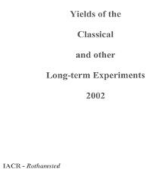
ROTHAMSTED RESEARCH

Yields of the Field Experiments 2002



Full Table of Content

Yields of the Classical and Other Experiments

Rothamsted Research

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Yields of the

Classical

and other

Long-term Experiments

2002

IACR - *Rothamsted*

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CONVENTIONS

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

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

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

The following conventions are observed unless otherwise stated.

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

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

All yields are per hectare.

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

Fertilizers

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

Epsom salts	$MgSO_4.7H_2O$ 10% magnesium and 13% sulphur
Fishmeal	approximately 6.5% nitrogen
FYM	Farmyard manure (from bullocks)
Gypsum	17.5% sulphur
Kieserite	$MgSO_4H_2O$ 17.7% magnesium and 23.3% sulphur
Manganese sulphate	$Mn_2(SO_4)_3$ 27% manganese and 24% sulphur
Muriate of potash	60% K_2O
Nitrate of soda	$NaNO_3$ 16% nitrogen and 27% sodium
Rhodoman	A seed dressing containing 500 g/l inorganic manganese
Silicate of soda	Na_2SiO_3 37% sodium and 23% silica
Sulphur Gold	30% nitrogen and 7.6% sulphur
Sulphate of ammonia	$(NH_4)_2SO_4$ 21% nitrogen 24% sulphur
Sulphate of potash	K_2SO_4 50% K_2O and 18.4% sulphur
Tiger 90	90% sulphur

https://doi.org/10.23637/ERADOC-1-259

Thiovit	80% sulphur
Triple superphosphate (TSP)	47% P_2O_5

Cereal straw is removed unless otherwise stated.

In the experimental diary;
T: Refers to treatments applied to part of the experiment.
B: Refers to basal operations and applications to the whole experiment.
GS: Growth stage.
tm): Tank mix; two or more products applied together.
tr.: means seed dressing

Machinery definitions as used in the diary.

Accord	Pneumatic drill with Suffolk coulters 12.5 cm apart.
Carrier	Drill with rigid tines 11.5 cm apart.
Combine drilled	Drill mounted behind a rotary harrow.
Dutch harrow	Rigid tine harrow
Flexitine	Heavy spring-tine cultivator.
Nodet Gougis	Pneumatic precision drill with variable spacing.
Nordsten	Drill with Suffolk coulters 12 cm apart.
Oyjord	Drill with Suffolk coulters 14.2 cm apart.
Rotaspike	Spiked rotary cultivator
Rotaridger	Rotary spiked cultivator for forming potato ridges
Shakerator	Deep tine cultivator with vibrating tines 60 cm apart and 45 cm deep.
Subsoiler	Deep tine cultivator with vibrating tines 60 cm apart and 45 cm deep
Thistlebar	Shallow cultivator used to weed fallows

Tables of means

The following abbreviations are used in variate headings:

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

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

Standard errors

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

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PESTICIDES USED

The following list of pesticides is based on The UK Pesticides Guide, CAB International and The British Crop Protection Council. CABI Publishing

KEY TO ABBREVIATIONS

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

TRADE NAME	FUNCTION	ACTIVE INGREDIENT
Ally	H	20% w/w metsulfuron-methyl
Amistar	F	250 g/l azoxystrobin
Aphox	I	50% w/w pirimicarb
Ardent	H	40:400 g/l diflufenican + trifluralin
Avadex Excel 15G	H	15% w/w tri-allate
Aventis Manganse 500		500 g/l manganese
Barclay Mutiny	H	250 g/l bromoxynil
BASF 3C Chlormequat 720	GR	720 g/l chlormequat
Baytan Flowable	F	22.5:187.5 g/l fuberidazole + triadimenol
Bravo 500	F	500 g/l chlorothalonil
Copper 500		500 g/l copper
Cropoil	AD	99% highly refined mineral oil
Duplosan KV	H	600 g/l mecoprop-P
Egret	H	360 g/l glyphosate
Folicur	F	250 g/l tebuconazole
Gesaprim	H	500 g/l atrazine
Gesatop	H	500 g/l simazine
Hallmark with Zeon Technology	I	100 g/l lambda-cyhalothrin
Hawk	H	12:383 g/l clodinafop-propargyl + trifluralin
Landmark	F	125:125 g/l epoxiconazole + kresoxim-methyl
Legumex Extra	H	27:237:42.8 g/l benazolin + 2, 4-DB + MCPA
Lentagran WP	H	45% w/w pyridate
Lexus Class WSB	H	33.3:16.7% w/w carfentrazone-ethyl + flupyrsulfuron-methyl
Lexus 50 DF	H	50% w/w flupyrsulfuron-methyl
Mesurol	M,I	methiocarb seed treatment
Moddus	GR	250 g/l trinexapac-ethyl
Opera	F	50:133 g/l epoxyconazole + pyraclostrobin
Opus	F	125 g/l epoxiconazole
Phase II	AD	95% w/w esterified rapeseed oil
Raxil S	F	20:20 g/l tebuconazole + triazoxide
Roundup Biactive	H	360 g/l glyphosate
Sibutol	F	375:23 g/l biteranol + fuberidazole
Sibutol Secur		140:8.6:87.5 g/l bitertanol + fuberidazole + imidacloprid
Starane 2	H	200 g/l fluroxypyr
Sting ECO	H	120 g/l glyphosate
Stomp 400 SC	H	400 g/l pendimethalin

https://doi.org/10.23637/ERADOC-1-259

Tolkan Liquid	**H**	500 g/l isoproturon
Topik	**H**	240 g/l clodinafop-propargyl
Twist	**F**	125 g/l trifloxystrobin
Unix	**F**	75% w/w cyprodinil

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02/R/BK/1

BROADBALK

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

The 159th year, w. wheat, w. oats and forage maize.

For previous years see 'Details' 1967 and 1973, Station Report for 1966, pp. 229-231; Station Report for 1968, Part 2; Station Report for 1982, Part 2, pp. 5-44 and 74-01/BK/1.

Areas harvested:

	Section	
Wheat:	0	0.00320
	1	0.00589
	4,5,6 and 7	0.00487
	8,9	0.00512
Oats:	2	0.00487
Maize:	3	0.00162

Treatments:

In 2001 a number of the treatments were changed. The treatments are now: -

Whole plots

PLOT	Fertilizers and organic manures Treatments Plot	from 2001
01(FYM)N4	01	N4
21FYMN2	2.1	FYM N2
22FYM	2.2	FYM
03Nil	03	None
05(P)KMg	05	(P) K Mg
06N1(P)KMg	06	N1 (P) K Mg
07N2(P)KMg	07	N2 (P) K Mg
08N3(P)KMg	08	N3 (P) K Mg
09N4(P)KMg	09	N4 (P) K Kg
10N4	10	N4
11N4PMg	11	N4 P Mg
12N1+3+1(P)K2Mg2	12	N1+3+1 (P) K2 Mg2
13N4PK	13	N4 P K
14N4PK*(Mg*)	14	N4 P K* (Mg*)
15N5(P)KMg	15	N5 (P) K Mg
16N6(P)KMg	16	N6 (P) K Mg
17N1+4+1PKMg	17	N1+4+1 P K Mg
18N1+2+1PKMg	18	N1+2+1 P K Mg
19N1+1+1KMg	19	N1+1+1 K Mg
20N4KMg	20	N4 K Mg

02/R/BK/1

W. oats; Nitrogen and farmyard manure were not applied.

N1,N2,N3,N4,N5,N6: 48, 96, 144, 192, 240, 288 kg N as 33.5% N; to be applied at the same time as the second dressings in the split nitrogen plots for wheat and to the seedbed for forage maize.

Split N to wheat

N1+1+1, 1+2+1 etc: Rates as above. Timings: first two weeks of March, GS31 or mid-April (whichever comes first) and GS37/mid-May.

Split N to forage maize

N2+1,2+2,2+3,2+4: Rates as above. Timings: to the seedbed and post-emergence.

P: 35 kg P as triple superphosphate.

(P): (none), to be reviewed in 2004/5.

K: 90 kg K as potassium sulphate.

K2: 180 kg K as potassium sulphate (plus 450 kg K autumn 2000 only).

K*: 90 kg K as potassium chloride.

Mg: 12 kg Mg as kieserite.

Mg2: 24 kg Mg as kieserite (plus 60 kg Mg, autumn 2000 only).

(Mg*): (none), to be reviewed in 2004/5.

FYM: Farmyard manure at 35 t

Previous treatment: -

Whole plots

PLOT		Fertilizers and organic manures:-		
	Plot	Treatments until 1967	Treatments from 1968	Treatments from 1985 - 2000
01DN4PK	01	-	D N2 P K	D N4 P K
21DN2	21	D	D N2	D N2
22D	22	D	D	D
030	03	None	None	None
05F	05	P K Na Mg	P K (Na) Mg	PK Mg
06N1F	06	N1 P K Na Mg	N1 P K (Na) Mg	N1 P K Mg
07N2F	07	N2 P K Na Mg	N2 P K (Na) Mg	N2 P K Mg
08N3F	08	N3 P K Na Mg	N3 P K (Na) Mg	N3 P K Mg
09N4F	09	N*1 P K Na Mg	N4 P K (Na) Mg	N4 P K Mg
10N2	10	N2	N2	N2
11N2P	11	N2 P	N2 P	N2 P
12N2PNA	12	N2 P Na	N2 P Na	N2 P Na
13N2PK	13	N2 P K	N2 P K	N2 P K
14N2PKMG	14	N2 P Mg	N2 P K Mg	N2 P K Mg
15N5F	15	N2 P K Na Mg	N3 P K (Na) Mg	N5 P K Mg
16N6F	16	N*2 P K Na Mg	N2 P K (Na) Mg	N6 P K Mg
17N1+3FH	17	N2(A)	N2 2(P K (Na) Mg)	N1+3 2(PK Mg) (A)+
18N0+3FH	18	P K Na Mg(A)	N2 2(P K (Na) Mg)	N0+3 2(PK Mg) (A)+
19(C)	19	C	C	(C) (since 1989)
20N2KMG	20	N2 K Na Mg	N2 K (Na) Mg	N2 K Mg

(A) Alternating each year

\+ This change since 1980. Treatments shown are those to w. wheat; autumn N alternates. Maize received N3 2(PK Mg) on both plots 17 and 18.

W. oats; Nitrogen and dung were not applied.

N1,N2,N3,N4,N5,N6: 48, 96, 144, 192, 240, 288 kg N as sulphate of ammonia until 1967, except N* which was nitrate of soda. All as 'Nitro-Chalk' in spring from 1968 to 1985, as 34.5% N since 1986.

