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Yields of the Field Experiments 2014

Full Table of Content

Results of the Classical and Other Long-term Experiments 2014

Rothamsted Research

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ROTHAMSTED RESEARCH

Results of the

Classical and other

Long-term Experiments

2014

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List of Experiments in the 2014 Yield Book

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W/RN/12	Organic Manuring

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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 calcium ammonium nitrate or ammonium nitrate.

Anhydrous Sulphate of Soda	
Chalk	
Compost	
Double Top	27% nitrogen and 30% SO_3
FYM	Farmyard manure (from bullocks)
Headland Manganese 500	500 g/l 27.5% w/w manganese carbonate
Kieserite	$MgSO_4H_2O$ 17.7% magnesium and 23.3% sulphur
Maize Tops	
Manganese sulphate	$Mn_2 (SO_4)_3$ 27% manganese and 24% sulphur
Magnesium sulphate	$MgSO_4$ H_2O 17.7% magnesium and 23.3% sulphur
Muriate of potash (MOP)	60% K_2O as Potassium Chloride (KCl)
Nitram	34.5% N
Nitraprill	34.5% N
Nitrate of soda	$NaNO_3$ 16% nitrogen and 27% sodium

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Nitro-Chalk	Calcium Ammonium Nitrate 27% N
Silicate of soda	Na_2SiO_3 37% sodium and 23% silica
Sodium Sulphate	99.9% SO_4
Sulphate of ammonia	$(NH_4)_2SO_4$ 21% nitrogen 24% sulphur
Sulphate of potash (SOP)	K_2SO_4 50% K_2O and 18.4% sulphur
Triple superphosphate (TSP)	47% P_2O_5

Cereal straw is removed unless otherwise stated.

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

Machinery Referred to in the Diary Notes

Cultivations			
	Manufacturer	**Width**	**Description**
Plough	Kverneland	1.5 m	5 Furrow, 25 cm Furrows.
Cultipress	Simba	3.3 m	Used after Ploughing.
Flexitine	Bunford	3.3 m	Used for lifting Worked ground.
Powerharrow	Kverneland	3.0 m	Used for creating seed bed.
Rotavator	Howard	1.3 m	Mainly used for BK/1 Paths.
Rotavator	Concept	1.2 m	Mainly Used for HB/2 Paths.
Drills			
	Manufacturer	**Width**	**Description**
Accord Combination Drill	Kverneland	3.0 m	Power-harrow Mounted Pneumatic drill with Suffolk coulters 12.5 cm apart.
Maize Drill	Nodet Pneumasem 2	5 Rows	Rows spaced at 70 cm.
Chemical Applications			
	Manufacturer	**Width**	**Description**
Aero-spreader	Kuhn	12 m	Tractor Mounted - General Fert Applications.

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Muck Spreader	International	1.5 m	Trailed - FYM Applications.
Exacto-matic	Ransome, Nordsten	3.8 m	Tractor Mounted - Fert Applications.
Sprayer	Knight	24 m	Tractor Mounted - Chemical Application.
Quickpass	Yr-Crop	1.5 m	Trailed - Fert Applications.
Lowspread	Lowspread	2.76 m	Tractor Mounted - Fert Applications.
Harvesters			
	Manufacturer	**Width**	**Description**
Rosenlew SR2010	Sampo	(Cut) 2m	Cereal Combine Harvester with a Continuous Weighing System.
3760	John Deere	2 Row	Maize Harvester, Cut and Mulch. Trailed Machine used after plot yields.
Tucano	Claas	6 m	Commercial Combine used for harvesting discards after plot yields.
Box Mower	Wilder	1.1 m	Box Mower Mainly used for yields on PG/5.
Mower	Unifarm	1.83 m	Commercial Mower used to mow discards on PG/5.
Other			
	Manufacturer	**Width**	**Description**
Ring Rolls	Cousins	3.3 m	Ring rolls for covering seed post drilling.
Topper 9	McConnell	2.72 m	Topper used for topping stubbles and grass areas.
Small Topper	Kilworth	1.1 m	Topper used with Iseki Tractor - Used for cutting Paths.
945 Conventional Baler	New Holland	-	Traditional Baler Used for baling straw samples.
Round Baler	Claas	-	Used for clearing unwanted leftover straw/grass from experiments.
Tractors			
	Manufacturer	**Weight**	**Description**
T7210	New Holland	8.1 t	Main cultivations tractor.
TL6030 Elite	New Holland	5.5 t	Sprayer tractor.
6830	John Deere	5.6 t	Drill and fertiliser application tractor.
TH4335	Iseki	1.1 t	Paths cutting tractor.

