 : B : Straw chopped.
29-Oct-91 : B : Ploughed.
22-Apr-92 : B : 34.5% N at 440kg.
22-Apr-92 : **T** : Spring-tine cultivated, rotary harrowed. Alexis, dressed Cerevax (except **INSCTCDE** IMADA SD), drilled at 160kg.
22-Apr-92 : **T** : **INSCTCDE** IMIDA SD: Spring-tine cultivated, rotary harrowed. Alexis, dressed imidacloprid, drilled at 160 kg.
22-Apr-92 : B : Rolled.
19-May-92 : B : Duplosan New System CMPP at 2.0 l, Vindex at 1.0 l and Calixin at 0.70 l in 200 l.
19-May-92 : **T** : **INSCTCDE** DELTA SP: Decis at 0.20 l in 220 l.
: **T** : **INSCTCDE** DEMET SP: Metasystox 55 at 0.42 l in 220 l.
: **T** : **INSCTCDE** PIRIM SP: Aphox at 0.28 kg in 220 l.
04-Jun-92 : **T** : **INSCTCDE** DELTA SP: Decis at 0.20 l in 300 l.
: **T** : **INSCTCDE** DEMET SP: Metasystox 55 at 0.42 l in 300 l.
: **T** : **INSCTCDE** PIRIM SP: Aphox at 0.28 kg in 300 l.
09-Jun-92 : B : Radar at 0.50 l in 200 l.
15-Jun-92 : **T** : **INSCTCDE** DELTA SP: Decis at 0.20 l in 200 l.
: **T** : **INSCTCDE** DEMET SP: Metasystox 55 at 0.42 l in 220 l.
: **T** : **INSCTCDE** PIRIM SP: Aphox at 0.28 kg in 220 l.
18-Aug-92 : B : Combine harvested.

Previous crops: W. oilseed rape 1990, w. wheat 1991

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92/R/BS/1

NOTE: Symptoms of BYDV were visually assessed in spring and summer and thousand grain weights measured at harvest.

GRAIN TONNES/HECTARE

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

INSCTCDE	
NONE	5.72
IMIDA SD	5.77
DELTA SP	5.81
DEMET SP	5.71
PIRIM SP	5.71
Mean	5.74

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

INSCTCDE
0.076

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.107	1.9

GRAIN MEAN DM% 83.8

PLOT AREA HARVESTED 0.00230

https://doi.org/10.23637/ERADOC-1-47

92/R/BS/2

SPRING BARLEY

SPRAY TIMINGS AND BYDV

Object: To investigate the optimum strategy for controlling barley yellow dwarf virus (BYDV) in spring barley in relation to sowing date, aphid immigration and subsequent population development - Little Hoos.

Sponsors: J. Mann, N. Carter, R.T. Plumb.

Design: 3 randomised blocks of 16 plots with external dummy plots and arranged to allow estimation of the effects of neighbouring plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

S P DATE	Dates of sowing and of applying pirimicarb:
E 0	Sown March 1992, no pirimicarb
E D1	" " pirimicarb applied after emergence
E D2	" " " " 10 days after emergence
E D3	" " " " 20 " " "
E D1 D2	" " " " after emergence and 10 days later
E D1 D3	" " " " after emergence and 20 days later
E D2 D3	" " " " 10 days and 20 days after emergence
E D1D2D3	" " " " after emergence, 10 days and 20 days later
L 0	Sown April, no pirimicarb
L D2	" " pirimicarb applied after emergence
L D3	" " " " 10 days after emergence
L D4	" " " " 20 " " "
L D2 D3	" " " " after emergence and 10 days later
L D2 D4	" " " " after emergence and 20 days later
L D3 D4	" " " " 10 days and 20 days after emergence
L D2D3D4	" " " " after emergence, 10 days and 20 days later

Experimental diary:

30-Aug-91 : B : Straw chopped.
30-Oct-91 : B : Ploughed.
17-Mar-92 : **T** : **S P DATE** E 0, E D1, E D2, E D3, E D1 D2, E D1 D3, E D2 D3, E D1D2D3: Rotary harrowed. Alexis, dressed Cerevax, drilled at 160 kg.
19-Mar-92 : B : Rolled.
22-Apr-92 : B : 34.5% N at 440 kg.
22-Apr-92 : **T** : **S P DATE** L 0, L D2, L D3, L D4, L D2 D3, L D2 D4, L D3 D4, L D2D3D4: Spring-tine cultivated, rotary harrowed, Alexis, dressed Cerevax, drilled at 160 kg.

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92/R/BS/2

Experimental diary:

24-Apr-92 : B : Rolled.
05-May-92 : **T** : **S P DATE** E D1, E D1 D2, E D1 D3, E D1D2D3: Aphox at 0.28 kg in 300 l.
15-May-92 : **T** : **S P DATE** E D2, E D1 D2, E D2 D3, E D1D2D3, L D2, L D2 D3, L D2 D4, L D2D3D4: Aphox at 0.28 kg in 300 l.
19-May-92 : B : Duplosan New System CMPP at 2.0 l, Vindex at 1.0 l and Calixin at 0.70 l in 200 l.
22-May-92 : **T** : **S P DATE** E D3, E D1 D3, E D2 D3, E D1D2D3, L D3, L D2 D3, L D3 D4, L D2D3D4: Aphox at 0.28 kg in 300 l.
04-Jun-92 : **T** : **S P DATE** L D4, L D2 D4, L D3 D4, L D2D3D4: Aphox at 0.28 kg in 300 l.
09-Jun-92 : B : Radar at 0.50 l in 200 l.
18-Aug-92 : B : Combine harvested.

Previous crops: W. oilseed rape 1990, w. wheat 1991.

NOTES: (1) Plant samples were taken to assess aphid numbers in spring and summer.
(2) Symptoms of BYDV were visually assessed and leaf samples taken for enzyme-linked immunosorbent assay in spring and summer.
(3) Number of ears was counted before harvest and thousand grain weights determined at harvest.

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92/R/BS/2

GRAIN TONNES/HECTARE

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

S P DATE	
E 0	7.93
E D1	7.89
E D2	8.23
E D3	8.10
E D1 D2	7.89
E D1 D3	8.12
E D2 D3	8.13
E D1D2D3	7.92
L 0	5.50
L D2	5.48
L D3	5.51
L D4	5.42
L D2 D3	5.78
L D2 D4	5.62
L D3 D4	5.62
L D2D3D4	5.72
Mean	6.80

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

S P DATE
0.162

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	30	0.198	2.9

GRAIN MEAN DM% 85.0

PLOT AREA HARVESTED 0.00230

https://doi.org/10.23637/ERADOC-1-47

92/R/RAW/1

WINTER OILSEED RAPE

FUNGAL PATHOGENS and GLUCOSINOLATES

Object: To monitor the accumulation of glucosinolates in pods and seeds following inoculation with a fungal pathogen - New Zealand.

Sponsors: K.J. Doughty, J. Fieldsend, G.F.J. Milford, R. Wallsgrove.

Design: 6 randomised blocks of 3 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

FUNGINOC	Fungicides and inoculation with fungal pathogen:
NOPRINA	No prochloraz, inoculation in autumn
PROCINS	Prochloraz applied in autumn and spring, inoculation in summer
PROCIPRO	Prochloraz applied in autumn and spring, iprodione in summer

NOTES: (1) **FUNGINOC** NOPRINA: Plots were inoculated with rape straw infected with Alternaria Sp., Pyrenopeziza brassicae and Leptosphaeria maculans.

(2) **FUNGINOC** PROCINS: Plots were inoculated with a mycelial suspension of Alternaria brassicae.

Experimental diary:

06-Sep-91 : B : Straw chopped.
06-Sep-91 : B : Dolomite at 5.0 t.
07-Sep-91 : B : Ploughed and furrow pressed.
09-Sep-91 : B : Rotary harrowed twice, Bienvenu drilled at 5.6 kg, rolled.
22-Oct-91 : B : Butisan S at 1.5 l and Pilot at 0.075 l with Actipron at 2.0 l in 200 l.
10-Nov-91 : **T** : **FUNGINOC** NOPRINA: Inoculated.
02-Dec-91 : **T** : **FUNGINOC** PROCINS and PROCIPRO: Autumn prochloraz at 0.50 kg in 200 l.
20-Feb-92 : B : 34.5% N at 220 kg.
25-Mar-92 : B : 34.5% N at 290 kg.
01-Apr-92 : **T** : **FUNGINOC** PROCINS and PROCIPRO: Spring prochloraz at 0.50 kg in 200 l.
15-Jun-92 : **T** : **FUNGINOC** PROCINS: Inoculated.
22-Jun-92 : **T** : **FUNGINOC** PROCIPRO: Iprodione at 0.50 kg in 200 l.
22-Jul-92 : B : Reglone at 3.0 l with Farmon Blue at 0.52 l in 260 l.
28-Jul-92 : B : Combine harvested.

Previous crops: W. wheat 1990 and 1991.

NOTE: Samples were taken for disease assessment in December, May, June and July. Pods and seeds were sampled in June and July to measure glucosinolates and the activity of glucosinolate biosynthetic enzymes.

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92/R/RAW/1

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

FUNGINOC	
NOPRINA	2.79
PROCINS	2.32
PROCIPRO	3.08
Mean	2.73

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

FUNGINOC
0.141

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	10	0.245	9.0

GRAIN MEAN DM% 86.8

PLOT AREA HARVESTED 0.00230

https://doi.org/10.23637/ERADOC-1-47

92/R/RAW/2

WINTER OILSEED RAPE

VARIETIES AND FUNGICIDES

Object: To investigate the effects of fungicides on a range of low glucosinolate varieties - Great Harpenden II.

Sponsors: V.J. Church, B.D.L. Fitt.

Design: 4 randomised blocks of 14 plots.

Whole plot dimensions: 3.0 x 21.0.

Treatments: All combinations of:-

1. **VARIETY** Varieties:

CAPRCORN	Capricorn
ENVOL	Envol
EUROL	Eurol
FALCON	Falcon
LIBRAVO	Libravo
SAMOURAI	Samourai
TAPIDOR	Tapidor

2. **FUNGCIDE** Fungicides:

NONE	None
PR+IP	Prochloraz in autumn and spring, iprodione in summer.

NOTE: CAPRCORN plots were systematically arranged at one end of each block.