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

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

K: 90 kg K as sulphate of potash

Na: 55 kg Na as sulphate of soda

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

Mg: 30 kg Mg annually to Plot 14 (applied at 26 kg 1990 to 2000), 35 kg Mg every third year to other plots since 1974 (applied at 30 kg in 1991, 1994, 1997 and 2000 and at 15 kg on half rate treatments). All as kieserite since 1974, previously as sulphate of magnesia annually

D: Farmyard manure at 35 t

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

F: Full rate P K (Na) Mg as above H: Half rate of above

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

SECTION	1/W34	9/W42	0/W49	8/W6	6/W23	5/O	3/W3	7/W1	4/M	2/W2
Section	1	9	0*	8+	6**	5	3	7	4	2
Year										
1968	W	W	W	W	F	W	W	P	W	BE
1969	W	W	W	W	W	F	W	BE	P	W
1970	W	W	W	W	W	W	F	W	BE	P
1971	W	W	W	W	F	W	W	P	W	BE
1972	W	W	W	F	W	F	W	BE	P	W
1973	W	W	W	W	W	W	F	W	BE	P
1974	W	W	W	W	F	W	W	P	W	BE
1975	W	W	W	W	W	F	W	BE	P	W
1976	W	W	W	W	W	W	F	W	BE	P
1977	W	W	W	W	F	W	W	P	W	BE
1978	W	W	W	W	W	F	W	BE	P	W
1979	W	W	W	W	W	W	F	W	P	F
1980	W	W	W	W	W	W	W	F	W	P
1981	W	W	W	F	W	W	W	P	F	W
1982	W	W	W	W	W	W	W	W	P	F
1983	W	W	W	W	W	W	W	F	W	P
1984	W	W	W	W	W	W	W	P	F	W
1985	W	W	W	W	W	F	W	W	P	W
1986	W	W	W	W	W	P	F	W	W	W
1987	W	W	W	W	W	W	P	W	W	F
1988	W	W	W	F	W	W	W	F	W	P

02/R/BK/1

SECTION										
Section	1	9	0*	8+	6**	5	3	7	4	2
Year										
1989	W	W	W	W	W	W	W	P	F	W
1990	W	W	W	W	W	F	W	W	P	W
1991	W	W	W	W	W	P	F	W	W	W
1992	W	W	W	W	W	W	P	W	W	F
1993	W	W	W	W	W	W	W	F	W	P
1994	W	W	W	F	W	W	W	P	F	W
1995	W	W	W	W	W	F	W	W	P	W
1996	W	W	W	W	W	P	O	W	W	W
1997	W	W	W	W	W	W	M	W	W	O
1998	W	W	W	W	W	W	W	O	W	M
1999	W	W	W	W	W	W	W	M	O	W
2000	W	W	W	W	W	O	W	W	M	W
2001	W	W	W	F	W	M	O	W	W	W
2002	W	W	W	W	W	W	M	W	W	O

W = w. wheat, O = w. oats (spring oats 2001), P = potatoes, BE = s. beans, F = fallow,
M = forage maize

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

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

Experimental diary:

All sections:

12-Sep-01	T	FYM	FYM at 35.0 tonnes, strips 2.1 & 2.2, not oat section.
	T	K*	Muriate of potash at 181 kg, strip 14.
	T	P	TSP at 171 kg, strips 11, 13, 14, 17, & 18.
	B		Ploughing started.
13-Sep-01	B		Ploughing completed.
07-Mar-02	T	K	Sulphate of potash at 217 kg, strips 5, 6, 7, 8, 9, 13, 15, 16, 17, 18, 19 & 20.
	T	K2	Sulphate of potash at 434 kg, strip 12.
08-Mar-02	T	MG	Kieserite at 80 kg, strips 5, 6, 7, 8, 9, 11, 15, 16, 17, 18, 19, & 20.
	T	MG2	Kieserite at 160 kg, strip 12.
04-Jul-02	B		Rogued wild oats, 2 plants.

Cropped sections:

W. wheat

24-Aug-01	T		straw baled (sections 1, 4, 6, 7 & 9)
25-Aug-01	T		chopped straw, section 0.
28-Sep-01	T		Combination drilled, Hereward, tr. Sibutol, at 380 seeds/m^2 with the Accord drill.
11-Oct-01	T		Avadex Excel 15 G at 15.0 kg, excluding section 8.
02-Nov-01	B		tm)Lexus 50 DF at 20 g in 200 l, excluding section 8.

02/R/BK/1

Experimental diary:

Cropped sections:

W. wheat

02-Nov-01	B		tm) Stomp 400 SC at 3.0 l in 200 l, excluding section 8.
15-Nov-01	T		Hallmark with Zeon technology at 25 ml in 200 l, not section 6.
26-Mar-02	T		1st split N applied (33 kg N over in error).
03-Apr-02	B		tm) Topik at 0.125 l in 100 l, excluding section 8.
	B		tm) Phase II at 1.0 l in 100 l, excluding section 8.
04-Apr-02	B		tm) Opus at 0.4 l in 100 l, excluding section 6.
	B		tm) Twist at 0.6 l in 100 l, excluding section 6.
	B		tm) BASF 3C chlormequat 720 at 1.25 l in 100 l, excluding section 6.
	B		tm) Moddus at 0.2 l in 100 l, excluding section 6.
24-Apr-02	T		Main N (except plot 2.1) and 2nd split N applied (33 kg N less to split N plots to balance error).
25-Apr-02	T		N to strip 2.1.
23-May-02	T		3rd split N applied.
01-Jun-02	T		Opera at 1.0 l in 200 l, excluding section 6.
14-Aug-02	P		Combine harvested, all discards to open up plots.
	T		Combine harvested plots for yield, sections 0, 1, 8, and 9.
	P		Swathed straw. Baled straw. Including section 0.
15-Aug-02	T		Combine harvested plots for yield, completed.
	T		Combined side discards to allow straw weights.
	T		Swathed straw.
	T		Sampled, baled and weighed straw, sections 1 and 9.
16-Aug-02	T		Sampled, baled and weighed straw, completed.
17-Aug-02	B		Combine harvested all remaining wheat.
	B		Swathed straw. Baled straw.
21-Aug-02			Carted bales.

W. oats

24-Aug-01	T		straw baled, section 2
27-Sep-01	T		Combination drilled, Gerald, tr. Sibutol, at 350 seeds/m2 with the Accord drill.
01-Nov-01	B		tm) Lexus Class at 60 g in 200 l.
	B		tm) Hallmark with Zeon technology at 40 ml in 200 l.
01-Jun-02	T		Opera at 1.0 l in 200 l, excluding section 6.
14-Aug-02	P		Combine harvested discards to allow straw weights to be taken.
	T		Combine harvested plots for yield.
	T		Swathed straw. Sampled, baled and weighed straw.
21-Aug-02			Carted bales.

Forage maize

24-Aug-01	T		Straw baled, section 3.
25-Mar-02			Sting ECO at 4.0 l in 200 l.
10-Apr-02	P		Flexitined.
02-May-02	T		Main N and 1st split N applied.
03-May-02	T		Rotary harrowed.
	T		Drilled, Hudson, tr. Mesurol at 102,000 seeds/ha, with the Nodet Gougis drill.
23-May-02	T		2nd split N applied.
19-Jun-02	T		tm) Barclay Mutiny at 0.6 l in 200 l.
	T		tm) Lentagran WP at 1.5 kg in 200 l.
11-Sep-02	T		Cut all discard maize. Cut sample areas by hand, weighed, and sampled.
02-Oct-02	T		Topped stalks ready for ploughing Countryside Stewardship Scheme margins
10-Apr-02	T		Flexitined.

24-Apr-02 : P : : Drilled special headland mix at 16.0 kg with the Moore drill, 2.0 m headland strips.

02/R/BK/1

NOTE: Straw on Section 0 was baled and removed at harvest 2002 (usually incorporated) as this section will remain unploughed to test control of *Equisetum*. Samples of wheat and oat grain and straw, and forage maize were taken for chemical analysis. Unground wheat gain and straw and maize samples from selected treatments were archived.

W. WHEAT

GRAIN TONNES/HECTARE

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

SECTION / PLOT	5/W1	8/W1	4/W2	7/W3	6/W25	1/W36	9/W44	0/W51
01(FYM)N4	11.24	*	10.22	8.78	7.23	*	*	*
21FYMN2	10.46	3.53	9.47	8.05	7.11	7.66	9.26	6.87
22FYM	5.86	3.47	5.44	4.52	4.93	5.45	6.13	4.22
03Nil	1.54	2.15	0.58	0.16	0.37	0.47	0.34	0.29
05(P)KMg	1.68	2.90	0.78	0.08	0.33	0.41	0.72	0.45
06N1(P)KMg	3.87	2.24	2.63	0.98	1.34	1.51	1.82	1.36
07N2(P)KMg	5.85	2.09	4.34	1.86	2.05	2.72	2.71	3.29
08N3(P)KMg	7.37	2.55	5.82	3.11	2.70	3.08	3.30	3.55
09N4(P)KMg	9.13	2.18	6.85	4.21	5.13	5.73	5.89	6.06
10N4	9.81	2.37	4.18	0.54	0.51	0.66	0.38	0.93
11N4PMg	8.28	2.10	7.20	3.39	2.32	4.45	3.80	4.55
12N1+3+1(P)K2Mg2	9.97	2.05	6.25	3.08	3.94	5.05	3.85	5.18
13N4PK	8.14	2.51	5.20	3.89	4.03	5.31	5.15	4.12
14N4PK*(Mg*)	8.80	4.05	4.79	3.03	4.63	5.44	5.13	4.30
15N5(P)KMg	10.01	2.54	6.58	4.67	4.12	4.02	6.68	4.51
16N6(P)KMg	10.61	2.48	8.83	5.58	6.79	7.15	8.00	7.34
17N1+4+1PKMg	10.66	1.74	7.51	6.16	6.22	6.12	7.65	6.19
18N1+2+1PKMg	9.16	2.16	7.75	4.55	5.51	3.89	6.82	4.85
19N1+1+1KMg	7.47	2.38	5.81	2.90	2.25	2.54	4.32	2.14
20N4KMg	*	*	*	*	*	0.14	*	0.45

GRAIN MEAN DM% 84.2

02/R/BK/1 W.WHEAT

STRAW TONNES/HECTARE

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

SECTION / PLOT	5/W1	6/W25	1/W36	9/W44
01(FYM)N4	6.97	4.53	*	*
21FYMN2	5.47	4.41	3.54	5.29
22FYM	3.84	3.94	2.74	3.08
03Nil	0.50	1.45	0.13	0.17
05(P)KMg	0.62	1.42	0.11	0.70
06N1(P)KMg	1.65	0.77	0.70	1.23
07N2(P)KMg	2.93	0.91	1.49	1.46
08N3(P)KMg	3.59	1.54	1.63	2.17
09N4(P)KMg	4.47	2.56	2.31	3.72
10N4	4.34	0.47	0.44	0.35
11N4PMg	3.33	0.76	1.90	2.23
12N1+3+1(P)K2Mg2	4.53	1.88	2.53	2.60
13N4PK	4.18	1.81	2.63	3.08
14N4PK*(Mg*)	4.12	1.61	2.37	2.51
15N5(P)KMg	5.21	2.27	2.05	3.99
16N6(P)KMg	5.32	3.15	2.99	5.09
17N1+4+1PKMg	5.38	3.05	3.67	4.80
18N1+2+1PKMg	3.73	2.54	1.82	4.23
19N1+1+1KMg	3.76	1.98	2.03	3.56
20N4KMg	*	*	0.09	*

STRAW MEAN DM% 87.5

W. OATS

GRAIN TONNES/HECTARE

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

PLOT	GRAIN	STRAW
01(FYM)[N4]	6.44	3.66
21[FYMN2]	7.63	4.29
22[FYM]	8.29	5.82
03Nil	2.22	0.92
05(P)KMg	2.64	1.12
06[N1](P)KMg	3.48	1.46
07[N2](P)KMg	4.06	1.89
08[N3](P)KMg	4.71	2.08
09[N4](P)KMg	4.91	2.76
10[N2]	5.50	3.46
11[N2]PMg	5.85	2.82
12[N2](P)K2Mg2	4.39	1.89
13[N2]PK	3.90	1.58
14[N2]PK*(Mg*)	4.14	1.65
15[N5](P)KMg	3.89	1.37
16[N6](P)KMg	5.75	3.36
17[N1+3]PKMg	5.44	2.32
18[N0+3]PKMg	3.41	1.28
19KMg	2.48	0.84

GRAIN MEAN DM% 85.9

STRAW MEAN DM% 72.9

02/R/BK/1 MAIZE

WHOLE CROP (100% DM) TONNES/HECTARE

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

PLOT	WHOLE CROP
01(FYM)N4	10.65
21FYMN2	7.68
22FYM	8.41
03Nil	2.53
05(P)KMg	1.94
06N1(P)KMg	8.81
07N2(P)KMg	10.70
08N3(P)KMg	12.41
09N4(P)KMg	13.60
10N4	0.67
11N4PMg	4.60
12N2+3(P)K2Mg2	12.05
13N4PK	12.37
14N4PK*(Mg*)	13.45
15N5(P)KMg	12.77
16N6(P)KMg	12.73
17N2+4PKMg	11.94
18N2+2PKMg	11.23
19N2+1KMg	6.15

CROP MEAN DM% 25.3

02/R/HB/2

HOOS BARLEY

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

The 151st year, s. barley.