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T503	Tym	2.0 t	Fertiliser applications and Rotovating.

Application code: This is used to identify the kind of application
a = application (cultivations, harvest, etc.), p = pesticide, f = fertilizer and s = seed.

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 DM%: 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.

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

ad	Adjuvant	d	Desiccant	f	Fungicide
gr	Growth regulator	h	Herbicide	i	Insecticide
m	Molluscicide	n	Nematicide	tr	Trace elements

Trade Name	Function	Active ingredient
Absolute	h	diflufenican + flupyrsulfuron-methyl (41.7:8.3% w/w)
Ally Max SX	h	metsulfuron-methyl + tribenuron-methyl (14.3:14.3 % w/w)
Amistar	f	azoxystrobin (250 g/l)
Artemis	f	fenpropidin + prochloraz + tebuconazole (150:200:150 g/l)
Atlantis	h	iodosulfuron-methyl-sodium + mesosulfuron-methyl (0.6:3.0 % w/w)
BASF 3C 720	gr	chlormequat (720 g/l)
BioPower	ad	6.7% w/w 3,6-dioxaeicosylsulphate sodium salt and 20.2% w/w 3,6-dioxaoctadecylsulphate sodium salt
Bravo 500	f	chlorothalonil (500 g/l)
Callisto	h	mesotrione (100 g/l)
Cello	f	prothioconazole + spiroxamine + tebuconazole (100:250:100 g/l)
Cortez	f	epoxiconazole (125 g/l)
Covershield	f	pyraclostrobin + kresoxim-methyl + epxiconazole (133:67:50 g/l)
Crystal	h	flufenacet + pendimethalin (60:300 g/l)
Cyflamid	f	cyflufenamid (50 g/l)
Defy	h	prosulfocarb (800 g/l)
Fezan	f	tebuconazole (250 g/l)
Firebrand	ad	ammonium sulphate (500 g/l)

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Gallup 360	h	glyphosate (360 g/l)
Hallmark with zeon tech	i	lambda-cyhalothrin (100 g/l)
Hatchet xtra	h	fluroxypyr (200 g/l)
Hunter	h	florasulam + fluroxypyr (2.5:100 g/l)
Hurricane	h	diflufenican (500 g/l)
Intracrop Dictate	ad	91.0% w/w oil (rapeseed fatty acid esters)
Karan	i	methiocarb (3% w/w)
Keystone	f	epoxiconazole + isopyrazam (99:125 g/l)
Kingdom	f	boscalid + epoxiconazole (140:50 g/l)
Laser	h	cycloxydim (200 g/l)
Lexus Millenium	h	flupyrsulfuron-methyl + thifensulfuron-methyl (10/40% w/w)
Liberator	h	difluenican + flufenacet (100:400 g/l)
Mesurol	i	methiocarb (500g/l)
Mobius	f	prothioconazole + trifloxystrobin (175:150 g/l)
Moddus	gr	trinexapac-ethyl (250 g/l)
New 5C Cycocel	gr	chlormequat
Nirvana	h	imazamox + pendimethalin (16.7:250 g/l)
Raxil star	f	fluopyram + prothioconazole + tebuconazole (20.8:103.1:63.2 g/l)
Redigo Deter	f	prothioconazole + clothiandin (50:250 g/l)
Refine Max	h	metsulfuron-methyl + thifensulfuron-methyl (6.7:33.3 w/w)
Samson Extra	h	nicosulfuron (60 g/l)
Samurai	h	glyphosate (360 g/l)
San 703	f	chlorothalonil + cyproconazole (375:40 g/l)
Sekator	h	amidosulfuron + iodosulfuron-methyl-sodium (5:1.25 % w/w)
Simba SX	h	metsulfuron-methyl (20 % w/w)
Sprinter-K	f	Foliar K fertilizer (2-4 ml/l)
Stomp 400 SC	h	pendimethalin (400 g/l)
TDS Major	m	metaldehyde (4% w/w)
Vortex	f	epoxiconazole + fluxapyroxad + pyraclostrobin (41.6:41.6:61 g/l)
Weedazole-TL	h	amitrole (225 g/l)
Zarado	ad	70% w/w oil (rapeseed oil fatty acid esters) as emulsifiable concentrate

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14/R/BK/1

BROADBALK

Object: To study the effects of organic manures and inorganic fertilisers on continuous w. wheat and wheat in rotation. 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 171st 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 Yield Books for 74-13/R/BK/1.