Experimental diary:

11-Aug-91 : B : Straw chopped.
21-Aug-91 : B : Deep tine cultivated with vibrating tines, 60 cm apart and 45 cm deep.
22-Aug-91 : B : Dolomite at 5.0 t, ploughed.
26-Aug-91 : B : Rolled.
10-Sep-91 : B : Cultivated twice by rotary grubber.
11-Sep-91 : B : Rolled.
11-Sep-91 : **T** : **VARIETY** ENVOL, EUROL, FALCON, LIBRAVO, SAMOURAI, TAPIDOR, CAPRCORN: Rotary harrowed. All varieties, dressed, drilled at 120 seeds per square metre.
22-Oct-91 : B : Butisan S at 1.5 l and Pilot at 75 ml with Actipron at 2.0 l in 200 l.
02-Dec-91 : **T** : **FUNGCIDE** PR+IP: Sportak 45 at 1.1 l in 200 l.
20-Feb-92 : B : 34.5% N at 220 kg.
20-Mar-92 : B : 34.5% N at 290 kg.
01-Apr-92 : **T** : **FUNGCIDE** PR+IP: Sportak 45 at 1.1 l in 200 l.
04-Jun-92 : **T** : **FUNGCIDE** PR+IP: Rovral Flo at 2.0 l in 200 l.
15-Jul-92 : B : Reglone at 3.0 l with Farmon Blue at 0.26 l in 260 l.
22-Jul-92 : B : Combine harvested.

Previous crops: W. wheat 1990, w. barley 1991.

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92/R/RAW/2

NOTE: Crop samples were taken in autumn, spring and summer to assess disease incidence. Glucosinolate levels and oil content of the grain were measured.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

FUNGCIDE / VARIETY	NONE	PR+IP	Mean
CAPRCORN	3.90	4.33	4.12
ENVOL	3.69	3.73	3.71
EUROL	3.70	4.05	3.88
FALCON	3.70	3.49	3.60
LIBRAVO	3.10	3.31	3.21
SAMOURAI	3.67	4.03	3.85
TAPIDOR	3.82	4.26	4.04
Mean	3.65	3.89	3.77

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

VARIETY	FUNGCIDE	VARIETY FUNGCIDE
0.141	0.075	0.199

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	39	0.282	7.5

GRAIN MEAN DM% 85.6

PLOT AREA HARVESTED 0.00483

https://doi.org/10.23637/ERADOC-1-47

92/R/RAW/4

WINTER OILSEED RAPE

N, S AND GLUCOSINOLATES

Object: To study the separate and combined effects of rates of nitrogen and sulphur on the quality and yield of three varieties of w. oilseed rape - Hoosfield Old 4-Course.

Sponsors: J.Fieldsend, M. Powell.

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

Whole plot dimensions: 3.0 x 19.0.

Treatments: All combinations of:-

1. **VARIETY** Varieties:

ARIANA	Ariana
FALCON	Falcon
TAPIDOR	Tapidor

2. **N** Rates of nitrogen (kg N) in spring:

   0
   150
   250

3. **S** Rates of sulphur (kg S) in spring:

   0
   50
   100

NOTE: Sulphur was applied as gypsum (17.5% S).

Experimental diary:

20-Aug-91 : B : Straw chopped.
25-Aug-91 : B : Ploughed.
26-Aug-91 : B : Rolled.
02-Sep-91 : B : Rotary harrowed twice, rolled.
03-Sep-91 : T : **VARIETY** ARIANA: Rotary harrowed, Ariana, dressed, drilled at 6.7 kg.
03-Sep-91 : T : **VARIETY** FALCON: Rotary harrowed, Falcon, dressed, drilled at 7.4 kg.
03-Sep-91 : T : **VARIETY** TAPIDOR: Rotary harrowed, Tapidor, dressed, drilled at 6.3 kg.
03-Sep-91 : B : Rolled.
05-Sep-91 : B : Butisan S at 1.5 l in 200 l.
24-Oct-91 : B : Pilot at 75 ml with Actipron at 2.0 l in 200 l.
19-Feb-92 : T : **N** 150: 34.5% N at 145 kg.
: T : **N** 250: 34.5% N at 145 kg.
05-Mar-92 : T : **S** 50: Gypsum at 284 kg.
: T : **S** 100: Gypsum at 568 kg.

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92/R/RAW/4

Experimental diary:

09-Apr-92 : **T** : **N** 150: 34.5% N at 290 kg.
: **T** : **N** 250: 34.5% N at 580 kg.
28-Jul-92 : B : Combine harvested.

Previous crops: Linseed, s. beans 1990, w. wheat 1991.

NOTES: (1) To allow for differing thousand seed weights of varieties sown, seed rates varied in order to achieve similar numbers of seeds sown per square metre.
(2) Soil and crop samples were taken throughout the growing season to measure levels of nitrogen and sulphur. Crop samples were analysed for glucosinolate content. Thousand seed weight was measured throughout seed development period.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

N	0	150	250	Mean
VARIETY				
ARIANA	1.29	3.09	3.39	2.59
FALCON	1.33	3.10	3.57	2.67
TAPIDOR	1.24	3.02	3.46	2.57
Mean	1.29	3.07	3.48	2.61

S	0	50	100	Mean
VARIETY				
ARIANA	2.58	2.62	2.57	2.59
FALCON	2.62	2.71	2.67	2.67
TAPIDOR	2.60	2.49	2.63	2.57
Mean	2.60	2.61	2.62	2.61

S	0	50	100	Mean
N				
0	1.21	1.30	1.34	1.29
150	3.20	3.06	2.95	3.07
250	3.39	3.45	3.58	3.48
Mean	2.60	2.61	2.62	2.61

	S	0	50	100
VARIETY	**N**			
ARIANA	0	1.21	1.41	1.25
	150	3.27	3.06	2.94
	250	3.27	3.38	3.52
FALCON	0	1.25	1.37	1.37
	150	3.12	3.15	3.04
	250	3.50	3.62	3.61
TAPIDOR	0	1.18	1.13	1.41
	150	3.22	2.97	2.86
	250	3.41	3.36	3.62

https://doi.org/10.23637/ERADOC-1-47

92/R/RAW/4

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

VARIETY	N	S	VARIETY N
0.058	0.058	0.058	0.100

VARIETY S	N S	VARIETY N S
0.100	0.100	0.174

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	78	0.245	9.4

GRAIN MEAN DM% 86.6

SUB PLOT AREA HARVESTED 0.00299

https://doi.org/10.23637/ERADOC-1-47

92/R/RAW/5

WINTER OILSEED RAPE

DISEASE FORECASTING AND YIELD LOSS

Object: To investigate the relationship between the timing and intensity of various diseases, crop development and yield loss - Pastures.

Sponsors: H.A. McCartney, B.D.L. Fitt, M.E. Lacey, G. Muuray.

Design: 2 randomised blocks of 27 plots plus 2 randomised blocks of 13 plots.

Whole plot dimensions: 3.0 x 25.0.

Treatments:

FUNGFREQ Prochloraz, iprodione and thiophanate-methyl on the following dates:

TREATMENT NUMBER	07 OCT	04 NOV	02 DEC	06 JAN	10 FEB	09 MAR	13 APR	11 MAY	08 JUN	06 JUL
1	-	-	-	-	-	-	-	-	-	-
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
4	✓	✓	✓	✓	✓	✓	✓	✓	-	-
5	✓	✓	✓	✓	✓	✓	✓	-	-	-
6	✓	✓	✓	✓	✓	✓	-	-	-	-
7	✓	✓	✓	✓	✓	-	-	-	-	-
8	✓	✓	✓	✓	-	-	-	-	-	-
9	✓	✓	✓	-	-	-	-	-	-	-
10	✓	✓	-	-	-	-	-	-	-	-
11	✓	-	-	-	-	-	-	-	-	-
12	-	✓	✓	✓	✓	✓	✓	✓	✓	✓
13	-	-	✓	✓	✓	✓	✓	✓	✓	✓
14	-	-	-	✓	✓	✓	✓	✓	✓	✓
15	-	-	-	-	✓	✓	✓	✓	✓	✓
16	-	-	-	-	-	✓	✓	✓	✓	✓
17	-	-	-	-	-	-	✓	✓	✓	✓
18	-	-	-	-	-	-	-	✓	✓	✓
19	-	-	-	-	-	-	-	-	✓	✓
20	-	-	-	-	-	-	-	-	-	✓
21	✓	✓	✓	✓	-	-	-	✓	✓	✓

22	Autumn inoculation	No spray	
23	" "	and treatment	18
24	" "	" "	15
25	Spring inoculation	" "	21
26	" "	" "	8
27	Summer "	" "	5

https://doi.org/10.23637/ERADOC-1-47

92/R/RAW/5

Experimental diary:

07-Aug-91 : B : Straw chopped.
21-Aug-91 : B : Gramoxone 100 at 2.0 l with Agral at 0.10 l in 200 l.
27-Aug-91 : B : Heavy spring-tine cultivated twice, disced.
28-Aug-91 : B : Rotary harrowed, Envol, dressed Lindex-Plus FS, drilled at 5.6 kg.
29-Aug-91 : B : Rolled.
30-Aug-91 : B : Butisan S at 1.5 l in 200 l.
14-Sep-91 : B : Irrigation: 12 mm applied.
12-Oct-91 : T : **FUNGFREQ** 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 21, 25, 26, 27: Compass at 1.5 l and Sportak 45 at 0.55 l in 200 l.
06-Nov-91 : T : **FUNGFREQ** 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 21, 25, 26, 27: Compass at 1.5 l and Sportak 45 at 0.55 l in 200 l.
02-Dec-91 : T : **FUNGFREQ** 2, 3, 4, 5, 6, 7, 8, 9, 12, 13, 21, 25, 26, 27: Compass at 1.5 l and Sportak 45 at 0.55 l in 200 l.
14-Jan-92 : T : **FUNGFREQ** 2, 3, 4, 5, 6, 7, 8, 12, 13, 14, 21, 25, 26, 27: Compass at 1.5 l and Sportak 45 at 0.55 l in 200 l.
11-Feb-92 : T : **FUNGFREQ** 2, 3, 4, 5, 6, 7, 12, 13, 14, 15, 24, 27: Compass at 1.5 l and Sportak 45 at 0.55 l in 200 l.
19-Feb-92 : B : 34.5% N at 220 kg.
21-Feb-92 : B : PK as (0:18:36) at 940 kg.
16-Mar-92 : T : **FUNGFREQ** 2, 3, 4, 5, 6, 12, 13, 14, 15, 16, 24, 27: Compass at 1.5 l and Sportak 45 at 0.55 l in 200 l.
20-Mar-92 : B : 34.5% N at 220 kg.
21-Apr-92 : T : **FUNGFREQ** 2, 3, 4, 5, 12, 13, 14, 15, 16, 24, 27: Compass at 1.5 l and Sportak 45 at 0.55 l in 200 l.
14-May-92 : T : **FUNGFREQ** 2, 3, 4, 12, 13, 14, 15, 16, 17, 18, 21, 23, 24, 25: Compass at 1.5 l and Sportak 45 at 0.55 l in 200 l.
09-Jun-92 : T : **FUNGFREQ** 2, 3, 12, 13, 14, 15, 16, 17, 18, 19, 21, 23, 24, 25: Compass at 1.5 l and Sportak 45 at 0.55 l in 200 l.
09-Jul-92 : B : Reglone at 3.0 l with Farmon Blue at 0.26 l in 260 l.
16-Jul-92 : B : Combine harvested.