For previous years see 'Details' 1967 and 1973, Station Report for 1966 and 74-01/HB/2.

Treatments: All combinations of:-

Whole plots

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

		Form of N 1852-1966	Additional treatments 1852-1979	Changes since 1980	Additional treatments since 2001
---	11	None	-	-	
-P-	21	None	P	-	
--K	31	None	K(Na)Mg	-	
-PK	41	None	PK(Na)Mg	-	
A--	12	A	-	-	
AP-	22	A	P	-	
A-K	32	A	K(Na)Mg	-	
APK	42	A	PK(Na)Mg	-	
N----	131	N	-	-	
NP---	231	N	P	-	
N-K--	331	N	K(Na)Mg	-	
NPK--	431	N	PK(Na)Mg	-	
N--S-	134	N	Si	Si omitted	
NP-S-	234	N	P Si	"	
N-KS-	334	N	K(Na)MgSi	"	
NPKS-	434	N	PK(Na)MgSi	"	
N---S	132	N	-	Si added	
NP--S	232	N	P	"	
N-K-S	332	N	K(Na)Mg	"	
NPK-S	432	N	PK(Na)Mg	"	
N--SS	133	N	Si	-	
NP-SS	233	N	P Si	-	
N-KSS	333	N	K(Na)MgSi	-	
NPKSS	433	N	PK(Na)MgSi	-	
C(--)	14	C	-	PKMg omitted	
C(P-)	24	C	P	"	
C(-K)	34	C	K(Na)Mg	"	
C(PK)	44	C	PK(Na)Mg	"	
D1852	72	None	D	-	
(D)	71	None	(D)	-	
(A)	62	None	(Ashes)	-	
-	61	None	-	-	
D2001	73	-	-	-	D
P2KMg	63	-	-	-	P2KMg

Form of N: A, sulphate of ammonia: N, nitrate of soda - each to supply 48 kg N: C, castor meal to supply 96 kg N
P: 35 kg P as triple superphosphate in 1974 and since 1988, single superphosphate in other years
P2: 44 kg P as triple superphosphate started in 2001.
K: 90 kg K as sulphate of potash
(Na): 16 kg Na as sulphate of soda until 1973
Mg: 35 kg Mg as kieserite every third year since 1974 (applied at

30 kg in 1992, 1995 and 1998)(sulphate of magnesia annually until 1973). Annually to new plot 63.
Si: Silicate of soda at 450 kg
D1852: Farmyard manure at 35 t since 1852.
D2001: Farmyard manure at 35 t since 2001
(D): until 1852 - 1871 only
(Ashes): Weed ash 1852-1916, furnace ash 1917-1932, none since

Sub-plots

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

0
48
96
144

Plus extra plots testing all combinations of:-

Whole plots

1 **MANURE** Fertilizers other than magnesium:

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

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

Sub-plots

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

0
35 (30 in 1992, 1995 and 1998)

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

Experimental diary:

13-Dec-01	**T**	: K, P and P2 applied.
19-Dec-01	**T**	: FYM, Si and MG2 applied.
20-Dec-01	B	: Ploughed.
18-Feb-02	B	: Combination drilled, Optic, tr. Raxil S, at 350 seeds/m^2 with the Accord 1 drill.
19-Apr-02	P	: Sprayed paths.
25-Apr-02	**T**	: N (27.5% N) applied by hand.
03-May-02	B	: tm)Ally at 30 g in 200 l.
	B	: tm)Duplosan KV at 1.0 l in 200 l.
	B	: tm)Amistar at 0.4 l in 200 l.
	B	: tm)Unix at 0.5 kg in 200 l
04-Jul-02	B	: Rogued wild oats, 3 plants.
07-Aug-02	B	: Roundup Biactive at 3.0 l in 200 l.
27-Aug-02	**T**	: Combine harvested plots for yield, started. Swathed straw and baled o&e's.
28-Aug-02	**T**	: Combine harvested plots for yield, completed.
	T	: Sampled, baled and weighed straw. Swathed straw.
02-Sep-02	B	: Combine harvested all remaining barley. Swathed and baled straw.
03-Sep-02	B	: Carted bales.

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

02/R/HB/2 MAIN PLOTS

GRAIN TONNES/HECTARE

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

N	0	48	96	144	Mean
MANURE					
---	0.56	0.39	0.67	1.11	0.68
-P-	1.77	1.53	1.37	0.86	1.38
--K	0.27	1.04	1.26	1.54	1.03
-PK	1.01	3.36	3.59	4.32	3.07
A--	0.39	0.37	0.49	0.54	0.45
AP-	1.19	0.68	0.80	0.57	0.81
A-K	0.41	0.83	1.01	0.82	0.77
APK	1.51	3.40	4.60	5.09	3.65
N----	0.57	0.84	0.80	1.46	0.92
NP---	2.01	2.32	1.67	2.07	2.02
N-K--	0.36	1.53	1.54	1.11	1.13
NPK--	1.63	3.76	4.62	5.41	3.86
N--S-	0.71	1.18	2.40	1.90	1.55
NP-S-	-0.03	0.95	1.67	1.40	1.00
N-KS-	1.51	2.23	1.93	3.46	2.28
NPKS-	1.97	4.93	5.41	7.19	4.87
N---S	1.61	1.73	1.79	2.06	1.80
NP--S	2.22	3.19	3.66	3.46	3.13
N-K-S	1.13	1.20	2.76	2.62	1.92
NPK-S	1.32	3.70	5.35	5.65	4.01
N--SS	1.19	1.36	1.59	2.21	1.59
NP-SS	1.87	2.92	2.94	1.94	2.42
N-KSS	1.35	2.00	2.37	3.71	2.36
NPKSS	1.61	3.58	5.14	5.95	4.07
C(--)	1.13	1.94	1.60	1.63	1.58
C(P-)	1.69	3.47	2.08	2.94	2.54
C(-K)	1.41	1.79	3.51	3.91	2.66
C(PK)	1.15	3.75	5.55	6.09	4.14
D1852	4.44	5.98	6.33	6.71	5.87
(D)	0.36	0.96	4.03	1.90	1.81
(A)	0.50	1.39	1.29	1.31	1.12
-	0.23	0.48	0.68	1.15	0.63
D2001	3.83	5.22	5.10	6.29	5.11
P2KMg	2.60	4.60	4.80	5.14	4.29
Mean	1.34	2.31	2.78	3.04	2.37

GRAIN MEAN DM% 82.3

02/R/HB/2 MAIN PLOTS

STRAW TONNES/HECTARE

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

N / MANURE	0	48	96	144	Mean
---	0.16	0.03	0.58	0.50	0.32
-P-	0.57	0.44	0.57	0.33	0.48
--K	0.09	0.29	0.98	0.61	0.49
-PK	0.34	1.22	1.97	2.02	1.39
A--	0.08	0.12	0.04	0.16	0.10
AP-	0.33	0.29	0.25	0.17	0.26
A-K	0.04	0.27	0.35	0.37	0.26
APK	0.24	1.44	2.21	2.06	1.49
D1852	1.53	2.80	3.28	3.52	2.78
(D)	0.14	0.39	1.22	1.11	0.72
(A)	0.05	0.81	0.73	0.84	0.61
-	0.16	0.29	0.47	0.65	0.39
D2001	1.39	2.20	2.25	2.93	2.19
P2KMg	0.72	1.38	2.24	2.13	1.62
Mean	0.42	0.86	1.22	1.24	0.94

STRAW MEAN DM% 82.3

EXTRA PLOTS

GRAIN TONNES/HECTARE

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

MANURE / MGNESIUM	551AN2PK	561--PK	571NN2--	581NN2--	Mean
0	3.23	0.22	1.20	0.43	1.27
35	3.46	0.20	1.05	0.46	1.29
Mean	3.34	0.21	1.13	0.44	1.28

GRAIN MEAN DM% 82.2

02/R/WF/3

WHEAT AND FALLOW

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

The 147th year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-01/R/WF/3.

Whole plot dimensions: 9 x 211.

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

Experimental diary:

04-Oct-01	T	Ploughed plot to be fallowed.
12-Oct-01	T	Ploughed plot to be wheat.
13-Oct-01	T	Combination drilled, Hereward, tr. Sibutol, at 350 seeds/m^2 with the Accord 1 drill.
11-Dec-01	T	tm) Hawk at 2.0 l in 200 l.
	T	tm) Tolkan liquid at 1.0 l in 200 l.
	T	tm) Phase II at 1.0 l in 200 l.
04-Apr-02	T	tm) Opus at 0.4 l in 100 l.
	T	tm) Twist at 0.6 l in 100 l.
	T	tm) BASF 3C Chlormequat 720 at 1.25 l in 100 l.
	T	tm) Moddus at 0.2 l in 100 l.
10-Apr-02	T	Flexitined.
31-May-02	T	tm) Opus at 0.5 l in 200 l.
	T	tm) Twist at 0.8 l in 200 l.
27-Jun-02	T	Rotary harrowed.
04-Jul-02	T	Rogued wild oats.
29-Jul-02	T	Rotavated.
13-Aug-02	T	Combine harvested, plots for yield. Swathed straw. Sampled, baled and weighed straw.
24-Aug-02	T	Carted bales.

Note: Unground grain and straw was archived.

GRAIN AND STRAW TONNES/HECTARE

	GRAIN	STRAW
YIELD	1.10	0.63
MEAN DM%	78.9	70.6

PLOT AREA HARVESTED 0.04431

https://doi.org/10.23637/ERADOC-1-259

02/R/PG/5

PARK GRASS

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

The 147th year, hay.

For previous years see 'Details' 1977 and 1973 and 74-01/R/PG/5.

Treatments: Combinations of:-

Whole plots

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

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

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

02/R/PG/5

Sub-plots

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

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

NOTE: Lime was applied regularly at the same rate, to all 'A' and 'B' sub-plots of plots 1 to 17 (except 12) from 1924. Differential liming started in 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. Lime was applied in 2000, the third application in a triennial scheme of soil pH analysis and remedial chalk applications.
[This note was incorrect in 97-01/R/PG/5 Yield book entries.]

LIME Liming plots 18-20:

NOTE: Differential rates of lime were applied to sub-plots 2 and 3 regularly 1920-1974. Since 1975 plot 18-1 has been split into two for treatments 'C' and 'D' as above and plot 18-3 split into two for treatments 'A' and 'B'. Plots 19 and 20 received no further chalk after 1968; plot 18/2 no further chalk after 1972.
[This note was incorrect in 97-01/R/PG/5 Yield book entries.]

Experimental diary:

12-Dec-01	**T**	P applied.
19-Dec-01	**T**	K and P applied to plot 20 only.
08-Jan-02	**T**	K, Mg, Na, Si applied.
25-Apr-02	**T**	N applied.
01-May-02	P	Cut external paths.
22-May-02	P	Cut paths.
20-Jun-02	**T**	Cut sample areas for yield, sampled and weighed, and carted cut grass.
23-Jun-02	**T**	Mowed for hay, except plot 5.
25-Jun-02	B	Turned hay.
26-Jun-02	B	Turned hay, twice.
27-Jun-02	B	Turned hay.
	B	Rowed up hay.
	B	Baled hay.
28-Jun-02	B	Carted bales.
02-Jul-02	B	Topped, where run down by mower.
24-Oct-02	**T**	Cut, weighed and sampled yield strips, started.
25-Oct-02	**T**	Cut, weighed and sampled yield strips, completed.
04-Nov-02	B	Cut discards, started.
19-Nov-02	B	Cut discards, completed.