Areas harvested[a]:

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

[a] Harvest areas in the 2007-2010 yield books were incorrectly assigned, but yields were correct.

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
21FYMN3	2.1	FYM N2 (1)
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 Mg
10N4	10	N4
11N4PMg	11	N4 P Mg
12N1+3+1(P)K2Mg2	12	N1+3+1 (P) K2 Mg2 (2)
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

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14/R/BK/1

(1) FYM N3 since 2005
(2) N1+3+1 (P) KMg since 2006

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 since 2001), to be reviewed in 2015/16.
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 60kg Mg, autumn 2000 only).
(Mg*):	(none since 2001), to be reviewed in 2015/16
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 ½[P K (Na) Mg]	N1+3 ½[P K Mg] (A)+
18N0+3FH	18	P K Na Mg (A)	N2 ½[P K (Na) Mg]	N0+3 ½[P K Mg] (A)+
19(C)	19	C	C	(C) (since 1989)
20N2KMG	20	N2 K Na Mg	N2 K (Na) Mg	N2 K Mg

(A) Alternating each year

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+ This change since 1980. Treatments shown are those to w.wheat; autumn N alternates. Maize received N3 ½[PK Mg] on both plots 17 and 18. These treatments shown incorrectly in 1999-2002 Yield books.
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:	30kg 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, the experiment was divided into 10 sections with the following cropping:-

SECTION

Section	1	9	0*	8+	6**	5	3	7	4	2
Year										
1968	W	W	W	W	F	W	W	P	W	BE
1969	W	W	W	W	W	F	W	BE	P	W
1970	W	W	W	W	W	W	F	W	BE	P
1971	W	W	W	W	F	W	W	P	W	BE
1972	W	W	W	F	W	F	W	BE	P	W
1973	W	W	W	W	W	W	F	W	BE	P
1974	W	W	W	W	F	W	W	P	W	BE
1975	W	W	W	W	W	F	W	BE	P	W
1976	W	W	W	W	W	W	F	W	BE	P
1977	W	W	W	W	F	W	W	P	W	BE
1978	W	W	W	W	W	F	W	BE	P	W
1979	W	W	W	W	W	W	F	W	P	F
1980	W	W	W	W	W	W	W	F	W	P
1981	W	W	W	F	W	W	W	P	F	W
1982	W	W	W	W	W	W	W	W	P	F
1983	W	W	W	W	W	W	W	F	W	P
1984	W	W	W	W	W	W	W	P	F	W
1985	W	W	W	W	W	F	W	W	P	W
1986	W	W	W	W	W	P	F	W	W	W
1987	W	W	W	W	W	W	P	W	W	F
1988	W	W	W	F	W	W	W	F	W	P
1989	W	W	W	W	W	W	W	P	F	W
1990	W	W	W	W	W	F	W	W	P	W

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Section	1	9	0*	8+	6**	5	3	7	4	2
Year										
1991	W	W	W	W	W	P	F	W	W	W
1992	W	W	W	W	W	W	P	W	W	F
1993	W	W	W	W	W	W	W	F	W	P
1994	W	W	W	F	W	W	W	P	F	W
1995	W	W	W	W	W	F	W	W	P	W
1996	W	W	W	W	W	P	O	W	W	W
1997	W	W	W	W	W	W	M	W	W	O
1998	W	W	W	W	W	W	W	O	W	M
1999	W	W	W	W	W	W	W	M	O	W
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
2003	W	W	F	W	W	W	W	O	W	M
2004	W	W	F	W	W	W	W	M	O	W
2005	W	W	W	W	W	O	W	W	M	W
2006	W	W	W	W	W	M	O	W	W	W
2007	W	W	W	W	W	W	M	W	W	O
2008	W	W	W	F	W	W	W	O	W	M
2009	W	W	W	W	W	W	W	M	O	W
2010	W	W	W	W	W	O	W	W	M	W
2011	W	W	W	W	W	M	O	W	W	W
2012	W	W	W	W	W	W	M	W	W	O
2013	W	W	W	W	W	W	W	O	W	M
2014	W	W	W	W	W	W	W	M	O	W

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 2.9t 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 (omitted). No chalk was applied after autumn 1991 until autumn 2007 when differential amounts were applied to selected plots (see "Results 2008").

(3) In 2003 and 2004 section 0 was used for an experiment (CS/595) investigating different herbicides to control *Equisetum arvense*.