Previous crops: W. barley 1990, w. oilseed rape 1991.

NOTES: (1) Only the yields from the main trial of 54 plots are reported.
(2) Inoculation was achieved by the application of rape straw from the 1991 harvest.
(3) Treatments planned for 6 July were not applied as crop was about to be disiccated. Summer inoculation of Treatment number 27 was not applied.
(4) Field assessments were made or crop samples taken to estimate disease before each spray treatment was applied. Crop growth and development were estimated at intervals during the growing season.

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92/R/RAW/5

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

FUNGFREQ	
1	2.68
2	3.38
3	3.66
4	3.37
5	3.29
6	3.21
7	3.15
8	3.13
9	3.10
10	3.16
11	3.06
12	3.52
13	3.32
14	3.52
15	3.08
16	3.42
17	3.58
18	3.06
19	3.00
20	3.17
21	3.42
22	2.85
23	3.13
24	3.72
25	3.42
26	3.52
27	3.28
Mean	3.27

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

FUNGFREQ
0.298

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	26	0.298	9.1

GRAIN MEAN DM% 79.5

PLOT AREA HARVESTED 0.00575

https://doi.org/10.23637/ERADOC-1-47

92/R/RAW/6

WINTER OILSEED RAPE

LIGHT LEAF SPOT STUDY

Object: To study methods for the prediction and detection of early infection of light leaf spot (Pyrenopeziza brassicae) and subsequent effects on crop phenology and yield - Great Knott III.

Sponsors: L. Figueroa, B.D.L. Fitt.

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

Whole plot dimensions: 9.0 x 21.0.

Treatments:

Whole plots

1. **FUNGCIDE** Time of fungicide application:

NONE	None
PROCAUT	Prochloraz in autumn
PROCWINT	Prochloraz in winter
PROCSPR	Prochloraz in spring
IPROSUM	Iprodione in summer
PA+PS+IS	Prochloraz in autumn and spring, iprodione in summer

Sub plots

2. **VARIETY** Varieties:

CAPRCORN	Capricorn
FALCON	Falcon

Experimental diary:

28-Aug-91 : B : Straw chopped.
05-Sep-91 : B : Ploughed, rolled.
06-Sep-91 : **T** : **VARIETY** CAPRCORN: Rotary harrowed. Capricorn, dressed Lindex-Plus FS, drilled at 9.7 kg.
06-Sep-91 : **T** : **VARIETY** FALCON: Rotary harrowed. Falcon, dressed Lindex-Plus FS, drilled at 8.0 kg.
06-Sep-91 : B : Rolled.
13-Oct-91 : B : Pilot at 0.15 l with Cropspray 11 E at 2.5 l in 200 l.
11-Nov-91 : B : Benazalox at 0.75 kg and Butisan S at 1.5 l in 200 l.
02-Dec-91 : **T** : **FUNGCIDE** PROCAUT, PA+PS+IS: Sportak 45 at 0.55 l in 200 l.
17-Feb-92 : **T** : **FUNGCIDE** PROCWINT: Sportak 45 at 0.55 l in 200 l.
19-Feb-92 : B : 34.5% N at 220 kg.
21-Feb-92 : B : Benazalox at 1.5 kg in 200 l.
25-Mar-92 : B : 34.5% N at 290 kg.
09-Apr-92 : **T** : **FUNGCIDE** PROCSPR, PA+PS+IS: Sportak 45 at 1.1 l in 200 l.
04-Jun-92 : **T** : **FUNGCIDE** IPROSUM, PA+PS+IS: Rovral Flo at 2.0 l in 200 l.

https://doi.org/10.23637/ERADOC-1-47

92/R/RAW/6

Experimental diary:
15-Jul-92 : B : Reglone at 3.0 l with Farmon Blue at 0.26 l in 260 l.
20-Jul-92 : B : Combine harvested.

Previous crops: W. wheat 1990 and 1991.

NOTE: Disease incidence on the crop was assessed at intervals during the growing season. Air-borne inoculation was monitored from autumn to spring using bait plants and a Burkard spore sampler. At harvest oil and glucosinolate levels in the seed were determined.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

FUNGCIDE / **VARIETY**	NONE	PROCAUT	PROCWINT	PROCSPR	IPROSUM	PA+PS+IS	Mean
CAPRCORN	4.60	4.55	4.38	4.67	4.45	4.53	4.53
FALCON	3.75	3.91	3.68	3.96	3.68	4.06	3.84
Mean	4.18	4.23	4.03	4.31	4.07	4.29	4.18

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

	FUNGCIDE	**VARIETY**	**FUNGCIDE** **VARIETY**
	0.220	0.077	0.257
Except when comparing means with the same level(s) of **FUNGCIDE**			0.188

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	0.311	7.4
BLOCK.WP.SP	18	0.266	6.4

GRAIN MEAN DM% 79.3

SUB PLOT AREA HARVESTED 0.00483

https://doi.org/10.23637/ERADOC-1-47

92/R/RAW/9

WINTER OILSEED RAPE

WINTER OILSEED RAPE AND WEED COMPETITION

Object: To investigate the effects of four weed species on the growth and yield of w. oilseed rape - Delharding.

Sponsor: P.J.W. Lutman.

Design: 4 randomised blocks of 24 plots. Treatments balanced for blocks in two directions.

Whole plot dimensions: 3.0 x 14.0.

Treatments: All combinations of:

1. **SPECIES** Weed species:

CHICKWD	Chickweed (Stellaria media)
SPEEDWEL	Speedwell (Veronica persica)
CLEAVERS	Cleavers (Galium aparine)
MAYWEED	Mayweed (Matricaria perforata)

2. **DENSITY** Weed density (plants per square metre):

	CHICKWEED	SPEEDWELL	CLEAVERS	MAYWEED
D0	0	0	0	0
D1	148	149	4	24
D2	267	271	9	32
D3	665	623	19	97
D4	1279	1110	37	120
D5	1988	2173	78	187

NOTE: Target weed densities were 0, 1x, 2x, 4x, 8x and 10x plants per square metre, where 'x' approximated to 100 for chickweed and speedwell, 10 for cleavers and 50 for mayweed.

Experimental diary:

12-Aug-91 : B : Straw chopped.
14-Aug-91 : B : PK as (0:16:36) at 1040 kg.
20-Aug-91 : B : Deep tine cultivated with vibrating tines 60 cm apart, 45 cm deep.
21-Aug-91 : B : Ploughed, rolled.
09-Sep-91 : B : Cultivated twice by rotary grubber. Spring-tine cultivated, rolled.
10-Sep-91 : **T** : **SPECIES** CHICKWD, SPEEDWEL, CLEAVERS: Chickweed, speedwell and cleavers broadcast by hand.
11-Sep-91 : B : Libravo, dressed Hydraguard and Rovral WP, drilled at 6.1 kg, rolled.
14-Sep-91 : **T** : **SPECIES** MAYWEED: Mayweed broadcast by hand.
15-Oct-91 : B : Pilot at 75 ml with Actipron at 2.0 l in 200 l.
14-Jan-92 : **T** : **DENSITY** D0: Benazalox at 1.25 kg and Kerb 50 W at 1.0 kg in 220 l.
19-Feb-92 : B : 34.5% N at 220 kg.

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92/R/RAW/9

Experimental diary:
25-Mar-92 : B : 34.5% N at 290 kg.
20-Jul-92 : B : Reglone at 3.0 l with Farmon Blue at 0.52 l in 260 l.
27-Jul-92 : **T** : Combine harvested.

Previous crops: W. wheat 1990, w. barley 1991.

NOTE: Estimation of crop growth and observations and counts of weeds were made during the growing season.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

DENSITY / **SPECIES**	D0	D1	D2	D3	D4	D5	Mean
CHICKWD	2.98	2.43	2.38	2.12	2.58	2.75	2.54
SPEEDWEL	3.34	3.04	2.87	3.40	3.23	2.78	3.11
CLEAVERS	3.11	2.93	3.33	2.91	2.46	2.74	2.91
MAYWEED	2.95	3.01	2.95	3.05	3.30	2.74	3.00
Mean	3.10	2.85	2.88	2.87	2.89	2.75	2.89

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

SPECIES	**DENSITY**	**SPECIES DENSITY**
0.150	0.184	0.369

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	69	0.521	18.0

GRAIN MEAN DM% 89.1

PLOT AREA HARVESTED 0.00230

https://doi.org/10.23637/ERADOC-1-47

92/R/RAS/1

SPRING OILSEED RAPE

WEED COMPETITION AND SPRING RAPE

Object: To study the relative competitive effects of two weed species and oats at different fertilizer nitrogen levels on the growth and yield of s. oilseed rape - Sawyers I E.

Sponsor: P.J.W. Lutman.

Design: 3 randomised blocks of 20 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. **SPECIES** Weed species:

CHICKWD	Chickweed (Stellaria media)
CHARLOCK	Charlock (Sinapis arvensis)

2. **DENSITY** Weed density (plants per square metre):

	CHICKWEED	CHARLOCK
D0	0	0
D1	128	8
D2	235	18
D3	672	24
D4	1220	62

plus all combinations of:

1. **DENSITYN** Density of chickweed (plants per square metre):

ND1	0
ND2	1194

2. **N** Nitrogen fertilizer (kg N):

50
100
150
200

plus 2 extra plots

OAT RATE Density of cultivated oats (Avena sativa) (plants per square metre):

OT1	79
OT2	240

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92/R/RAS/1

NOTES: (1) Target weed densities (number of plants per square metre):
SPECIES CHICKWD: 0, 150, 300, 600 and 1200.
SPECIES CHARLOCK: 0, 30, 60, 120 and 240.
DENSITYN: 0 and 600.
(2) Target weed sowing densities (number of seeds sown per square metre):
OAT RATE: 120 and 480.