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

02/R/PG/5

1ST CUT (20/6/02) DRY MATTER TONNES/HECTARE

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

LIME / MANURE		A	B	C	D	MEAN
N1	1	3.62	3.25	2.41	1.40	2.67
K	2/1	2.83	2.92	1.88	2.01	2.41
O(D)	2/2	2.72	2.68	1.91	2.51	2.46
O	3	2.75	2.50	1.67	2.56	2.37
P	4/1	4.46	4.40	3.37	3.28	3.88
N2P	4/2	5.27	4.85	5.82	3.74	4.92
N1MN	6	6.36	5.74			6.05
MN	7	6.59	5.75	5.77	4.32	5.61
PNAMG	8	4.96	5.37	4.32	4.57	4.80
MN(N2)	9/1	5.32	5.93	6.89	1.99	5.03
N2MN	9/2	6.59	7.40	6.65	6.48	6.78
N2PNAMG	10	5.62	5.35	7.01	4.19	5.55
N3MN	11/1	6.89	7.31	6.50	6.38	6.77
N3MNSI	11/2	7.22	7.74	6.50	6.81	7.07
O	12	3.00	3.12	3.09	2.20	2.85
(D/F)	13/1	4.61	5.19	5.29	5.09	5.05
D/F	13/2	3.80	5.58	7.14	6.58	5.77
MN(N2*)	14/1	4.31	5.33	4.82	4.10	4.64
N2*MN	14/2	5.35	4.97	5.13	5.47	5.23
MN(N2*)	15	4.99	5.00	4.33	3.25	4.39
N1*MN	16	6.18	6.15	5.07	4.38	5.44
N1*	17	3.00	3.30	3.01	2.81	3.03
N2KNAMG0	18/1			5.69	1.64	3.66
N2KNAMG2	18/2					4.08
N2KNAMG1	18/3	2.83	3.03			2.93
D0	19/1					5.66
D2	19/2					5.83
D1	19/3					4.84
D/N*PK0	20/1					6.18
D/N*PK2	20/2					6.70
D/N*PK1	20/3					5.91

1ST CUT MEAN DM% 25.0

02/R/PG/5

2ND CUT (24-25/10/02) DRY MATTER TONNES/HECTARE

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

LIME / MANURE		A	B	C	D	MEAN
N1	1	1.80	2.01	1.43	0.69	1.48
K	2/1	2.14	2.46	1.39	1.47	1.87
O(D)	2/2	1.99	2.59	1.64	2.02	2.06
O	3	1.88	2.24	1.46	1.95	1.88
P	4/1	2.59	2.92	2.14	2.09	2.43
N2P	4/2	1.93	1.63	1.61	0.92	1.52
N1MN	6	2.45	2.66			2.56
MN	7	3.18	3.10	2.70	1.87	2.71
PNAMG	8	3.12	2.68	2.50	2.78	2.77
MN(N2)	9/1	2.68	2.54	2.44	0.43	2.02
N2MN	9/2	2.62	2.79	3.01	2.84	2.82
N2PNAMG	10	2.70	2.58	7.60	1.85	3.68
N3MN	11/1	3.65	3.33	4.24	3.59	3.70
N3MNSI	11/2	4.53	3.76	3.39	3.33	3.75
O	12	2.69	4.03	3.38	2.24	3.09
(D/F)	13/1	5.83	3.78	3.49	3.25	4.09
D/F	13/2	2.82	4.38	4.00	4.95	4.04
MN(N2*)	14/1	2.44	2.80	2.51	2.43	2.54
N2*MN	14/2	5.00	3.00	2.87	2.65	3.38
MN(N2*)	15	2.69	2.39	2.29	1.52	2.23
N1*MN	16	2.90	3.00	2.85	2.05	2.70
N1*	17	2.42	2.77	2.15	2.15	2.37
N2KNAMG0	18/1			2.54	0.51	1.53
N2KNAMG2	18/2					3.09
N2KNAMG1	18/3	2.24	2.36			2.30
D0	19/1					3.71
D2	19/2					8.37
D1	19/3					3.68
D/N*PK0	20/1					3.41
D/N*PK2	20/2					5.33
D/N*PK1	20/3					3.41

2ND CUT MEAN DM% 26.9

02/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME / MANURE		A	B	C	D	MEAN
N1	1	5.42	5.26	3.84	2.09	4.15
K	2/1	4.96	5.38	3.28	3.49	4.28
O(D)	2/2	4.71	5.27	3.55	4.53	4.51
O	3	4.63	4.74	3.13	4.51	4.25
P	4/1	7.05	7.31	5.51	5.37	6.31
N2P	4/2	7.19	6.48	7.43	4.66	6.44
N1MN	6	8.81	8.40			8.61
MN	7	9.77	8.85	8.47	6.19	8.32
PNAMG	8	8.08	8.05	6.82	7.34	7.57
MN(N2)	9/1	8.00	8.48	9.32	2.42	7.05
N2MN	9/2	9.21	10.20	9.66	9.32	9.60
N2PNAMG	10	8.33	7.93	14.61	6.04	9.23
N3MN	11/1	10.54	10.64	10.74	9.97	10.47
N3MNSI	11/2	11.75	11.50	9.89	10.14	10.82
O	12	5.69	7.15	6.48	4.45	5.94
(D/F)	13/1	10.44	8.97	8.78	8.35	9.13
D/F	13/2	6.62	9.96	11.14	11.54	9.81
MN(N2*)	14/1	6.75	8.13	7.33	6.53	7.18
N2*MN	14/2	10.36	7.97	8.00	8.12	8.61
MN(N2*)	15	7.68	7.39	6.63	4.77	6.62
N1*MN	16	9.08	9.14	7.92	6.43	8.14
N1*	17	5.42	6.07	5.16	4.95	5.40
N2KNAMG0	18/1			8.23	2.15	5.19
N2KNAMG2	18/2					7.17
N2KNAMG1	18/3	5.07	5.39			5.23
D0	19/1					9.37
D2	19/2					14.20
D1	19/3					8.52
D/N*PK0	20/1					9.60
D/N*PK2	20/2					12.04
D/N*PK1	20/3					9.33

TOTAL OF 2 CUTS MEAN DM% 25.9

02/R/GC/8

GARDEN CLOVER

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

The 149th year, red clover.

For previous years see `Details' 1967 and 1973, and 74-00/R/GC/8.

Design: 2 blocks of 2 plots.

Whole plot dimensions: 1.00 x 1.40.

Treatments:

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

Experimental diary:

14-Apr-02	B		Area hand weeded, lightly cultivated and raked.
30-May-02	B		First cut.
17-Jul-02	B		Second cut.
06-Sep-02	B		Third cut.

NOTE: Clover samples taken for chemical analysis.

https://doi.org/10.23637/ERADOC-1-259

02/R/GC/8

1ST CUT (30/5/02) DRY MATTER TONNES/HECTARE

FUNG RES	NONE	BENOMYL	Mean
	3.96	4.09	4.02

1ST CUT MEAN DM% 17.9

2ND CUT (17/7/02) DRY MATTER TONNES/HECTARE

FUNG RES	NONE	BENOMYL	Mean
	5.43	5.27	5.35

2ND CUT MEAN DM% 16.1

3RD CUT (6/9/02) DRY MATTER TONNES/HECTARE

FUNG RES	NONE	BENOMYL	Mean
	3.73	3.64	3.69

3RD CUT MEAN DM% 17.9

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

FUNG RES	NONE	BENOMYL	Mean
	13.12	13.00	13.06

TOTAL OF 3 CUTS MEAN DM% 17.3

02/R/EX/4

EXHAUSTION LAND

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

The 147th year, w. wheat.

For previous years see 'Details' 1977, 1973 and 74-01/EX/4.

Treatments: All combinations of:-

Whole plots (P test)

1. **OLD RES**		Residues of manures applied annually 1876-1901:
	O	None
	D	Farmyard manure at 35 t
	N	96 kg N as ammonium salts
	P	34 kg P as superphosphate
	NPKNAMG	N and P as above plus 137 kg K as sulphate of potash, 16 kg Na as sulphate of soda, 11 kg Mg as sulphate of magnesia
2. **P**		Maintenance P (20 kg P) applied annually from 2000 to maintain existing levels of available P in the soil. (P1) (P2) and (P3) are residues of P applied annually 1986-1992:

	2000-02	1986-92
O	None	None
P(P1)	20 kg P	44 kg P
P(P2)	20 kg P	87 kg P
P(P3)	20 kg P	131 kg P

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

plus

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

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

Experimental diary:

K test:

04-Oct-01	**T**	P	P basal:(triple superphosphate at 98 kg), plots 2, 4, 6, 8 & 10.

P test:

04-Oct-01	**T**	K	K basal/100 kg (muriate of potash at 250 kg), plots 1, 3, 5, 7 & 9.
	T	P	P test:(triple superphosphate at 98 kg), plots 011-013, 031-033, 051-053, 071-073, & 091-093.

All plots

04-Oct-01	B	Subsoiled.
	B	Ploughed.
13-Oct-01	B	Combination drilled, Hereward, tr. Sibutol at 350 seeds/m^2.
11-Dec-01	B	tm)Hawk at 2.0 l in 200 l.

```
            : B :      : tm)Tolkan liquid at 1.0 l in 200 l.
            : B :      : tm)Phase II at 1.0 l in 200 l.
   04-Apr-02 : B :      : tm)Opus at 0.4 l in 100 l.
            : B :      : tm)Twist at 0.6 l in 100 l.
            : B :      : tm)BASF 3C Chlormequat 720 at 1.25 l in 100 l.
            : B :      : tm)Moddus at 0.2 l in 100 l.
   29-Apr-02 : B :      : 33.5% N at 567 kg.
   20-May-02 : P :      : Rotavated down paths.
   31-May-02 : B :      : Starane 2 at 0.75 l in 200 l.
            : B :      : tm)Opus at 0.5 l in 200 l.
            : B :      : tm)Twist at 0.8 l in 200 l.
   04-Jul-02 : B :      : Rogued wild oats.
   01-Aug-02 : B :      : Roundup Biactive at 3.0 l in 100 l.
   13-Aug-02 : T :      : Combine harvested, plots for yield. Swathed straw.
                          Sampled, baled and weighed straw.
   24-Aug-02 : B :      : Carted bales.
```

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

P TEST

GRAIN TONNES/HECTARE

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

P RES / OLD RES	0	P1	P2	P3	Mean
0	1.04	4.94	5.96	5.96	4.47
D	4.02	6.91	7.62	7.43	6.49
N	1.15	5.28	6.14	4.66	4.31
P	4.00	6.52	6.72	6.46	5.93
NPKNAMG	3.04	6.27	7.10	6.30	5.68
Mean	2.65	5.99	6.71	6.16	5.38

GRAIN MEAN DM% 82.6

STRAW TONNES/HECTARE

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

P RES / OLD RES	0	P1	P2	P3	Mean
0	1.04	2.47	3.18	2.65	2.33
D	2.64	3.56	3.99	3.75	3.49
N	1.71	2.93	3.16	2.74	2.63
P	2.99	2.93	2.96	3.08	2.99
NPKNAMG	2.36	3.35	3.33	2.81	2.96
Mean	2.15	3.05	3.32	3.00	2.88

STRAW MEAN DM% 74.4

PLOT AREA HARVESTED 0.00538

02/R/EX/4

K TEST

GRAIN TONNES/HECTARE

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

OLD RES	
O	5.96
D	6.92
N*	6.05
PK	5.92
N*PK	6.28
Mean	6.23

Grain Mean Dm% 83.1

K TEST

STRAW TONNES/HECTARE

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

OLD RES	
O	2.85
D	3.60
N*	3.19
PK	3.43
N*PK	3.49
Mean	3.31

STRAW MEAN DM% 75.7

PLOT AREA HARVESTED 0.00538

02/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 65th year, leys, w. beans, w. wheat, w. rye, forage maize.

For previous years see 'Details' 1967 & 1973 and 74-01/W/RN/3.