(4) In 2013 the wheat variety changed from Hereward to Crusoe, but it was sown very late (22nd February 2013) because of the very wet autumn and winter of 2012-13.

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14/R/BK/1

Experimental Diary:

Date		Application	Rate	Units
All Sections				
30-Sep-13	a	Topped rough areas around field edges		
30-Sep-13	f	Spread MOP on plots 140-149	181	kg/ha
30-Sep-13	f	Applied TSP - Plots 180-189, 170-179, 140-149, 130-139, 110-119	171	kg/ha
01-Oct-13	a	Applied Chalk - Plots 017, 2.27, 057, 066, 067, 068, 070, 071, 076, 078, 079, 081, 085, 086, 089, 095, 098, 105, 108, 115, 116, 118, 125, 126, 135, 136, 145, 146, 150, 153, 169, 172, 177, 178, 179, 196, 199 - Not Section 4	2	t/ha
01-Oct-13	a	Applied Chalk - Plots 012, 077, 080, 082, 087, 088, 097, 106, 109, 119, 128, 129, 138, 139, 147, 148, 149, 151, 155, 156, 158, 159, 167, 168, 197, 198 - Not Section 4	4	t/ha
01-Oct-13	a	Applied Chalk - Plots 107, 117, 127, 137, 152, 157, 162 - Not Section 4	6	t/ha
02-Oct-13	f	Applied FYM to plots 2.20-2.29 and 2.10-2.19 - Not Section 4	35	t/ha
03-Oct-13	a	Ploughed, soil thrown north		
04-Oct-13	f	Applied FYM to plots 2.20-2.29 and 2.10-2.19 - Not Section 4	35	t/ha
05-Oct-13	a	Ploughed, soil thrown north		
07-Oct-13	a	Cultipressed		
09-Oct-13	a	Cultipressed		
10-Oct-13	a	marked out maize and oats sections with GPS		
06-Jan-14	a	Hedge Cutting - Roadside		
07-Feb-14	a	Dug channels to clear water at east end of Field		
09-Apr-14	f	Applied Kieserite Treatments - Not to plots in strips 01, 2.1, 2.2, 03, 10, 13, 14	80	kg/ha
09-Apr-14	f	Applied SOP - Not to plots in strips 01, 2.1, 2.2, 03, 10, 11, 14	217	kg/ha
29-Apr-14	a	Mowed All Paths		
30-Apr-14	p	Sprayed Kingdom - NOT sections 8, 4 or 7	1.25	l/ha
30-Apr-14	p	Sprayed Bravo 500 - NOT sections 8, 4 or 7	1.0	l/ha
09-May-14	a	Cut Paths with Iseki and Mower		
16-May-14	p	Sprayed Vortex - All but NOT section 6 and 7	1.5	l/ha

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19-May-14	a	cut paths with iseki		
03-Jun-14	a	Cut paths and hand rogued blackgrass, section 9 only		
03-Jun-14	a	Rotivated Strip Paths		
09-Jun-14	a	Hand rogued blackgrass		
10-Jun-14	a	Hand rogued blackgrass		
17-Jun-14	a	Paths Cut with Iseki and Mower		
18-Jun-14	a	Hand rogued blackgrass		
09-Jul-14	a	cut paths with Iseki and Mower		
10-Jul-14	a	Hand rogued wild oats, 57 plants in total		
29-Jul-14	a	cut paths with Iseki and Mower		
30-Jul-14	a	Claas Harvested OE's		