Experimental diary:

06-Sep-91	B	Straw chopped.
31-Oct-91	B	Ploughed (start).
26-Nov-91	B	Ploughed (finish).
21-Feb-92	B	PK as (0:18:36) at 940 kg.
09-Apr-92	**T**	**N** 50: 34.5% N at 145 kg.
	T	**N** 100: 34.5% N at 290 kg.
	T	**N** 150: 34.5% N at 435 kg.
	T	**N** 200: 34.5% N at 580 kg.
09-Apr-92	B	Spring-tine cultivated twice.
10-Apr-92	B	Rotary harrowed, Puma, dressed Lindex-Plus FS, drilled at 6.2 kg.
10-Apr-92	**T**	**OAT RATE** 120: Dula, broadcast at 120 seeds per square metre.
10-Apr-92	**T**	**OAT RATE** 480: Dula, broadcast at 480 seeds per square metre.
26-Jun-92	B	Ripcord at 0.30 l in 260 l.
25-Aug-92	**T**	Hand harvested (start).
29-Aug-92	**T**	Hand harvested (finish).

Previous crops: W. wheat 1990, s. beans 1991.

NOTE: Crop and weed counts were made and dry weight samples were taken at intervals during the growing season.

https://doi.org/10.23637/ERADOC-1-47

92/R/RAS/1

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

DENSITY	D0	D1	D2	D3	D4	Mean
SPECIES						
CHICKWD	3.02	3.04	3.15	2.99	3.21	3.08
CHARLOCK	3.26	3.04	2.77	2.52	2.10	2.74
Mean	3.14	3.04	2.96	2.75	2.65	2.91
N	50	100	150	200	Mean	
DENSITYN						
ND1	2.92	2.89	3.21	3.32	3.09	
ND2	2.75	3.12	3.01	3.13	3.00	
Mean	2.84	3.00	3.11	3.23	3.05	
OAT RATE						
OT1	1.31					
OT2	0.38					
Mean	0.84					

GRAND MEAN 2.76

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

SPECIES	**DENSITY**	**DENSITN**	**N**
0.080	0.127	0.090	0.127

OAT RATE	**SPECIES**	**DENSITN**
	DENSITY	**N**
0.179	0.179	0.179

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	38	0.219	8.0

GRAIN MEAN DM% *

PLOT AREA HARVESTED 0.00020

https://doi.org/10.23637/ERADOC-1-47

92/R/BEW/2

WINTER BEANS

WINTER BEANS AND WEED DENSITIES

Object: To investigate the effects of two weed species on the growth and yield of w. beans - Dell Piece.

Sponsor: P.J.W. Lutman.

Design: 4 randomised blocks of 12 plots. Treatments balanced for blocks in two directions.

Whole plot dimensions: 3.0 x 14.0.

Treatments: All combinations of:-

1. **SPECIES** Weed species:

OATS	Cultivated oats (Avena sativa)
CLEAVERS	Cleavers (Galium aparine)

2. **DENSITY** Weed density (number of plants per square metre):

	OATS	CLEAVERS
D0	0	0
D1	5	8
D2	17	9
D3	80	21
D4	137	76
D5	263	195

NOTES: (1) Autumn-sown chickweed (Stellaria media) and cleavers (G. aparine) failed to establish. Plots were resown with cultivated oats (A. sativa) and cleavers (G. aparine) in spring.

(2) Target weed densities (number of plants per square metre):

	D1	D2	D3	D4	D5
Oats	10	40	120	240	480
Cleavers	4	8	16	32	64

Experimental diary:

21-Aug-91 : B : Straw chopped.
22-Aug-91 : B : Dolomite at 5.0 t.
16-Oct-91 : B : Disced.
17-Oct-91 : B : Rolled.
23-Oct-91 : B : Punch, undressed, broadcast at 160 kg.
: B : Ploughed and furrow pressed.
14-Jan-92 : B : Laser at 1.25 l with Actipron at 1.8 l in 200 l.
04-Mar-92 : **T** : **SPECIES** OATS, CLEAVERS: Oats (cv. Dula) and cleavers broadcast by hand, harrowed.
21-May-92 : B : Tripart Defensor FL at 0.50 l and Chiltern Olé at 1.5 l with Farmon Blue at 0.80 l in 200 l.
15-Jun-92 : B : Tripart Defensor FL at 0.50 l and Chiltern Chlorothalonil 500 at 1.5 l in 200 l.
10-Sep-92 : B : Combine harvested.

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92/R/BEW/2

Previous crops: W. wheat 1990 and 1991.

NOTE: Estimation of crop growth and observations and counts of weeds were made during the growing season.

GRAIN TONNES/HECTARE

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

DENSITY / **SPECIES**	D0	D1	D2	D3	D4	D5	Mean
OATS	4.88	5.34	5.25	4.61	5.01	5.01	5.02
CLEAVERS	4.84	5.82	4.97	4.97	4.13	4.51	4.87
Mean	4.86	5.58	5.11	4.79	4.57	4.76	4.94

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

SPECIES	**DENSITY**	**SPECIES DENSITY**
0.155	0.268	0.379

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	33	0.536	10.8

GRAIN MEAN DM% 75.7

PLOT AREA HARVESTED 0.00230

https://doi.org/10.23637/ERADOC-1-47

92/R/BES/3

SPRING BEANS

EFFECTS OF SEMIOCHEMICALS

Object: To study the effects of a fungal pathogen, attractant and anti-feedant compounds on Sitona sp. - Delafield.

Sponsors: L.E. Smart, M.M. Blight, B.J. Pye.

Design: 6 x 6 quasi-complete latin square.

Whole plot dimensions: 6.0 x 6.0.

Treatments:

CHEMICAL	Type of chemical or agent applied:
NONE	None
FUNGPATH	Fungal pathogen (Beauveria sp.)
ATTRACTN	Attractant (pheromone) lures
ATTRDELT	Attractant (pheromone) lures plus deltamethrin
ANTIFEED	Anti-feedant (neem oil 50% a.i.)
DELTMETH	Deltamethrin

Experimental diary:

06-Dec-91 : B : Sting CT at 2.0 l in 200 l.
03-Jan-92 : B : Ploughed.
24-Feb-92 : B : PK as (0:20:32) at 1050 kg.
27-Feb-92 : B : Spring-tine cultivated.
27-Feb-92 : B : Rotary harrowed, Alfred drilled at 310 kg.
05-Mar-92 : B : Rolled.
09-Mar-92 : B : Opogard at 2.3 l in 200 l.
08-Apr-92 : **T** : **CHEMICAL** ATTRACTN and ATTRDELT: Attractant lures installed.
10-Apr-92 : **T** : **CHEMICAL** ANTIFEED: Anti-feedant at 8.0 kg in 25 l.
22-Apr-92 : **T** : **CHEMICAL** ATTRDELT: Decis at 0.40 l in 25 l.
ANTIFEED: Anti-feedant at 8.0 kg in 25 l.
DELTMETH: Decis at 0.40 l in 25 l.
05-May-92 : **T** : **CHEMICAL** ANTIFEED: Anti-feedant at 8.0 kg in 25 l.
13-May-92 : **T** : **CHEMICAL** ATTRDELT: Decis at 0.40 l in 25 l.
ANTIFEED: Anti-feedant at 8.0 kg in 25 l.
DELTMETH: Decis at 0.40 l in 25 l.
03-Jun-92 : **T** : **CHEMICAL** FUNGPATH: Fungal pathogen applied as suspension of spores in water.
09-Sep-92 : B : Combine harvested.

Previous crops: W. wheat 1990 and 1991.

NOTE: Assessment of adult and larval Sitona lineatus population size and feeding damage were made between April and June.

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92/R/BES/3

GRAIN TONNES/HECTARE

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

CHEMICAL	
NONE	4.39
FUNGPATH	4.34
ATTRACTN	4.26
ATTRDELT	4.81
ANTIFEED	4.27
DELTMETH	4.50
Mean	4.43

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

CHEMICAL
0.193

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

Stratum	d.f.	s.e.	cv%
ROW.COL	20	0.335	7.6

GRAIN MEAN DM% 82.9

PLOT AREA HARVESTED 0.00138

https://doi.org/10.23637/ERADOC-1-47

92/R/BES/4

SPRING BEANS

METHODS OF APPLYING ANTI-FEEDANTS

Object: To assess the efficiency of different spraying methods for applying anti-feedants to field beans - Delafield.

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

Design: 5 x 5 quasi-complete Latin square.

Whole plot dimensions: 3.0 x 5.0.

Treatments:

CHEMAPPL	Type of chemical and method of application:
NONE	None
DELT JUM	Deltamethrin applied with Jumbo electrostatic sprayer
ANT HYDR	Anti-feedant applied with hydraulic sprayer
ANT APE	Anti-feedant applied with Ape electrostatic sprayer
ANT JUM	Anti-feedant applied with Jumbo electrostatic sprayer

NOTE: Anti-feedant applied was neem oil (100% a.i.).

Experimental diary:

28-Aug-91 : B : Straw chopped.
06-Dec-91 : B : Sting CT at 2.0 l in 200 l.
03-Jan-92 : B : Ploughed.
24-Feb-92 : B : PK as (0:20:32) at 1050 kg.
27-Feb-92 : B : Spring-tine cultivated, rotary harrowed, Alfred, undressed, drilled at 310 kg.
05-Mar-92 : B : Rolled.
09-Mar-92 : B : Opogard 500 FW at 2.3 l in 200 l.
22-Apr-92 : **T** : **CHEMAPPL** DELT JUM: Delamethrin at 10 g in 10 l.
ANT HYDR: Neem oil at 4 kg in 400 l.
ANT APE: Neem oil at 4 kg in 10 l.
ANT JUM: Neem oil at 4 kg in 10 l.
05-May-92 : **T** : **CHEMAPPL**: All applications as 22-Apr-92.
13-May-92 : **T** : **CHEMAPPL**: All applications as 22-Apr-92.
24-Jun-92 : B : Chiltern Chlorothalonil at 1.5 l and Tripart Defensor FL at 0.5 l in 200 l.
09-Sep-92 : B : Combine harvested.

Previous crops: W. wheat 1991 and 1992.