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

Whole plot dimensions: 8.53 x 40.7.

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

ROTATION

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

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

Rotations themselves followed different cycles:

On four plots in each block the rotations were repeated

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

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

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

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

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

02/W/RN/3

ROTATION (continued)

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

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

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

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

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

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

Yields are taken from the leys, arable treatment crops and the test crops.

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

Whole plots:

1. **ROTATION** Rotations before wheat:

   LLN 8
   LN 3
   LLC 8
   LC 3
   AM
   ABe

1/2 plots:

2. **NSPLIT(FYM res)** Farmyard manure residues, last applied 1967:

   Nsplit(noFYM)
   Nsingle(FYM)

1/8 plots:

3. **N** Nitrogen fertilizer in spring 2002 (kg N) as 27% N for 1st split dressing, as 33.5% N for second and single dressings:

0				
70	)as a		40 + 30	)split dressings
140	)single	OR	40 + 100	)late Feb/early Mar
210	)dressing		40 + 170	)and GS31 or mid-Apr

02/W/RN/3

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

Whole plots:

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

   LLN 8
   LN 3
   LLC 8
   LC 3
   AF
   AB

1/2 plots:

2. **NSPLIT(FYM res)** Farmyard manure residues, last applied 1966:

   Nsplit to wheat in 2001(noFYM)
   Nsingle to wheat in 2001 (FYM)

1/8 plots:

3. **N** Nitrogen fertilizer in spring 2002 (kg N) as 33.5% N:

   0
   40
   80
   120

Treatments to leys:

FYM RES Farmyard manure residues:

NONE
FYM 38 t on each occasion, last applied 1965 to 1st and 6th year leys, 1964 to 2nd and 7th year leys, 1963 to 3rd and 8th year leys, 1967 to 4th year leys, 1966 to 5th year leys.

NOTE: Corrective K dressings (kg K_2O) as muriate of potash, applied where necessary to first test crop w. wheat and long-term leys in the wheat block, applied 20th and 26th September 2001.

Continuous rotations before wheat	No FYM half plots	FYM half plots
AM	190	190
ABe	180	210
Ln	60	20

None to other plots.

02/W/RN/3

Experimental diary:

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

20-Sep-01	T	Ploughed.
21-Sep-01	T	Rolled.
22-Sep-01	T	Rotary harrowed, drilled, grass/clover mix and grass mix, at 30 kg with 4.0 m Accord drill. Rolled.
04-Oct-01	T	27.0% N at 93 kg, 1st year grass/clover leys; at 185 kg, 1st year grass leys.
12-Mar-02	T	33.5% N at 224 kg grass leys.
13-Mar-02	T	Muriate of potash at 167 kg.
14-Apr-02	T	Legumex Extra at 7.0 l in 200 l.
18-Jun-02	T	Cut yield strips, weighed and sampled.
25-Jun-02	T	Mowed for hay.
	T	Turned hay.
26-Jun-02	T	Turned hay.
28-Jun-02	T	Turned hay.
29-Jun-02	T	Baled hay.
02-Jul-02	T	Muriate of potash at 83 kg.
	T	33.5% N at 224 kg, grass leys.
24-Sep-02	T	Mowed discard. Mowed, sampled and weighed plots for yield.
26-Sep-02	B	Rowed up, baled, and carted grass, clover/grass.

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

02-Jan-02	T	Potassium sulphate at 140 kg, Triple superphosphate at 213 kg.
12-Mar-02	T	33.5% N at 224 kg grass leys.
13-Mar-02	T	Muriate of potash at 167 kg.
14-Apr-02	T	Legumex Extra at 7.0 l in 200 l.
18-Jun-02	T	Cut yield strips, weighed and sampled.
25-Jun-02	T	Mowed for hay.
	T	Turned hay.
26-Jun-02	T	Turned hay.
28-Jun-02	T	Turned hay.
29-Jun-02	T	Baled hay.
02-Jul-02	T	Muriate of potash at 83 kg.
	T	33.5% N at 224 kg, grass leys.
19-Sep-02	T	Egret at 4.0 l in 200 l, LN3, LLN8 plots that are to be ploughed.
24-Sep-02	T	Mowed discard, except plots 51, 52, 57 & 58 (previously sprayed with Egret).
	T	Mowed, sampled and weighed plots for yield.
26-Sep-02	B	Rowed up, baled, and carted grass.

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

02-Jan-02	T	Potassium sulphate at 140 kg, Triple superphosphate at 213 kg.
13-Mar-02	T	Muriate of potash at 167 kg.
14-Apr-02	T	Legumex Extra at 7.0 l in 200 l.
18-Jun-02	T	Cut yield strips, weighed and sampled.
25-Jun-02	T	Mowed for hay.
	T	Turned hay.
26-Jun-02	T	Turned hay.
28-Jun-02	T	Turned hay.
29-Jun-02	T	Baled hay.
02-Jul-02	T	Muriate of potash at 83 kg.
19-Sep-02	T	Egret at 4.0 l in 200 l, LC3 and LLC8 plots that are to be ploughed.

02/W/RN/3

Experimental diary:

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

24-Sep-02	: **T** :		: Mowed discard grass, except plots 49, 50, 59, & 60 (previously sprayed with Egret).
	: **T** :		: Mowed, sampled and weighed plots for yield.
26-Sep-02	: B :		: Rowed up, baled, and carted clover/grass.

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

20-Sep-01	: **T** :		: Sulphate of potash at 140 kg, (except plots 53 and 54).
	: **T** :		: Triple superphosphate at 127 kg, (except plots 53 and 54).
26-Sep-01	: **T** :		: Sulphate of potash at 140 kg, plots 53 and 54.
	: **T** :		: Triple superphosphate at 127 kg, plots 53 and 54.
05-Nov-01	: **T** :		: Broadcast, Clipper, recleaned at 25 seeds/m^2 by hand. Ploughed.
03-Dec-01	: **T** :		: Gesatop at 2.0 l in 220 l.
11-Apr-02	: **T** :		: Hallmark with Zeon technology at 75 ml in 220 l.
01-Jul-02	: **T** :		: tm) Bravo 500 at 2.0 l in 200 l.
	: **T** :		: tm) Folicur at 0.5 l in 200 l.
	: **T** :		: tm) Aphox at 280 g in 200 l.
29-Aug-02	: **T** :		: Combine harvested plots for yield.
	: **T** :		: Swathed straw.
31-Aug-02	: B :		: Baled and removed straw.
19-Sep-02	: **T** :		: Egret at 4.0 l in 200 l.

Forage maize, 2nd and 3rd treatment crop (**ROTATION** Abe and AM)

20-Sep-01	: **T** :		: Sulphate of potash at 140 kg.
	: **T** :		: Triple superphosphate at 127 kg.
05-Nov-01	: **T** :		: Ploughed.
09-May-02	: **T** :		: Rotary harrowed. Drilled, Hudson, tr. Mesurol, at 10 seeds/m^2 with the Nodet drill.
20-May-02	: **T** :		: 27.0% N at 370 kg.
20-Jun-02	: **T** :		: tm) Gesaprim at 3.0 l in 220 l.
	: **T** :		: tm) Cropoil at 5.0 l in 220 l.
12-Sep-02	: **T** :		: Cut discards.
	: **T** :		: Cut sample areas, weighed and sampled.
19-Sep-02	: **T** :		: Egret at 4.0 l in 200 l.

W. wheat, 1st test crop (W)

20-Sep-01	: **T** :		: Muriate of potash (corrective K) by hand at 60 kg K_2O plot 65; 20 kg K_2O plot 66; 210 kg K_2O plot 67; 180 kg K_2O plot 68.
	: **T** :		: Sulphate of potash at 140 kg, (except plots 73 and 74, still in maize).
	: **T** :		: Triple superphosphate at 127 kg, (except plots 73 and 74).
	: **T** :		: Ploughed for leys, wheat and rye, except those still in maize.
21-Sep-01	: **T** :		: Rolled.
26-Sep-01	: **T** :		: Muriate of potash (corrective K) by hand at 190 kg K_2O plots 73 and 74.
	: **T** :		: Sulphate of potash at 140 kg, plots 73 and 74.
	: **T** :		: Triple superphosphate at 127 kg, plots 73 and 74.
	: **T** :		: Ploughed and rolled, plots 73 and 74.
	: **T** :		: Drilled, Claire, tr. Sibutol + Aventis Manganese 500, at 300 seeds/m^2 with the Accord drill.
28-Sep-01	: **T** :		: Rolled.
16-Nov-01	: **T** :		: tm) Stomp 400 SC at 4.0 l in 200 l.
	: **T** :		: tm) Tolkan liquid at 2.5 l in 200 l.
14-Mar-02	: **T** :		: 1st N applied to split N sub-plots.

02/W/RN/3

Experimental diary:

W. wheat, 1st test crop (W)

14-Apr-02	: T		tm) Ally at 30 g in 200 l.
	: **T**	:	tm) Opus at 0.5 l in 200 l.
	: **T**	:	tm) BASF 3C Chlormequat 720 at 2.0 l in 200 l.
16-Apr-02	: **T**	:	2nd N applied to split N sub-plots and single dose to others.
27-May-02	: **T**	:	tm) Amistar at 0.8 l in 200 l.
	: **T**	:	tm) Opus at 0.5 l in 200 l.
22-Aug-02	: **T**	:	Combine harvested plots for yield.
30-Aug-02	: B	:	Combine harvested all remaining wheat. Swathed straw. Sampled, baled and weighed straw.
31-Aug-02	: B	:	Baled and removed straw.
19-Sep-02	: **T**	:	Egret at 4.0 l in 200 l.

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

20-Sep-01	: **T**	:	Sulphate of potash at 140 kg.
	: **T**	:	Triple superphosphate at 127 kg.
	: **T**	:	Ploughed.
21-Sep-01	: **T**	:	Rolled.
04-Oct-01	: **T**	:	Rotary harrowed. Drilled, Picasso/Nikita blend (90:10), tr. Baytan, at 275 seeds/m^2 with 4.0 m Accord drill. Rolled.
17-Oct-01	: **T**	:	Ardent at 2.0 l in 200 l.
16-Apr-02	: **T**	:	N applied, 27% N at 296 kg to treatment plots.
	: **T**	:	N applied to 2nd test crop.
27-May-02	: **T**	:	tm) Amistar at 0.8 l in 200 l.
	: **T**	:	tm) Opus at 0.5 l in 200 l.
22-Aug-02	: **T**	:	Combine harvested plots for yield.
30-Aug-02	: B	:	Combine harvested all remaining rye. Swathed straw. Sampled, baled and weighed straw.
31-Aug-02	: B	:	Baled and removed straw.
19-Sep-02	: **T**	:	Egret at 4.0 l in 200 l.