NOTE: Estimates of crop damage by adult pea and bean weevil (Sitona lineatus) were made in spring.

https://doi.org/10.23637/ERADOC-1-47

92/R/BES/4

GRAIN TONNES/HECTARE

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

CHEMAPPL	
NONE	5.39
DELT JUM	5.20
ANT HYDR	5.35
ANT APE	5.09
ANT JUM	5.13
Mean	5.23

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

CHEMAPPL
0.231

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

Stratum	d.f.	s.e.	cv%
ROW.COL	12	0.366	7.0

GRAIN MEAN DM% 82.5

PLOT AREA HARVESTED 0.00115

https://doi.org/10.23637/ERADOC-1-47

92/R/BES/5

SPRING BEANS

WEED COMPETITION AND SPRING BEANS

Object: To study the competitive effects of cultivated oats (Avena sativa) and wild oats (Avena fatua) on the growth and yield of s. beans - Great Harpenden I.

Sponsor: P.J.W. Lutman.

Design: 3 randomised blocks of 16 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. **SOWDATE** Time of drilling cultivated oats (A. sativa):

PREBEAN	Seven days before drilling s. beans
AS BEAN	Same day as drilling s. beans
POSTBEAN	Seven to ten days after drilling s. beans

2. **DENSITY** Density of cultivated oats (number of plants established square metre):

	PREBEAN	AS BEAN	POSTBEAN
D0	0	0	0
D1	17	25	12
D2	58	83	23
D3	112	142	46
D4	161	310	48

plus one extra plot

WILD OAT Wild oats (A. fatua) sown on same day as s. beans. Number of plants established: 172 per square metre:

NOTES: (1) Target sowing densities (number of seeds sown per square metre) were: **DENSITY** D1 40, D2 120, D3 240, D4 480 and **WILD OAT** 240.
(2) Cultivated oats were sown in the central 2 m of the plot.

Experimental diary:

06-Nov-91 : B : Straw mechanically destroyed.
07-Nov-91 : B : Ploughed.
16-Jan-92 : B : Deep tine cultivated.
04-Mar-92 : B : Spring-tine cultivated.
04-Mar-92 : **T** : **SOWDATE** PREBEAN: Dula drilled.
04-Mar-92 : B : Harrowed.
17-Mar-92 : **T** : **SOWDATE** AS BEAN: Dula drilled.
: **T** : **WILD OAT**: Hand broadcast wild oats.
17-Mar-92 : B : Rotary harrowed. Alfred, undressed, drilled at 310 kg, harrowed, rolled.
02-Apr-92 : **T** : **SOWDATE** POSTBEAN: Dula drilled, harrowed.

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92/R/BES/5

Experimental diary:
19-May-92 : B : Basagran at 3.0 l in 300 l.
15-Jun-92 : B : Chiltern Chlorothalonil at 1.5 l, Tripart Defensor FL at 0.50 l and Metasystox 55 at 0.42 l in 200 l.
20-Aug-92 : B : Hand harvested.

Previous crops: W. barley 1990, sunflowers 1991.

NOTE: At intervals during the growing season crop and weed counts were made and samples taken for the assessment of leaf area and dry weight.

GRAIN TONNES/HECTARE

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

DENSITY	D0	D1	D2	D3	D4	Mean
SOW DATE						
PREBEAN	4.72	3.10	2.42	2.12	2.14	2.90
AS BEAN	4.84	3.04	2.15	1.96	1.63	2.72
POSTBEAN	4.53	4.04	4.43	3.35	3.50	3.97
Mean	4.70	3.39	3.00	2.48	2.42	3.20

WILD OAT 1.00

GRAND MEAN 3.06

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

SOW DATE	DENSITY	SOW DATE DENSITY & WILD OAT
0.210	0.271	0.470

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	30	0.576	18.8

MEAN DM% *

PLOT AREA HARVESTED 0.0002

https://doi.org/10.23637/ERADOC-1-47

92/R/LP/3

WINTER LUPINS

PLANT POPULATIONS

Object: To study the effect of sowing date on the relationship between plant population, earliness of maturity and yield of a semi-determinate variety - Long Hoos VI/VII 4.

Sponsors: G.F.J. Milford, J.E. Leach, J.M. Day, H.J. Stevenson.

Design: 4 randomised blocks of 10 plots.

Whole plot dimensions: 2.88 x 6.0.

Treatments:

POPULATN Plant population (number of plants per square metre):

7
14
21
28
35

NOTE: Final populations were established in spring by hand thinning where necessary the larger sown populations of 14, 28, 42, 56 and 70 seeds per square metre.

Experimental diary:

10-Sep-91 : B : Straw baled.
16-Sep-91 : B : Ploughed.
17-Sep-91 : B : Rotary harrowed, twice.
18-Sep-91 : **T** : **POPULATN** 7, 14, 21, 28, 35: Hand sown at 14, 28, 42, 56, 70 seeds per square metre, respectively.
20-Sep-91 : B : Opogard 500 FW at 2.8 l in 200 l.
06-Nov-91 : B : Draza at 5.5 kg.
15-Jan-92 : B : Sportak 45 at 1.1 l in 220 l.
10-Apr-92 : **T** : **POPULATN** 28, 35: Hand thinned to required population.
19-May-92 : B : Aphox at 0.28 kg with Farmon Blue at 0.66 l in 220 l.
28-May-92 : B : Radar at 1.0 l in 200 l.
28-May-92 : B : Aphox at 0.28 kg with Farmon Blue at 0.60 l in 200 l.
09-Jun-92 : **T** : Alto 100 SL at 0.80 l and Metasystox 55 at 0.56 l in 300 l (except two plots).
15-Jun-92 : **T** : Metasystox 55 at 0.42 l in 220 l (two plots not sprayed on 9 June).
08-Jul-92 : B : Calirus at 2.0 kg in 260 l.
08-Jul-92 : B : Decis at 0.80 l in 200 l.
01-Sep-92 : B : Combine harvested.

Previous crops: W. & s. lupins 1991, s. wheat 1992.

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92/R/LP/3

NOTES: (1) Yields were taken from one set of 20 plots, measurements of plant N uptake were made on the other set of 20 plots.
(2) Crop growth and development contents were made during the growing season. Crop samples were taken for physiological determination during spring and summer.

GRAIN TONNES/HECTARE

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

POPULATN	
7	2.09
14	4.08
21	4.21
28	4.03
35	3.89
Mean	3.66

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

POPULATN
0.321

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.454	12.4

GRAIN MEAN DM% 72.0

PLOT AREA HARVESTED 0.00160

https://doi.org/10.23637/ERADOC-1-47

92/W/LP/2

SPRING LUPINS

ROW SPACING

Object: To test the effects of plant density on the yield and maturity of two lines of spring-sown Lupinus albus - Woburn, Butt Furlong.

Sponsors: J.M. Day, G.F.J. Milford, J.E. Leach, H.L. Stevenson.

Design: 4 blocks of 2 x 3 plots.

Whole plot dimensions: 2.0 x 5.0.

Treatments: All combinations of:-

1. **GENOTYPE** Line:

   CH 306
   C 342

2. **ROW SPAC** Row width and seed spacing (cm):

12.5+7	12.5 cm between rows, 7 cm within rows
25+7	25 cm between rows, 7 cm within rows
12.5+14	12.5 cm between rows, 14 cm within rows

Experimental diary:

20-Sep-91	B	Ploughed.
21-Sep-91	B	Rolled.
19-Mar-92	B	Rotary cultivated with crumbler attached.
	T	**GENOTYPE** and **ROW SPAC**: Seed drilled.
01-Apr-92	B	Opogard 500 FW at 1.6 l in 200 l.
15-Jun-92	B	Hand weeded.
20-Jul-92	B	Aphox at 0.28 kg with Vassgro Spreader at 0.45 l in 300 l.
08-Sep-92	B	Combine harvested.

Previous crops: Potatoes 1990, s. barley 1991.

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92/W/LP/2

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

ROW SPAC	12.5+7	25+7	12.5+14	Mean
GENOTYPE				
CH 306	0.11	0.09	0.05	0.08
C 342	0.07	0.06	0.06	0.07
Mean	0.09	0.07	0.06	0.07

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

GENOTYPE	ROW SPAC	GENOTYPE ROW SPAC
0.017	0.021	0.030

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	0.042	57.7

GRAIN MEAN DM% 75.8

PLOT AREA HARVESTED 0.00100

https://doi.org/10.23637/ERADOC-1-47

92/R/SU/1

SUNFLOWERS

VARIETIES & DISEASE

Object: To assess early maturing varieties of sunflowers and their susceptibility to Botrytis cinerea and other fungal diseases - Great Knott I.

Sponsors: V.J. Church, H.A. McCartney.

Design: 6 randomised blocks of 4 plots.

Whole plot dimensions: 3.66 x 10.0.

Treatments:

VARIETY:	Varieties:
AVANTE	
ALLEGRO	
SAM 301	
SAM 313	

Experimental diary:

25-Aug-91	B	Straw chopped.
31-Oct-91	B	Ploughed. (start)
07-Nov-91	B	Ploughed. (finish)
21-Feb-92	B	PK as (0:18:36) at 940 kg.
27-Apr-92	B	NPK as (12:20:20) at 380 kg.
	B	Heavy spring-tine cultivated.
04-May-92	B	Spring-tine cultivated.
05-May-92	B	Treflan at 2.3 l in 260 l, spring-tine cultivated.
06-May-92	B	Rotary harrowed.
06-May-92	**T**	**VARIETY** AVANTE: Seed, dressed, drilled at 14 seeds per square metre.
	T	**VARIETY** ALLEGRO: Seed, dressed, drilled at 14 seeds per square metre.
	T	**VARIETY** SAM 301: Seed, dressed, hand sown at 14 seeds per square metre.
	T	**VARIETY** SAM 313: Seed, dressed, hand sown at 14 seeds per square metre.
07-May-92	B	Rolled.
13-May-92	B	Rotalin at 1.6 l in 400 l.
21-Aug-92	B	**VARIETY** AVANTE, ALLEGRO: Reglone at 3.0 l with Farmon Blue at 0.33 l in 330 l.
26-Aug-92	**T**	**VARIETY** SAM 313: Reglone at 3.0 l with Farmon Blue at 0.33 l in 330 l.
28-Aug-92	**T**	**VARIETY** AVANTE, ALLEGRO: Cut by hand, threshed by stationary combine harvester.
04-Sep-92	**T**	**VARIETY** SAM 313: Cut by hand, threshed by stationary combine harvester.
07-Sep-92	**T**	**VARIETY** SAM 301: Reglone at 3.0 l with Farmon Blue at 0.33 l in 330 l.

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92/R/SU/1

Experimental diary:
14-Sep-92 : **T** : **VARIETY** SAM 301: Cut by hand, threshed by stationary combine harvester.

Previous crops: W. barley 1990, w. wheat 1991.

NOTE: Crop was assessed for growth stage from emergence to desiccation. Incidence of Botrytis cinerea as assessed from early July to desiccation. Airborbe spores were monitored with a Burkard spore trap. Seed moisture was assessed during seed development, oil content was measured at harvest.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

VARIETY	
AVANTE	2.91
ALLEGRO	3.06
SAM 301	2.93
SAM 313	3.07
Mean	2.99

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

VARIETY
0.056

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

Stratum	d.f.	s.e.	cv%
BLOCK	5	0.032	1.1
BLOCK.WP	15	0.098	3.3

GRAIN MEAN DM% 75.7

PLOT AREA HARVESTED 0.00150

https://doi.org/10.23637/ERADOC-1-47

92/R/SU/2

SUNFLOWERS

FUNGICIDE AND GROWTH STAGE

Object: To test fungicides to control Botrytis cinerea applied in relation to growth stage of sunflowers - Great Knott I.

Sponsors: V.J. Church, H.A. McCartney.

Design: 4 randomised blocks of 8 plots.

Whole plot dimensions: 3.66 x 10.

Treatments: All combinations of:-

1. **GS 4.2** Prochloraz and chlorothalonil applied at growth stage 4.2:

   NONE
   APPLIED

2. **GS 4.5** Prochloraz and chlorothalonil applied at growth stage 4.5:

   NONE
   APPLIED

3. **GS 5.1.1** Prochloraz and chlorothalonil applied at growth stage 5.1.1:

   NONE
   APPLIED

Experimental diary:

25-Aug-91 : B : Straw chopped.
30-Oct-91 : B : Ploughed. (start)
07-Nov-91 : B : Ploughed. (finish)
21-Feb-92 : B : PK as (0:18:36) at 940 kg.
27-Apr-92 : B : NPK as (12:20:20) at 380 kg.
27-Apr-92 : B : Heavy spring-tine cultivated.
04-May-92 : B : Spring-tine cultivated twice.
05-May-92 : B : Treflan at 2.3 l in 260 l.
05-May-92 : B : Spring-tine cultivated, rotary harrowed. Primo, dressed, drilled at 13 seeds per square metre.
07-May-92 : B : Rolled.
13-May-92 : B : Rotalin at 1.6 l in 400 l.
09-Jul-92 : **T** : **GS 4.2** APPLIED: Chiltern Chlorothalonil 500 at 2.0 l in 220 l.
09-Jul-92 : **T** : **GS 4.2** APPLIED: Sportak 45 at 1.1 l in 220 l.
22-Jul-92 : **T** : **GS 4.5** APPLIED: Chiltern Chlorothalonil 500 at 2.0 l in 220 l.
22-Jul-92 : **T** : **GS 4.5** APPLIED: Sportak 45 at 1.1 l in 220 l.
06-Aug-92 : **T** : **GS 5.1.1** APPLIED: Chiltern Chlorothalonil 500 at 2.0 l in 220 l.

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92/R/SU/2

Experimental diary:

06-Aug-92 : **T** : **GS 5.1.1** APPLIED: Sportak 45 at 1.1 l in 220 l.
21-Aug-92 : B : Reglone at 3.0 l with Farmon Blue at 0.33 l in 330 l.
01-Sep-92 : B : Cut by hand, threshed by stationary combine harvester.

Previous crops: W. barley 1990, w. wheat 1991.

NOTES: (1) One plot was sown to a different variety because of a seed shortage. The yield of this plot with treatment combination **GS 4.2** APPLIED, **GS 4.5** APPLIED was not measured. An estimated value was used in the analysis.

(2) Crop was assessed for growth stage from emergence to desiccation. Incidence of Botrytis cinerea was assessed. Seed moisture was assessed during seed development and oil content measured at harvested.

https://doi.org/10.23637/ERADOC-1-47

92/R/SU/2

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

GS 4.5	NONE	APPLIED	Mean
GS 4.2			
NONE	2.77	2.74	2.75
APPLIED	2.74	2.80	2.77
Mean	2.76	2.77	2.76

GS 5.1.1	NONE	APPLIED	Mean
GS 4.2			
NONE	2.77	2.73	2.75
APPLIED	2.82	2.72	2.77
Mean	2.80	2.73	2.76

GS 5.1.1	NONE	APPLIED	Mean
GS 4.5			
NONE	2.73	2.78	2.76
APPLIED	2.86	2.67	2.77
Mean	2.80	2.73	2.76

GS 4.5	NONE		APPLIED	
GS 4.2 GS 5.1.1	NONE	APPLIED	NONE	APPLIED
NONE	2.74	2.80	2.81	2.67
APPLIED	2.73	2.76	2.91	2.68

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

GS 4.2	**GS 4.5**	**GS 5.1.1**	**GS 4.2**
			GS 4.5
0.028	0.028	0.028	0.040

GS 4.2	**GS 4.5**	**GS 4.2**
GS 5.1.1	**GS 5.1.1**	**GS 4.5**
		GS 5.1.1
0.040	0.040	0.056

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	20	0.080	2.9

GRAIN MEAN DM% 83.1

PLOT AREA HARVESTED 0.00150

https://doi.org/10.23637/ERADOC-1-47

92/R/LN/1

LINSEED

VARIETIES AND DISEASE

Object: To investigate the effects of pathogens on varieties of linseed - White Horse II.

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

Design: 4 randomised blocks of 10 plots.

Whole plot dimensions: 3.0 x 15.0.

Treatments: All combinations of:-

1. **VARIETY** Varieties:

   ANTARES
   BARBARA
   MCGREGOR
   NORLIN
   CD 1747

2. **FUNGCIDE** Fungicides:

NONE	None
APPLIED	Prochloraz seed dressing, iprodione during flowering, prochloraz and carbendazim plus maneb post-flowering

Experimental diary:

16-Oct-91	B	Straw burnt.
28-Nov-91	B	Farmyard manure at 10 t.
04-Dec-91	B	Ploughed.
18-Mar-92	B	PK as (0:18:36) at 940 kg.
10-Apr-92	B	34.5% N at 220 kg.
11-Apr-92	B	Spring-tine cultivated.
21-Apr-92	T	**VARIETY**: All varieties drilled at 550 seeds per square metre.
	T	**FUNGCIDE** APPLIED: Seed, dressed Prelude 20LF, drilled.
22-Apr-92	B	Rolled.
02-Jun-92	B	Basagran at 2.0 l and Vindex at 1.0 l in 200 l.
24-Jun-92	T	**FUNGCIDE** APPLIED: Rovral Flo at 2.0 l in 200 l.
08-Jul-92	T	**FUNGCIDE** APPLIED: Sportak 45 at 0.90 l in 200 l.
23-Jul-92	T	**FUNGCIDE** APPLIED: Delsene M Flowable at 5.0 l in 200 l.
05-Sep-92	B	Challenge at 3.0 l in 400 l.
29-Sep-92	B	Combine harvested.

Previous crops: W. wheat 1990, linseed 1991.

NOTE: Emergence counts were made in spring. Samples were taken fortnightly from June to September for disease assessment. Oil content of the grain was measured.

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92/R/LN/1

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

FUNGCIDE VARIETY	NONE	APPLIED	Mean
ANTARES	2.41	2.55	2.48
BARBARA	1.74	2.12	1.93
MCGREGOR	2.31	2.42	2.36
NORLIN	2.01	2.30	2.16
CD 1747	2.15	2.32	2.23
Mean	2.12	2.34	2.23

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

VARIETY	FUNGCIDE	VARIETY FUNGCIDE
0.087	0.055	0.123

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	27	0.174	7.8

GRAIN MEAN DM% 88.7

PLOT AREA HARVESTED 0.00276

https://doi.org/10.23637/ERADOC-1-47

92/R/LN/2

LINSEED

WEED COMPETITION AND LINSEED

Object: To investigate the effects of weed competition on the growth and yield of linseed - Fosters Corner.

Sponsor: P.J.W. Lutman.

Design: 3 randomised blocks of 10 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. **SPECIES** Weed species:

   CUL OATS — Cultivated oats (Avena sativa) to simulate wild oats (A. fatua)
   CHICKWD — Chickweed (Stellaria media)

2. **DENSITY** Density of established plants (number of plants per square metre):

	Cultivated oats	Chickweed
D0	0	0
D1	6	57
D2	24	159
D3	49	182
D4	119	465

NOTES: (1) Target plant populations (number of plants per square metre):

	D0	D1	D2	D3	D4
Cultivated oats	0	10	50	100	200
Chickweed	0	100	200	400	800

(2) Weed species were sown in the central 2 m of each plot.

Experimental diary:

06-Sep-91 : B : Straw chopped.
06-Dec-91 : B : Ploughed (start).
02-Jan-92 : B : Ploughed (finish).
22-Apr-92 : B : 34.5% N at 220 kg.
: B : Spring-tine cultivated.
23-Apr-92 : B : Harrowed.
23-Apr-92 : **T** : **SPECIES** CUL OATS: Dula drilled.
: **T** : **SPECIES** CHICKWD: Broadcast by hand.
23-Apr-92 : B : Rotary harrowed, Antares, dressed Prelude 20LF, drilled at 48 kg, harrowed.
24-Apr-92 : B : Rolled.
09-Jun-92 : **T** : **SPECIES** CUL OATS: Basagran at 2.0 l and Vindex at 1.0 l in 220 l.
08-Sep-92 : **T** : Hand harvested (start).
09-Sep-92 : **T** : Hand harvested (finish).

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92/R/LN/2

Previous crops: W. wheat 1990, s. beans 1991.

NOTE: Weed counts were made and dry weight samples were taken at intervals during the growing season.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

DENSITY / **SPECIES**	D0	D1	D2	D3	D4	Mean
CUL OATS	1.62	1.34	0.98	0.65	0.47	1.01
CHICKWD	1.63	1.27	1.39	1.43	1.43	1.43
Mean	1.63	1.31	1.18	1.04	0.95	1.22

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

SPECIES	**DENSITY**	**SPECIES DENSITY**
0.065	0.102	0.144

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	18	0.177	14.5

GRAIN MEAN DM% *

PLOT AREA HARVESTED 0.00020

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92/R/PE/1

PEAS

VARIETIES

Object: To compare the protein content and yield of varieties of marrowfat peas - Long Hoos VI/VII 5.

Sponsors: G.F.J. Milford, J.M. Day.

Design: 3 randomised blocks of 4 plots.

Whole plot dimensions: 2.0 x 10.0.