02/W/RN/3

LEYS

1ST CUT (18/6/02) DRY MATTER TONNES/HECTARE

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

FYM RES	NONE	FYM	Mean
LEY			
LC1	1.18	1.20	1.19
LC2	4.15	4.82	4.48
LC3	6.14	6.22	6.18
LN1	3.64	3.93	3.78
LN2	7.85	8.09	7.97
LN3	6.93	7.02	6.98
LLC1	1.24	0.73	0.99
LLC2	5.56	5.14	5.35
LLC3	6.74	6.91	6.83
LLC4	5.60	5.28	5.44
LLC5	6.07	6.21	6.14
LLC6	4.31	2.79	3.55
LLC7	2.03	3.16	2.60
LLC8	5.61	6.10	5.86
LLN1	2.61	3.19	2.90
LLN2	7.27	7.45	7.36
LLN3	7.19	7.54	7.37
LLN4	6.81	7.22	7.01
LLN5	8.52	8.15	8.34
LLN6	8.06	8.99	8.52
LLN7	7.60	6.81	7.20
LLN8	8.18	7.58	7.88
Mean	5.60	5.66	5.63

1ST CUT MEAN DM% 26.6

02/W/RN/3

LEYS

2ND CUT (24/9/02) DRY MATTER TONNES/HECTARE

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

FYM RES	NONE	FYM	Mean
LEY			
LC1	0.97	0.88	0.92
LC2	0.97	0.96	0.96
LC3	1.81	1.66	1.74
LN1	0.54	0.37	0.45
LN2	2.06	1.96	2.01
LN3	1.53	1.98	1.76
LLC1	1.88	1.82	1.85
LLC2	1.09	1.07	1.08
LLC3	1.84	1.86	1.85
LLC4	1.84	1.80	1.82
LLC5	1.40	0.93	1.17
LLC6	0.74	0.30	0.52
LLC7	0.33	0.42	0.38
LLC8	1.28	1.06	1.17
LLN1	0.94	1.47	1.20
LLN2	1.80	1.51	1.65
LLN3	1.42	1.21	1.31
LLN4	1.56	1.90	1.73
LLN5	2.23	2.67	2.45
LLN6	2.47	2.52	2.50
LLN7	1.81	2.38	2.10
LLN8	2.55	2.12	2.33
Mean	1.50	1.49	1.50

2ND CUT MEAN DM% 39.3

02/W/RN/3

LEYS

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

FYM RES	NONE	FYM	Mean
LEY			
LC1	2.15	2.07	2.11
LC2	5.12	5.77	5.44
LC3	7.95	7.89	7.92
LN1	4.18	4.29	4.23
LN2	9.91	10.04	9.98
LN3	8.46	9.00	8.73
LLC1	3.12	2.55	2.83
LLC2	6.65	6.22	6.43
LLC3	8.58	8.77	8.67
LLC4	7.44	7.07	7.26
LLC5	7.47	7.14	7.31
LLC6	5.05	3.09	4.07
LLC7	2.37	3.58	2.97
LLC8	6.89	7.16	7.03
LLN1	3.55	4.66	4.11
LLN2	9.07	8.96	9.01
LLN3	8.61	8.76	8.68
LLN4	8.37	9.13	8.75
LLN5	10.75	10.82	10.79
LLN6	10.54	11.50	11.02
LLN7	9.41	9.19	9.30
LLN8	10.73	9.70	10.22
Mean	7.11	7.15	7.13

TOTAL OF 2 CUTS MEAN DM% 33.0

PLOT AREA HARVESTED 0.00200

W. BEANS

GRAIN (AT 85% DRY MATTER) TONNES/HECTARE

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

FYMRES	NONE	FYM	Mean
	2.97	3.50	3.23

GRAIN MEAN DM% 81.2

PLOT AREA HARVESTED 0.00413

02/W/RN/3

W. WHEAT

GRAIN TONNES/HECTARE

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

NSPLITFYM	Nsplit(noFYM)	Nsingle(FYM)	Mean
ROTATION			
LLN 8	7.36	7.53	7.44
LN 3	6.70	7.08	6.89
LLC 8	9.01	8.19	8.60
LC 3	9.16	9.77	9.47
AM	6.62	6.37	6.49
ABe	6.90	6.90	6.90
Mean	7.62	7.64	7.63

N	0	70	140	210	Mean
ROTATION					
LLN 8	4.94	7.75	8.45	8.63	7.44
LN 3	4.54	7.06	7.95	8.00	6.89
LLC 8	6.59	8.20	9.59	10.03	8.60
LC 3	7.28	10.01	10.32	10.25	9.47
AM	2.44	6.05	8.46	9.03	6.49
ABe	3.30	6.56	8.46	9.29	6.90
Mean	4.85	7.61	8.87	9.20	7.63

N	0	70	140	210	Mean
NSPLITFYM					
Nsplit(noFYM)	4.94	7.49	9.09	8.98	7.62
Nsingle(FYM)	4.75	7.72	8.66	9.43	7.64
Mean	4.85	7.61	8.87	9.20	7.63

N		0	70	140	210
ROTATION	NSPLITFYM				
LLN 8	Nsplit(noFYM)	5.06	7.21	8.67	8.49
	Nsingle(FYM)	4.82	8.28	8.23	8.77
LN 3	Nsplit(noFYM)	4.28	6.50	8.43	7.58
	Nsingle(FYM)	4.80	7.63	7.47	8.41
LLC 8	Nsplit(noFYM)	7.97	8.64	9.38	10.07
	Nsingle(FYM)	5.22	7.77	9.79	9.98
LC 3	Nsplit(noFYM)	6.72	9.89	10.30	9.71
	Nsingle(FYM)	7.83	10.12	10.34	10.80
AM	Nsplit(noFYM)	2.43	6.04	8.89	9.11
	Nsingle(FYM)	2.44	6.07	8.02	8.94
Abe	Nsplit(noFYM)	3.20	6.67	8.84	8.89
	Nsingle(FYM)	3.40	6.45	8.09	9.68

GRAIN MEAN DM% 84.3

02/W/RN/3

W. WHEAT

STRAW TONNES/HECTARE

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

NSPLITFYM	Nsplit(noFYM)	Nsingle(FYM)	Mean
ROTATION			
LLN 8	3.05	2.74	2.90
LN 3	2.70	2.86	2.78
LLC 8	4.60	3.56	4.08
LC 3	4.30	4.41	4.36
AM	2.70	2.82	2.76
ABe	2.98	2.57	2.77
Mean	3.39	3.16	3.27

N	0	70	140	210	Mean
ROTATION					
LLN 8	1.41	2.61	3.52	4.04	2.90
LN 3	1.52	3.20	3.70	2.69	2.78
LLC 8	2.53	3.61	4.95	5.23	4.08
LC 3	2.94	4.96	4.79	4.74	4.36
AM	0.55	2.62	3.90	3.98	2.76
ABe	0.88	2.57	3.65	3.99	2.77
Mean	1.64	3.26	4.08	4.11	3.27

N	0	70	140	210	Mean
NSPLITFYM					
Nsplit(noFYM)	1.71	3.27	4.41	4.17	3.39
Nsingle(FYM)	1.57	3.25	3.76	4.06	3.16
Mean	1.64	3.26	4.08	4.11	3.27

N		0	70	140	210
ROTATION	NSPLITFYM				
LLN 8	Nsplit(noFYM)	1.66	2.61	3.78	4.17
	Nsingle(FYM)	1.16	2.61	3.26	3.92
LN 3	Nsplit(noFYM)	1.26	2.57	4.46	2.51
	Nsingle(FYM)	1.79	3.84	2.94	2.88
LLC 8	Nsplit(noFYM)	3.52	4.19	5.19	5.50
	Nsingle(FYM)	1.54	3.03	4.71	4.95
LC 3	Nsplit(noFYM)	2.56	4.87	4.82	4.94
	Nsingle(FYM)	3.31	5.06	4.75	4.53
AM	Nsplit(noFYM)	0.49	2.76	3.84	3.72
	Nsingle(FYM)	0.60	2.47	3.97	4.23
Abe	Nsplit(noFYM)	0.74	2.63	4.36	4.16
	Nsingle(FYM)	1.02	2.51	2.94	3.83

STRAW MEAN DM% 85.7

Plot area harvested 0.00183

02/W/RN/3

W. RYE

GRAIN TONNES/HECTARE

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

NSPLITFYM	(Nsplit) (noFYM)	(Nsingle) (FYM)	Mean
ROTATION			
LLN 8	7.06	7.29	7.17
LN 3	8.28	8.27	8.28
LLC 8	7.21	7.24	7.22
LC 3	7.43	7.50	7.46
AM	5.77	6.35	6.06
ABe	6.48	7.01	6.75
Mean	7.04	7.28	7.16

N	0	40	80	120	Mean
ROTATION					
LLN 8	4.87	6.69	8.60	8.53	7.17
LN 3	5.83	7.62	9.62	10.05	8.28
LLC 8	4.74	7.23	8.20	8.73	7.22
LC 3	4.86	6.89	8.97	9.14	7.46
AM	2.61	5.43	7.27	8.92	6.06
ABe	3.69	6.03	8.06	9.20	6.75
Mean	4.43	6.65	8.45	9.10	7.16

N	0	40	80	120	Mean
NSPLITFYM					
(Nsplit) (noFYM)	4.47	6.61	8.19	8.88	7.04
(Nsingle) (FYM)	4.40	6.69	8.71	9.31	7.28
Mean	4.43	6.65	8.45	9.10	7.16

N		0	40	80	120
ROTATION	NSPLITFYM				
LLN 8	(Nsplit) (noFYM)	4.90	6.53	8.48	8.35
	(Nsingle) (FYM)	4.85	6.86	8.72	8.72
LN 3	(Nsplit) (noFYM)	6.13	7.69	9.18	10.14
	(Nsingle) (FYM)	5.53	7.54	10.07	9.95
LLC 8	(Nsplit) (noFYM)	4.90	7.35	8.09	8.48
	(Nsingle) (FYM)	4.58	7.10	8.31	8.98
LC 3	(Nsplit) (noFYM)	5.09	6.93	8.65	9.04
	(Nsingle) (FYM)	4.62	6.84	9.28	9.24
AM	(Nsplit) (noFYM)	2.36	5.32	7.08	8.32
	(Nsingle) (FYM)	2.86	5.54	7.46	9.53
Abe	(Nsplit) (noFYM)	3.44	5.82	7.69	8.97
	(Nsingle) (FYM)	3.94	6.24	8.43	9.43

GRAIN MEAN DM% 84.0

02/W/RN/3

W. RYE

STRAW TONNES/HECTARE

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

NSPLITFYM	(Nsplit) (noFYM)	(Nsingle) (FYM)	Mean
ROTATION			
LLN 8	4.41	4.97	4.69
LN 3	5.29	5.11	5.20
LLC 8	4.89	4.85	4.87
LC 3	4.86	5.08	4.97
AM	3.46	3.47	3.46
ABe	4.17	4.34	4.25
Mean	4.51	4.64	4.57

N	0	40	80	120	Mean
ROTATION					
LLN 8	3.44	4.57	5.78	5.00	4.69
LN 3	3.71	4.78	6.11	6.20	5.20
LLC 8	3.58	4.83	5.43	5.62	4.87
LC 3	3.24	4.18	5.70	6.75	4.97
AM	1.76	3.44	3.91	4.74	3.46
ABe	2.69	3.76	5.11	5.45	4.25
Mean	3.07	4.26	5.34	5.63	4.57

N	0	40	80	120	Mean
NSPLITFYM					
(Nsplit) (noFYM)	3.16	4.36	5.04	5.50	4.51
(Nsingle) (FYM)	2.98	4.17	5.64	5.76	4.64
Mean	3.07	4.26	5.34	5.63	4.57

N		0	40	80	120
ROTATION	NSPLITFYM				
LLN 8	(Nsplit) (noFYM)	3.31	4.18	5.63	4.55
	(Nsingle) (FYM)	3.57	4.95	5.93	5.44
LN 3	(Nsplit) (noFYM)	3.73	5.23	5.61	6.61
	(Nsingle) (FYM)	3.70	4.33	6.61	5.80
LLC 8	(Nsplit) (noFYM)	4.13	5.23	4.96	5.22
	(Nsingle) (FYM)	3.02	4.44	5.90	6.02
LC 3	(Nsplit) (noFYM)	3.48	3.98	5.19	6.79
	(Nsingle) (FYM)	3.00	4.39	6.22	6.72
AM	(Nsplit) (noFYM)	1.65	3.68	3.82	4.70
	(Nsingle) (FYM)	1.88	3.20	4.01	4.78
Abe	(Nsplit) (noFYM)	2.65	3.84	5.07	5.11
	(Nsingle) (FYM)	2.73	3.67	5.16	5.79

STRAW MEAN DM% 89.9

Plot area harvested 0.00192

02/W/RN/3

W. RYE EXTRA

GRAIN TONNES/HECTARE

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

FYMRES	NONE	FYM	Mean
	6.15	6.18	6.16

GRAIN MEAN DM% 83.8

PLOT AREA HARVESTED 0.00413

MAIZE

WHOLE CROP (AT 100% DRY MATTER) TONNES/HECTARE

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

FYMRES	NONE	FYM	Mean
	12.85	12.61	12.73

TOTAL PLANT DM% 27.9

PLOT AREA HARVESTED 0.00108

02/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 38th year, w. wheat.