Treatments:

VARIETY	Varieties:
MARO	Maro
PROGRET	Progretta
GUIDO	Guido
42-17	42-17

Experimental diary:

16-Mar-92 : B : Deep tine cultivated.
09-Apr-92 : B : Heavy spring-tine cultivated, rotary harrowed.
10-Apr-92 : **T** : **VARIETY** MARO, PROGRET, GUIDO, 42-17: All drilled at 280 kg, rolled.
03-Jun-92 : B : Fortrol at 2.0 l and Trifolex-Tra at 2.0 l in 200 l.
22-Jun-92 : B : Chiltern Chlorothalonil 500 at 3.0 l and Aphox at 0.28 kg in 260 l.
03-Aug-92 : **T** : **VARIETY** 42-17: Cut and threshed.
05-Aug-92 : **T** : **VARIETY** MARO, PROGRET: Cut and threshed.
10-Aug-92 : **T** : **VARIETY** GUIDO: Cut and threshed.

Previous crops: W. lupins 1990, s. wheat 1991.

NOTES: (1) Experiment was preceeded by w. lupins, which were sown in autumn 1991 and subsequently failed.
(2) Each variety was cut by hand and threshed by stationary combine harvested.

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92/R/PE/1

GRAIN TONNES/HECTARE

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

VARIETY	
MARO	4.22
PROGRET	3.80
GUIDO	4.23
42-17	4.83
Mean	4.27

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

VARIETY
0.219

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	6	0.268	6.3

GRAIN MEAN DM% 84.7

PLOT AREA HARVESTED 0.00195

https://doi.org/10.23637/ERADOC-1-47 *pp 162*

92/R/PE/2

PEAS

BREEDER'S LINES

Object: To evaluate the protein content and yield of new pea lines - Long Hoos VI/VII 5.

Sponsors: G.F.J. Milford, J.M. Day.

Design: 3 randomised blocks of 13 plots.

Whole plot dimensions: 2.0 x 10.0.

Treatments:

LINE	Code number of breeder's line:
42-5	
30-4	
30-5	
53-16	
53-17	
53-18	
53-19	
53-20	
53-21	
53-22	
53-23	
53-24	
53-25	

Experimental diary:

16-Mar-92	: B	:	Deep tine cultivated.
09-Apr-92	: B	:	Heavy spring-tine cultivated.
	: B	:	Rotary harrowed.
10-Apr-92	: B	:	Drilled at 320 kg, rolled.
03-Jun-92	: B	:	Fortrol at 2.0 l and Trifolex-Tra at 2.0 l in 200 l.
22-Jun-92	: B	:	Chiltern Chlorothalonil 500 at 3.0 l and Aphox at 0.28 kg in 260 l.
29-Jul-92	: **T**	:	**LINE** 30-4: Cut and threshed.
31-Jul-92	: **T**	:	**LINE** 53-20, 53-24, 53-25: Cut and threshed.
03-Aug-92	: **T**	:	**LINE** 30-5,53-16, 53-17, 53-22: Cut and threshed.
05-Aug-92	: **T**	:	**LINE** 42-5, 53-19, 53-21: Cut and threshed.
10-Aug-92	: **T**	:	**LINE** 53-23: Cut and threshed.

NOTES: (1) Experiment was preceded by w. lupins, which were sown in autumn 1991 and subsequently failed.

(2) Each line was cut by hand and threshed by stationary combine harvester.

(3) With the following lines one of the three plots was cut and threshed on a different day: **LINE** 42-5 and 53-21 on 3 Aug and 53-19 on 10 Aug.

(4) **LINE** 53-18 one plot cut and threshed on 3 Aug, one on 5 Aug, one plot not cut.

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92/R/PE/2

Previous crops: W. lupins 1990, s. wheat 1991.

GRAIN TONNES/HECTARE

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

LINE	
42-5	4.87
30-4	4.41
30-5	5.20
53-16	5.13
53-17	4.94
53-18	5.23
53-19	3.99
53-20	4.61
53-21	4.18
53-22	4.67
53-23	3.92
53-24	4.55
53-25	4.81
Mean	4.66

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

LINE
0.382

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	24	0.467	10.0

GRAIN MEAN DM% 88.0

PLOT AREA HARVESTED 0.00194

https://doi.org/10.23637/ERADOC-1-47

92/R/P/1

POTATOES

CONTROL OF STORAGE DISEASES

Object: To study the effects of applying fungicides to seed tubers, harvest dates and post-harvest physical treatments on tuber diseases - Great Knott I.

Sponsors: G.A. Hide, P.J. Read, S.M. Hall.

Design: 3 randomised blocks of 2 whole plots split into 21 sub plots.

Whole plot dimensions: 1.5 x 7.62.

Treatments:

Whole plots

1. **HARVDATE** Harvest dates:

H1	Early
H2	Later

Sub plots: All combinations of:-

2. **FUNGRATE** Concentration of a mixture of thiabendazole (30%) and imazalil (10%) as a pre-planting dip:

0	None
F1	0.07% active ingredient of mixture
F2	0.27% active ingredient of mixture

3. **POSTHARV** Post-harvest treatment:

NONE	No curing
DC1WK	One week dry curing
DC2WK	Two weeks dry curing
FC2H	Two hours field drying
F2H+D1WK	Two hours field drying plus one week dry curing
BLSTD60H	60 hours blast drying
F2H+D2H	Two hours field drying plus two hours dry curing

Experimental diary:

25-Aug-91 : B : Chopped straw.
07-Nov-91 : B : Ploughed.
21-Feb-92 : B : PK as (0:18:36) at 940 kg.
14-Apr-92 : B : NPK as (12:20:20) at 1750 kg.
21-Apr-92 : B : Rotary harrowed.
22-Apr-92 : B : Ridged, King Edward hand planted, ridges split back.
06-May-92 : B : Rota-ridged.
13-May-92 : B : Rotalin at 5.5 l in 200 l.
22-Jun-92 : B : Chiltern Manex at 2.0 l with Nu-Film P at 0.18 l in 200 l.

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Experimental diary:

08-Jul-92 : B : Chiltern Manex at 2.0 l, Aphox at 0.28 kg with Nu-Film P at 0.18 l in 200 l.
16-Jul-92 : B : Chiltern Manex at 2.0 l with Nu-Film P at 0.18 l in 200 l.
28-Jul-92 : B : Chiltern Manex at 2.5 l with Nu-Film P at 0.18 l in 200 l.
17-Aug-92 : **T** : **HARVDATE** H1: Haulm mechanically destroyed.
18-Aug-92 : **T** : **HARVDATE** H2: Chiltern Super Tin 4L at 0.56 l with Nu-Film P at 0.18 l in 200 l.
03-Sep-92 : **T** : **HARVDATE** H1: Lifted by machine, hand picked.
11-Sep-92 : **T** : **HARVDATE** H2: Haulm mechanically destroyed.
29-Sep-92 : **T** : **HARVDATE** H2: Lifted by machine, hand picked.

Previous crops: W. barley 1990, w. wheat 1991

NOTE: Tuber diseases were assessed after harvest and in storage.

TOTAL TUBERS TONNES/HECTARE

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

HARVDATE	H1	H2	Mean
POSTHARV			
NONE	52.9	68.4	60.6
DC1WK	49.4	67.3	58.3
DC2WK	49.8	67.3	58.5
FC2H	49.1	64.7	56.9
F2H+D1WK	50.4	66.1	58.2
BLSTD60H	49.6	68.5	59.1
F2H+D2H	51.5	65.0	58.2
Mean	50.4	66.8	58.6

FUNGRATE	0	F1	F2	Mean
HARVDATE				
H1	51.7	50.3	49.2	50.4
H2	68.0	65.9	66.5	66.8
Mean	59.8	58.1	57.8	58.6

FUNGRATE	0	F1	F2	Mean
POSTHARV				
NONE	59.8	59.3	62.9	60.6
DC1WK	61.5	57.7	55.8	58.3
DC2WK	62.5	56.2	57.0	58.5
FC2H	57.5	56.8	56.5	56.9
F2H+D1WK	57.8	58.9	57.9	58.2
BLSTD60H	59.4	57.6	60.2	59.1
F2H+D2H	60.2	60.1	54.4	58.2
Mean	59.8	58.1	57.8	58.6

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92/R/P/1

TOTAL TUBERS TONNES/HECTARE

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

HARVDATE	FUNGRATE POSTHARV	0	F1	F2
H1	NONE	53.5	51.2	53.9
	DC1WK	50.5	49.7	47.8
	DC2WK	47.5	51.3	50.6
	FC2H	52.6	48.2	46.5
	F2H+D1WK	50.7	51.2	49.2
	BLSTD60H	51.6	49.5	47.8
	F2H+D2H	55.2	50.9	48.4
H2	NONE	66.1	67.3	71.9
	DC1WK	72.4	65.7	63.8
	DC2WK	77.4	61.2	63.3
	FC2H	62.4	65.4	66.5
	F2H+D1WK	65.0	66.6	66.6
	BLSTD60H	67.2	65.6	72.7
	F2H+D2H	65.2	69.3	60.4

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

FUNGRATE	POSTHARV	HARVDATE* FUNGRATE	HARVDATE* POSTHARV
0.97	1.49	1.38	2.10

FUNGRATE POSTHARV	HARVDATE* FUNGRATE POSTHARV
2.58	3.64

* Within the same level of **HARVDATE** only

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP.SP	80	4.46	7.6

PLOT AREA HARVESTED 0.00114

https://doi.org/10.23637/ERADOC-1-47

92/R/M/1

WINTER WHEAT AND WINTER BARLEY

APHIDS AND BYDV

Object: To study the effects of aphids and barley yellow dwarf virus (BYDV) on winter cereals - Black Horse I North.

Sponsors: N. Carter, R.T. Plumb.

Design: 3 randomised blocks of 8 plots.

Whole plot dimensions: 9.0 x 10.0.

Treatments: All combinations of:-

1. **CROP** Crops:

WHEAT	W. wheat
BARLEY	W. barley

2. **APHICIDE** Aphicide type and time of application:

NONE	None
CYP AUT	Cypermethrin in the autumn
PIR FLO	Pirimicarb at flowering
CYPAPIRS	Cypermethrin in the autumn, pirimicarb in the summer

NOTE: **APHICIDE** PIR FLO: Pirimicarb applied separately to w. wheat and w. barley.