For previous years see 'Details' 1973 and 74-01/W/RN/12.

Design: 4 blocks of 8 plots split into 6.

Whole plot dimensions: 8.0 x 29.5.

Treatments: From 1966 to 1971 the experiment had a preliminary period designed to build up organic matter from different sources. An arable rotation was started on two blocks in 1972 and the remaining two blocks in 1973. After a period of testing the residues, a further period of accumulation was started; on two blocks (which included ley sown in 1979) in 1981 and on the other two (which included ley sown in 1980) in 1982. A second test phase began when leys on the first pair of blocks were ploughed for the 1st test crop in 1987 and on the second pair for the 1st test crop in 1988. From 1988 two blocks, and 1989 the other two, to 1994, plots were split into 6 sub-plots to test five levels of nitrogen and nil. From 1995 to 1997 residual effects of that nitrogen were measured. In 1998 to 2000 yields were taken from whole plots only. In 2001 plots were split into half-plots to test two rates of N.

Whole blocks

1. **CROPSEQ** Crop sequence:

WHEAT A	W. wheat, after w. wheat 1988, potatoes 1989, w. wheat 1990, w. beans 1991, w. wheat 1992-6, w. rye 1997, w. wheat 1998-2000
WHEAT B	W. wheat, after w. wheat 1987, potatoes 1988, w. wheat 1989, w. beans 1990, w. wheat 1991-6, w. rye 1997, w. wheat 1998-2000

Whole plots

2. **TREATMNT** Previous treatments:

(LC 8 GM)	Eight-year clover/grass ley until 1987 (WHEAT A) or 1986 (WHEAT B), green manure in the preliminary period
(LC 8 PT)	As above, peat in the preliminary period
(LC 6 LC)	Six-year clover/grass ley until 1987 (WHEAT A) or 1986 (WHEAT B), clover/grass ley in the preliminary period
(LC 6 LN)	As above, grass ley with N in the preliminary period
(FYM)	Farmyard manure annually 1981 to 1986 (WHEAT A) or 1985 (WHEAT B) and in the preliminary period
(STRAW)	Straw in both periods

https://doi.org/10.23637/ERADOC-1-259

02/W/RN/12

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

(FERT-FYM) Fertilizers only in both periods, rates of P, K & Mg equivalent to amounts in FYM

(FERT-STR) Fertilizers only in both periods, rates of P, K & Mg equivalent to amounts in straw (+P)

3. **N** Nitrogen treatment to half plots

N1 160 kg N split 40 + 80 + 40) Applied first two weeks of March, GS31
N2 200 kg N split 40 + 120 + 40) or mid-April (whichever comes first)
) and GS37/mid-May.

Experimental diary:

20-Sep-01	B	:	Sulphate of potash at 200 kg. Triple superphosphate at 106 kg. Ploughed.
21-Sep-01	B	:	Rolled.
22-Sep-01	B	:	Drilled, Claire, tr. Sibutol + Aventis Manganese 500, at 300 seeds/m^2 with 4.0 m Accord drill.
13-Oct-01	**T**	:	Avadex Excel 15g at 15.0 kg.
16-Nov-01	B	:	tm) Stomp 400 SC at 4.0 l in 200 l.
	B	:	tm) Tolkan liquid at 2.5 l in 200 l.
12-Mar-02	**T**	:	1^{st} N split applied as 33.5% N.
09-Apr-02	**T**	:	2^{nd} N split applied as 33.5% N.
14-Apr-02	B	:	tm) Ally at 30 g in 200 l.
	B	:	tm) Opus at 0.5 l in 200 l.
	B	:	tm) BASF 3C Chlormequat 720 at 2.0 l in 200 l.
08-May-02	**T**	:	3^{rd} N split applied as 33.5% N.
27-May-02	B	:	tm) Amistar at 0.8 l in 200 l.
	B	:	tm) Opus at 0.5 l in 200 l.
22-Aug-02	**T**	:	Combine harvested, plots for yield.
24-Aug-02	P	:	Combine harvested all remaining wheat. Swathed straw. Baled and removed straw.

NOTE: Samples of grain were taken for chemical analysis.

02/W/RN/12

GRAIN TONNES/HECTARE

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

Cropseq	WHEAT A	WHEAT B	Mean
Treatmnt			
(LC 8 GM)	3.75	3.56	3.65
(LC 8 PT)	4.14	3.08	3.61
(LC 6 LC)	3.54	2.97	3.26
(LC 6 LN)	4.43	3.73	4.08
(FYM)	4.50	3.39	3.95
(STRAW)	4.91	2.64	3.78
(FERT-FYM)	3.13	2.39	2.76
(FERT-STR)	3.47	2.40	2.94
Mean	3.98	3.02	3.50

N	160	200	Mean
Treatmnt			
(LC 8 GM)	3.58	3.73	3.65
(LC 8 PT)	3.56	3.65	3.61
(LC 6 LC)	3.34	3.18	3.26
(LC 6 LN)	4.08	4.08	4.08
(FYM)	3.71	4.18	3.95
(STRAW)	3.83	3.73	3.78
(FERT-FYM)	2.71	2.81	2.76
(FERT-STR)	3.18	2.69	2.94
Mean	3.50	3.51	3.50

N	160	200	Mean
Cropseq			
WHEAT A	3.90	4.07	3.98
WHEAT B	3.10	2.95	3.02
Mean	3.50	3.51	3.50

N		160	200
Treatmnt	**Cropseq**		
(LC 8 GM)	WHEAT A	3.56	3.94
	WHEAT B	3.59	3.52
(LC 8 PT)	WHEAT A	4.17	4.10
	WHEAT B	2.96	3.21
(LC 6 LC)	WHEAT A	3.62	3.47
	WHEAT B	3.06	2.89
(LC 6 LN)	WHEAT A	4.40	4.45
	WHEAT B	3.76	3.70
(FYM)	WHEAT A	3.97	5.04
	WHEAT B	3.46	3.32
(STRAW)	WHEAT A	4.77	5.06
	WHEAT B	2.89	2.40
(FERT-FYM)	WHEAT A	3.07	3.18
	WHEAT B	2.34	2.44
(FERT-STR)	WHEAT A	3.64	3.30
	WHEAT B	2.72	2.09

02/W/RN/12

GRAIN TONNES/HECTARE

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

Treatmnt	N	Cropseq* Treatmnt
0.424	0.060	0.599

Cropseq* N	Treatmnt N	Cropseq* Treatmnt N
0.085	0.441	0.623

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

Treatmnt	0.171
Cropseq.Treatmnt	0.242

* Within the same level of **Cropseq** only

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

Stratum	d.f.	s.e.	cv%
Blocks.Plots	14	0.599	17.1
Blocks.Plots.Subplots	16	0.242	6.9

GRAIN MEAN DM% 84.3

AVERAGE PLOT AREA HARVESTED 0.00602

02/R/CS/326 and 02/W/CS/326

AMOUNTS OF STRAW

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

Sponsors: M.J. Glendining, P.C. Brookes.

The 16th year, w. wheat.

For previous years see 87-01/R & W/CS/326.

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

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

Treatments:

STRAW Amounts of straw incorporated into the seedbed, cumulative to previous annual dressings:

		R	W
NONE	None	-	-
NORMAL	Normal	2.5	3.6
2 NORMAL	Twice normal	5.0	7.2
4 NORMAL	Four times normal	10.0	14.4

Experimental diary:

Great Knott III (R):

29-Aug-01	**T**	:	Straw treatments applied.
30-Aug-01	**T**	:	Chopped straw.
14-Sep-01	B	:	Ploughed.
26-Sep-01	B	:	Combination drilled, Hereward, tr. Sibutol Secur, at 350 seeds/m^2 with the Accord 2 drill.
28-Sep-01	B	:	Rolled.
01-Nov-01	B	:	tm) Lexus 50 DF at 20 g in 200 l.
	B	:	tm) Stomp 400 SC at 3.0 l in 200 l.
14-Mar-02	B	:	33.5% N at 150 kg.
04-Apr-02	B	:	tm) Opus at 0.4 l in 100 l.
	B	:	tm) Twist at 0.6 l in 100 l.
	B	:	tm) BASF 3C Chlormequat 720 at 1.25 l in 100 l.
	B	:	tm) Moddus at 0.2 l in 100 l.
25-Apr-02	B	:	33.5% N at 418 kg.
31-May-02	B	:	tm) Opus at 0.5 l in 200 l.
	B	:	tm) Twist at 0.8 l in 200 l.
01-Aug-02	B	:	Roundup Biactive at 3.0 l in 100 l.
13-Aug-02	**T**	:	Combine harvested plots for yield, and discards. Chopped discard straw.
14-Aug-02	**T**	:	Sampled, baled and weighed straw.
30-Aug-02	**T**	:	Spread and chopped straw as plan.

02/R/CS/326 and 02/W/CS/326

Experimental diary:

Far Field I (W):

03-Aug-01	B	Muriate of potash at 250 kg
23-Aug-01	**T**	Straw treatments applied.
20-Sep-01	B	Ploughed.
21-Sep-01	B	Rolled.
22-Sep-01	B	Rotary harrowed. Drilled, Hereward, tr. Sibutol + Aventis Manganese 500 at 350 seeds/m^2 with the Accord drill. Rolled.
13-Oct-01	B	Avadex Excel 15g at 15.0 kg.
16-Nov-01	B	tm) Stomp 400 S at 4.0 l in 200 l.
	B	tm) Tolkan liquid at 2.5 l in 200 l.
12-Mar-02	B	Sulphur Gold 30% N, 7.6% S at 167 kg.
	B	Sulphur Gold 30% N, 7.6% S at 167 kg.
12-Apr-02	B	tm) Opus at 0.5 l in 200 l.
	B	tm) BASF 3C Chlormequat 720 at 2.0 l in 200 l.
02-May-02	B	Ally at 30 g in 200 l.
07-May-02	B	Sulphur Gold 30% N, 7.6% S at 333 kg.
	B	Sulphur Gold 30% N, 7.6% S at 333 kg
27-May-02	B	Opus at 0.75 l in 200 l.
23-Aug-02	**T**	Combine harvested plots for yield. Swathed straw.
30-Aug-02	**T**	Sampled, baled and weighed straw.
31-Aug-02	B	Baled and removed straw.

NOTE: Grain and straw samples were taken for N analysis.

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

GRAIN TONNES/HECTARE

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

Straw	
NONE	7.64
NORMAL	7.24
2 NORMAL	7.21
4 NORMAL	7.39
Mean	7.37

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

Straw
0.456

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

Stratum	d.f.	s.e.	cv%
Blocks.Plots	9	0.645	8.8

GRAIN MEAN DM% 84.6

STRAW TONNES/HECTARE

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

Straw	
NONE	3.27
NORMAL	3.82
2 NORMAL	3.93
4 NORMAL	4.00
Mean	3.75

STRAW MEAN DM% 91.3

PLOT AREA HARVESTED 0.00284

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

GRAIN TONNES/HECTARE

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

Straw	
NONE	2.58
NORMAL	3.39
2 NORMAL	2.66
4 NORMAL	2.67
Mean	2.83

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

Straw
0.650

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

Stratum	d.f.	s.e.	cv%
Blocks.Plots	6	0.796	28.2

GRAIN MEAN DM% 83.9

STRAW TONNES/HECTARE

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

Straw	
NONE	1.85
NORMAL	2.11
2 NORMAL	1.88
4 NORMAL	1.97
Mean	1.95

STRAW MEAN DM% 89.5

PLOT AREA HARVESTED 0.00305

02/R/CS/477

CONTINUOUS MAIZE

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

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

The sixth year, forage maize and s. barley.