Experimental diary:

14-Aug-91	B	Straw chopped.
01-Sep-91	B	Deep tine cultivated with vibrating tines, 60 cm apart and 45 cm deep.
16-Sep-91	B	Ploughed and furrow pressed.
17-Sep-91	**T**	**CROP** WHEAT: Mercia drilled at 161 kg.
	T	**CROP** BARLEY: Magie drilled at 140 kg.
17-Sep-91	B	Rolled.
12-Nov-91	**T**	**APHICIDE** CYP AUT, CYPAPIRS: Ripcord at 0.20 l in 200 l.
03-Dec-91	B	Stefes IPU at 1.0 l and Stomp 400 at 2.5 l in 200 l.
07-Feb-92	B	PK as (0:18:36) at 940 kg.
27-Feb-92	B	34.5% N at 120 kg.
03-Apr-92	B	34.5% N at 320 kg.
04-May-92	B	Calixin at 0.50 l and Radar at 0.50 l in 260 l.
21-May-92	**T**	**APHICIDE** PIR FLO, CYPAPIRS: Aphox at 0.28 kg in 200 l to BARLEY.
09-Jun-92	**T**	**APHICIDE** PIR FLO, CYPAPIRS: Aphox at 0.28 kg in 200 l to WHEAT.
24-Jul-92	**T**	**CROP** BARLEY: Combine harvested.
30-Jul-92	**T**	**CROP** WHEAT: Combine harvested.

Previous crops: W. barley 1990, w. oilseed rape 1991.

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NOTES: (1) Aphids were sampled from October to July.
(2) BYDV was assessed visually and virus isolates determined by enzyme-linked immunosorbent assay during April and June.
(3) Components of yield were measured.

GRAIN TONNES/HECTARE

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

APHICIDE / CROP	NONE	CYP AUT	PIR FLO	CYPAPIRS	Mean
WHEAT	7.41	7.27	7.58	7.81	7.52
BARLEY	7.86	7.85	7.87	7.94	7.88
Mean	7.63	7.56	7.72	7.87	7.70

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

CROP	APHICIDE	CROP APHICIDE
0.093	0.132	0.187

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	14	0.229	3.0

GRAIN MEAN DM% 86.8

PLOT AREA HARVESTED 0.00230

https://doi.org/10.23637/ERADOC-1-47

METEOROLOGICAL RECORDS 1992 - 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	57 (+5)	3.6 (+0.6)	1.7	5.2	7.0
FEB	62 (-3)	4.8 (+1.6)	2.5	5.1	6.2
MAR	64 (-43)	7.3 (+2.0)	4.7	7.0	7.0
APR	133 (-6)	8.5 (+0.9)	5.4	8.7	8.0
MAY	275 (+88)	13.4 (+2.5)	9.6	12.7	10.3
JUNE	214 (+23)	15.5 (+1.6)	11.6	16.0	13.4
JULY	148 (-40)	16.5 (+0.7)	13.0	16.9	14.8
AUG	162 (-16)	16.0 (+0.1)	12.3	16.8	15.5
SEPT	130 (-10)	13.4 (-0.1)	11.2	14.6	14.4
OCT	111 (+7)	7.7 (-2.7)	5.5	11.4	12.8
NOV	62 (-4)	7.1 (+1.1)	5.3	8.4	10.1
DEC	51 (+5)	3.3 (-0.7)	1.8	6.0	8.2
YEAR*	1468 (+6)	9.8 (+0.6)	7.1	10.7	10.6

MONTH	Ground frosts (2)	Total rainfall:mm 12.7cm (5 in) gauge	Rain days (3)	Drainage through 50.8cm (20 in) soil:mm	Wind km per hour (4)
JAN	20	25 (-41)	10	12	7.8
FEB	22	21 (-27)	10	11	8.7
MAR	10	57 (+0)	20	15	11.8
APR	11	64 (+11)	16	23	10.1
MAY	7	103 (+50)	12	66	7.3
JUNE	1	36 (-22)	9	8	6.0
JULY	0	62 (+15)	14	13	5.3
AUG	2	114 (+61)	18	49	6.7
SEPT	5	128 (+73)	16	90	5.3
OCT	17	71 (+5)	14	44	7.8
NOV	18	114 (+50)	22	94	9.7
DEC	19	50 (-19)	16	47	6.6
YEAR*	132	844 (+156)	177	472	7.7

30-year means are for the period 1961-90
(1)Mean of maximum and minimum
(2)Number of nights grass min. was below 0.0 C
(3)Number of days rainfall was 0.2 mm or more
(4)At 2 metres above ground level
*Mean or total

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METEOROLOGICAL RECORDS 1992 - WOBURN

(Departure from 30-year means in brackets)

Mean temperature: C

MONTH	Total sunshine: hours	Air(1)	Dew point	In ground under grass 30 cm	100 cm	Ground frosts (2)	Total rainfall: mm 12.7 (5in)	cm gauge	Rain days (3)	Wind km per hour (4)
JAN	41 (-9)	3.3 (-0.1)	1.9	4.9	7.2	18	50	(-2)	9	7.3
FEB	62 (+3)	5.3 (+1.8)	2.7	5.0	6.1	14	15	(-25)	10	9.7
MAR	55 (-48)	7.5 (+1.9)	5.0	7.3	7.1	8	47	(-5)	22	11.2
APR	127 (-3)	8.7 (+1.0)	5.5	8.9	8.0	12	59	(+9)	15	8.8
MAY	254 (+75)	13.2 (+2.2)	9.6	14.1	10.8	4	69	(+16)	12	6.2
JUNE	199 (+16)	15.1 (+1.2)	12.0	17.3	14.2	1	46	(-9)	11	4.8
JULY	157 (-24)	16.7 (+0.8)	13.3	18.4	16.0	0	93	(+44)	15	6.2
AUG	181 (+12)	15.9 (+0.1)	12.1	17.6	16.5	0	102	(+44)	19	9.2
SEPT	135 (-1)	13.8 (+0.2)	11.3	14.8	15.0	0	115	(+64)	16	7.4
OCT	92 (-9)	7.6 (-2.9)	5.5	10.6	13.2	10	77	(+21)	16	7.5
NOV	59 (-3)	7.3 (+1.1)	5.4	7.9	10.2	10	101	(+44)	17	11.0
DEC	35 (-7)	3.3 (-1.0)	1.6	5.4	8.3	20	42	(-17)	10	7.1
YEAR*	1396 (+3)	9.8 (+0.6)	7.2	11.0	11.1	97	816	(+183)	172	8.0

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CONVERSION FACTORS

Factors for the Conversion of Imperial to Metric Units

1 inch (in.)	= 2·540 centimetres (cm)
1 foot (ft) (=12 in.)	= 30·48 cm
1 yard (yd) (=3 ft)	= 0·9144 metre (m)
1 square yard (yd²)	= 0·8361 m²
1 acre (ac) (=4840 yd²)	= 0·4047 hectare (ha)
1 ounce (oz)	= 28·35 grams (g)
1 pound (lb)	= 0·4536 kilogram (kg)
1 hundredweight (cwt) (=112 lb)	= 50·80 kg
1 ton (=2240 lb)	= 1016 kg = 1·016 metric tons (tonnes) (t)
1 pint	= 0·5682 litre (l)
1 gallon (gal) (=8 pints)	= 4·546 litres
1 fluid ounce = 1/20 pint	= 0·02841 litre = 28·41 ml
1 cubic foot	= 28·32 litres

To convert	*Multiply by*
oz ac^{-1} to g ha^{-1}	70·06
lb ac^{-1} to kg ha^{-1}	1·121
cwt ac^{-1} to kg ha^{-1}	125·5
cwt ac^{-1} to t ha^{-1}	0·1255
ton ac^{-1} to kg ha^{-1}	2511
ton ac^{-1} to t ha^{-1}	2·511
gal ac^{-1} to l ha^{-1}	11·233

The following factors are accurate to about 2 parts in 100:

1 lb ac^{-1} = 1·1 kg ha^{-1}
1 gal ac^{-1} = 11 litres ha^{-1}
1 ton ac^{-1} = 2·5 t ha^{-1}

In general reading of the text there will be no great inaccuracy in regarding:

1 lb = 0·5 kg
1 lb ac^{-1} = 1 kg ha^{-1}

Temperatures

To convert °F into °C subtract 32 and multiply by $\frac{5}{9}$ (0.556)
To convert °C into °F multiply by $\frac{9}{5}$ (1·8) and add 32

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CONVERSION FACTORS

Factors for the Conversion of Metric to Imperial Units

1 centimetre (cm)	=	0·3937 inch (in.) = 0·03281 ft
1 metre (m)	=	1·094 yards (yd)
1 square metre (m^2)	=	1·196 square yards (yd^2)
1 hectare (ha)	=	2·471 acres (ac)
1 gram (g)	=	0·03527 ounce (oz)
1 kilogram (kg)	=	2·205 pounds (lb)
1 kg	=	0·01968 hundredweight (cwt) = 0·0009842 ton
1 metric ton (tonne) (t)	=	0·9842 ton
1 litre	=	1·760 pints = 0·2200 gallon (gal)

1 litre = 1000 millilitres (ml) = 35·20 fluid ounces = 0·03531 cubic foot (ft^3)

To convert	*Multiply by*
g ha^{-1} to oz ac^{-1}	0·01427
kg ha^{-1} to lb ac^{-1}	0·8921
kg ha^{-1} to cwt ac^{-1}	0·007966
t ha^{-1} to cwt ac^{-1}	7·966
kg ha^{-1} to tons ac^{-1}	0·0003983
t ha^{-1} to tons ac^{-1}	0·3983
l ha^{-1} to gal ac^{-1}	0·08902

Plant nutrients

Plant nutrients are best stated in terms of amounts of the elements (P, K, Na, Ca, Mg, S); the old 'oxide' terminology (P_2O_5, K_2O, Na_2O, CaO, MgO, SO_3) is still used in work involving fertilisers and liming since Regulations require statements of P_2O_5, K_2O, etc.

For quick conversions

(accurate to within 2%) the following factors may be used:

$2\frac{1}{3} \times P = P_2O_5$	$\frac{3}{7} \times P_2O_5 = P$
$1\frac{1}{5} \times K = K_2O$	$\frac{5}{6} \times K_2O = K$
$1\frac{2}{5} \times Ca = CaO$	$\frac{7}{10} \times CaO = Ca$
$1\frac{2}{3} \times Mg = MgO$	$\frac{3}{5} \times MgO = Mg$

For accurate conversions:

To convert	*Multiply by*	*To convert*	*Multiply by*
P_2O_5 to P	0·4364	P to P_2O_5	2·2915
K_2O to K	0·8301	K to K_2O	1·2047
CaO to Ca	0·7146	Ca to CaO	1·3994
MgO to Mg	0·6031	Mg to MgO	1·6581

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