For previous years see 97-01/R/CS/477

Design: 3 randomised blocks of 6 plots.

Plot dimensions: 12.0 x 25.0.

Treatments:-

CROP	Crop and straw treatments:
M	Continuous maize, stubble incorporated
(M)B	S. barley after five years maize, stubble incorporated
MT	Maize, stubble plus 10 t maize tops incorporated
(B)M	Maize, after three years of s. barley with straw removed
BT	Continuous spring barley, straw removed plus 10 t maize tops incorporated
B	Continuous spring barley, straw removed

Experimental diary:

06-Nov-01	B		Sulphate of potash at 217 kg.
	B		Triple superphosphate at 171 kg.
	T	BT, MT:	Maize tops at 300 kg per plot.
12-Nov-01	B		Ploughed, started.
13-Nov-01	B		Ploughed, completed.
08-Apr-02	B	(M)B, BT, B:	Sting ECO at 4.0 l in 200 l.
09-Apr-02	**T**	(M)B, BT, B:	Combination drilled, Optic, tr. Raxil S, at 350 seeds/m^2 with the Accord 2 drill.
10-Apr-02	**T**	(B)M, MT, M:	Flexitined.
	T	(M)B, BT, B:	Rolled.
02-May-02	B		33.5% N at 284 kg.
03-May-02	**T**	(B)M, MT, M:	Rotary harrowed.
	T	(B)M, MT, M:	Drilled, Hudson, tr. Mesurol, at 102,000 seeds/ha with the Nodet Gougis drill.
	T	(M)B, BT, B:	tm)Ally at 30 g in 200 l.
	T		tm)Duplosan KV at 1.0 l in 200 l.
	T		tm)Amistar at 0.4 l in 200 l.
	T		tm)Unix at 0.5 kg in 200 l
19-Jun-02	**T**	(B)M, MT, M:	tm)Lentagran WP at 1.5 kg in 200 l.
	T		tm)Mutiny at 0.6 l in 200 l.
27-Aug-02	**T**	(M)B, BT, B:	Combine harvested plots for yield. Swathed straw.
28-Aug-02	**T**	(M)B, BT, B:	Combine harvested discards, started. Swathed straw.
02-Sep-02	B	(M)B, BT, B:	Combine harvested all remaining barley. Swathed straw. Baled straw.
03-Sep-02	B	(M)B, BT, B:	Carted bales.
11-Sep-02	**T**	(B)M, MT, M:	Cut discard maize. Cut sample areas by hand, weighed and sampled.

NOTE: Forage maize and barley grain samples were taken for N analysis.

02/R/CS/477 MAIZE

WHOLE CROP (AT 100% DRY MATTER) TONNES/HECTARE

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

Treatment	
M	9.22
(B)M	9.29
MT	9.40
Mean	9.30

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

Treatment
1.412

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

Stratum	d.f.	s.e.	cv%
Blocks.Plots	4	1.729	18.6

GRAIN MEAN DM% 25.1

PLOT AREA HARVESTED 0.00108

S. BARLEY

GRAIN TONNES/HECTARE

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

Treatment	
(M)B	3.57
BT	2.76
B	2.55
Mean	2.96

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

Treatment
0.237

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

Stratum	d.f.	s.e.	cv%
Blocks.Plots	4	0.290	9.8

GRAIN MEAN DM% 83.9

PLOT AREA HARVESTED 0.00525

02/W/CS/478

CONTINUOUS MAIZE

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

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

The sixth year, forage maize and s. barley.

For previous years see 97-01/W/CS/478.

Design: 3 randomised blocks of 6 plots.

Plot dimensions: 9.0 x 25.0.

Treatments:

CROP	Crop and straw treatments:
M	Continuous maize, stubble incorporated
(M)B	S. barley after five years maize, stubble incorporated
MT	Maize, stubble plus 10 t maize tops incorporated
(B)M	Maize after three years of spring barley, straw removed
BT	Continuous spring barley, straw removed plus 10 t maize tops incorporated
B	Continuous spring barley, straw removed

Experimental diary:

31-Oct-01	**T**	BT, MT:	Maize tops applied at 225 kg per plot.
05-Nov-01	B	:	Sulphate of potash at 217 kg. Triple superphosphate at 171 kg. Ploughed.
23-Mar-02	B	:	Sting ECO at 4.0 l in 200 l.
09-Apr-02	B	:	Potassium sulphate at 217 kg. Rotary harrowed.
10-Apr-02	**T**	(M)B, BT, B:	Drilled, Optic, tr. Raxil S, at 400 seeds/m^2 with the Accord drill.
11-Apr-02	B	:	Rolled.
12-Apr-02	**T**	(M)B, BT, B:	Stomp 400 SC at 2.0 l in 200 l.
08-May-02	B	:	33.5% N at 287 kg.
09-May-02	**T**	(B)M, MT, M:	Rotary harrowed. Drilled, Hudson, tr. Mesurol, at 10 seeds/m^2 with the Nodet drill.
13-Jun-02	B	(M)B, BT, B:	tm) Copper 500 at 1.0 l in 200 l.
	B	:	tm) Landmark at 0.75 l in 200 l.
20-Jun-02	B	(B)M, MT, M:	tm) Gesaprim at 3.0 l in 220 l.
	B	:	tm) Cropoil at 5.0 l in 220 l.
29-Aug-02	**T**	(M)B, BT, B:	Combine harvested plots for yield. Swathed straw.
30-Aug-02	B	(M)B, BT, B:	Combine harvested all remaining barley. Swathed straw.
31-Aug-02	B	(M)B, BT, B:	Baled and removed straw.
12-Sep-02	**T**	(B)M, MT, M:	Cut discards. Cut sample areas, weighed, and sampled.

NOTE: Forage maize and barley grain samples were taken for N analysis.

02/W/CS/478 MAIZE

WHOLE CROP (AT 100% DRY MATTER) TONNES/HECTARE

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

Treatment	
M	9.08
MT	7.41
(B)M	7.87
Mean	8.12

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

Treatment
1.465

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

Stratum	d.f.	s.e.	cv%
Blocks.Plots	4	1.794	22.1

GRAIN MEAN DM% 28.0

PLOT AREA HARVESTED 0.00108

S. BARLEY

GRAIN TONNES/HECTARE

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

Treatment	
(M)B	5.35
BT	4.62
B	4.19
Mean	4.72

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

Treatment
0.068

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

Stratum	d.f.	s.e.	cv%
Blocks.Plots	4	0.084	1.8

GRAIN MEAN DM% 84.0

PLOT AREA HARVESTED 0.00525

Rothamsted Experimental Station

The Weather : Monthly Summary : 2002

(Departure from 30-year means (1971 - 2000) in brackets)

	Sunshine		Mean temperatures oC								Rain			Drainage	Wind
			Maximum		Minimum		Dew	Ground	In ground under grass		Total mm		Rain	20 inch	***
	Hours	( )		( )		( )	point	frosts *	30 cm	100 cm	5" turf wall		days **	mm	km/hr
January	37.8	(-17.3)	8.35	(+2.01)	2.39	(+1.53)	3.45	11	4.89	6.59	69.4	(-0.3)	21	54.2	9.9
February	80.1	(+9.4)	10.06	(+3.35)	3.41	(+2.67)	3.83	8	6.78	7.61	84.0	(+35.2)	21	59.4	16.0
March	98.4	(-8.8)	11.28	(+1.79)	3.44	(+1.11)	4.55	13	7.33	7.59	49.3	(-4.6)	10	30.0	9.7
Aprll	200.9	(+54.1)	14.15	(+2.21)	4.51	(+0.89)	4.87	7	9.62	9.11	55.7	(+2.2)	8	17.8	9.9
May	173.5	(-21.4)	15.73	(-0.02)	7.78	(+1.46)	8.15	1	12.25	10.83	81.0	(+31.3)	16	26.9	8.4
June	189.8	(-0.5)	18.96	(+0.36)	9.86	(+0.65)	10.5	0	15.34	13.35	29.2	(-31.0)	15	1.8	6.3
July	179.5	(-23.8)	20.9	(-0.52)	11.84	(+0.48)	12.2	0	17.09	14.97	93.5	(+51.4)	14	33.4	5.3
August	155.7	(-41.1)	21.62	(+0.19)	13.21	(+1.86)	13.6	0	18.42	16.67	52.3	(-1.4)	10	23.1	5.0
September	163.7	(+21.4)	18.58	(+0.59)	10.00	(+0.56)	11.1	0	15.89	16.08	25.6	(-35.4)	5	0.7	5.9
October	95.4	(-16.7)	13.62	(-0.12)	6.58	(-0.07)	7.64	7	12.20	13.75	89.3	(+14.6)	15	47.5	7.9
November	48.6	(-21.5)	11.20	(+1.82)	5.60	(+2.27)	7.06	4	9.68	11.33	132.9	(+66.7)	24	113.0	6.7
December	30.9	(-17.2)	7.52	(+0.33)	4.08	(+2.16)	4.55	6	7.08	9.03	112.6	(+42.5)	25	97.3	9.6
Year	1454.3	(-83.4)	14.33	(+1.0)	6.89	(+1.30)		57			874.8	(+171.2)	184	505.1	

* Number of nights grass minimum was below 0.0 oC

** Number of days rain was 0.2 mm or more

*** At 2 metres above ground

Woburn Experimental Farm

The Weather : Monthly Summary : 2002

(Departure from 30-year means (1971 - 2000) in brackets)

	Sunshine		Mean temperatures oC								Rain			Wind
			Maximum		Minimum		Dew	Ground	In ground under grass		Total mm		Rain	***
	Hours	( )		( )		( )	point	frosts *	30 cm	100 cm	Tipping bucket	( )	days **	km/hr
January	60.00	(+11.5)	8.65	(+1.93)	2.38	(+1.34)	3.63	12	5.03	6.57	46.8	(-8.5)	23	10.85
February	73.10	(+9.1)	10.17	(+3.08)	3.67	(+3.01)	3.96	9	7.00	7.64	68.2	(+27.6)	22	16.13
March	131.00	(+29.7)	11.63	(+1.75)	3.09	(+0.7)	4.31	10	7.40	7.55	40.0	(-9.6)	17	8.68
April	208.90	(+73.1)	14.56	(+2.31)	4.00	(+0.59)	4.96	7	9.52	8.75	29.4	(-23.3)	14	8.08
May	187.20	(+4.1)	16.08	(+0.04)	7.72	(+1.68)	8.13	1	11.90	10.20	62.4	(+9.7)	20	8.58
June	195.70	(+18.8)	19.37	(+0.43)	9.94	(+0.93)	11.05	0	15.08	12.21	27.6	(-31.2)	16	8.19
July	171.40	(-22.2)	21.59	(-0.13)	11.44	(+0.26)	13.03	0	16.23	13.54	55.2	(+9.6)	18	6.10
August	143.30	(-41.3)	22.25	(+0.66)	12.50	(+1.40)	14.56	0	17.63	15.35	40.2	(-14.3)	18	3.92
September	144.70	(+13.5)	19.19	(+0.94)	8.71	(-0.58)	11.64	0	15.24	14.85	19.4	(-38.7)	7	4.33
October	89.20	(-14.6)	14.05	0.00	5.87	(-0.61)	7.98	5	11.66	12.83	109.8	(+45.4)	18	6.77
November	50.10	(-13.3)	11.13	(+1.50)	5.83	(+2.44)	7.67	1	9.74	10.95	120.2	(+63.0)	25	6.70
December	32.50	(-9.1)	7.56	(+0.05)	3.63	(+1.72)	5.25	5	7.13	8.83	109.6	(+50.1)	26	7.10
Year	1487.1	(+59.3)	14.69	(+1.05)	6.56	(+1.06)		50			728.8	(+79.8)	224	

* Number of nights grass minimum was below 0.0 oC

** Number of days rain was 0.2 mm or more

*** At 2 metres above ground