W Wheat

18-Oct-13	s	Drilled all WW Plots var. Crusoe	400	seeds/m^2
27-Nov-13	p	Applied Major Slug Pellets	4	kg/ha
27-Nov-13	p	Sprayed Hallmark - All wheats but NOT section 8	50	ml/ha
27-Nov-13	p	Sprayed Liberator - All wheats but NOT section 8	600	ml/ha
27-Nov-13	p	Sprayed Stomp - All wheats but NOT section 8	1.7	l/ha
27-Nov-13	p	Sprayed Hallmark - Section 8 only	50	ml/ha
10-Mar-14	f	applied Nitram @ 35%N - To strips 12, 17, 18, 19 but not in sections in 4 or 7	139	kg/ha
03-Apr-14	f	Applied Nitram @ 35%N - To strips 6 and 19 but not in sections in 4 or 7	139	kg/ha
03-Apr-14	f	Applied Nitram @ 35%N - To strips 7 and 18 but not in sections in 4 or 7	278	kg/ha
03-Apr-14	f	Applied Nitram @ 35%N - To strips 8 and 12 but not in sections in 4 or 7	417	kg/ha
03-Apr-14	f	Applied Nitram @ 35%N - To strips 01, 09, 10, 11, 13, 14, 17, 20 but not in sections in 4 or 7	556	kg/ha
03-Apr-14	f	Applied Nitram @ 35%N - To strip 15 but not in sections in 4 or 7	696	kg/ha
03-Apr-14	f	Applied Nitram @ 35%N - To strip 16 but not in sections in 4 or 7	835	kg/ha
04-Apr-14	f	Applied Nitram @ 35%N - To strip 2.1 but not in sections in 4 or 7	417	kg/ha
13-May-14	f	Applied Nitram @ 35%N - To plots in strip 12 but not in sections in 4 or 7	139	kg/ha
13-May-14	f	Applied Nitram @ 35%N - To plots in strip 17 but not in sections in 4 or 7	139	kg/ha
13-May-14	f	Applied Nitram @ 35%N - To plots in strip 18 but not in sections in 4 or 7	139	kg/ha
13-May-14	f	Applied Nitram @ 35%N - To plots in strip 19 but not in sections in 4 or 7	139	kg/ha
15-May-14	p	Sprayed Ally Max - NOT sections 8, 4 or 7	42	g/ha

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15-May-14	p	Sprayed Hatchet Xtra - NOT sections 8, 4 or 7	700	ml/ha
06-Jun-14	p	Sprayed Cello Section 4, 6 + 7 NOT Sprayed	1.1	l/ha
20-Aug-14	a	Sampo Harvested - All wheat plots		
21-Aug-14	a	Claas Harvested OE's		
21-Aug-14	a	Sampled, Baled and Weighed Straw - All Winter Wheat Plots - Also baled OE's on trial		
02-Sep-14	a	Removed Bales From Plots Area		

W Oats

18-Oct-13	s	Drilled OW var. Gerald	400	seeds/m^2
26-Nov-13	p	Sprayed Lexus Millenium - Oats only	100	g/ha
26-Nov-13	p	Sprayed Hallmark - Oats only	50	ml/ha
26-Nov-13	p	Sprayed - Oats only	100	ml/ha
30-Jul-14	a	Baled and Removed Oat Straw		
30-Jul-14	a	Harvested - Sampo - Oat Plots for Yield - on section 4		
31-Jul-14	a	Sampled Baled and Weighed all Oat Plots - section 4		
19-Aug-14	a	Claas Harvested OE's		

Maize

10-Apr-14	p	Sprayed Samurai - Maize section only	3.0	l/ha
10-Apr-14	p	Sprayed Firebrand - Maize section only	1.0	l/ha
15-May-14	a	Flexityned Maize Plots		
15-May-14	a	Power-harrowed Maize Plots		
16-May-14	s	Drilled Maize plots var. Hudson dr mesural	11.5	seeds/m^2
20-May-14	f	Applied Nitram @ 35%N - To plots in strip 06, section 7	139	kg/ha
20-May-14	f	Applied Nitram @ 35%N - To plots in strips 07, 12, 17, 18, 19, section 7	278	kg/ha
20-May-14	f	Applied Nitram @ 35%N - To plots in strips 2.1, 08, section 7	417	kg/ha
20-May-14	f	Applied Nitram @ 35%N - To plots in strips 01, 09, 10, 11, 13, 14, section 7	556	kg/ha
20-May-14	f	Applied Nitram @ 35%N - To plots in strip 15, section 7	696	kg/ha
20-May-14	f	Applied Nitram @ 35%N - To plots in strip 16, section 7	835	kg/ha
02-Jun-14	p	Applied KARAN - Section 7 Only - Slug Pellets	5	kg/ha
16-Jun-14	f	Applied Nitram @ 35%N - To plots in strip 12, section 7	417	kg/ha
16-Jun-14	f	Applied Nitram @ 35%N - To plots in strip 17, section 7	556	kg/ha

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16-Jun-14	f	Applied Nitram @ 35%N - To plots in strip 18, section 7	278	kg/ha
16-Jun-14	f	Applied Nitram @ 35%N - To plots in strip 19, section 7	139	kg/ha
19-Jun-14	p	Sprayed Samson Extra 6% - Maize only	500	ml/ha
19-Jun-14	p	Sprayed Callitso - Maize only	750	ml/ha
30-Sep-14	a	Harvested all maize plots for yield - Harvested by hand		
30-Sep-14	a	Harvested and removed all leftover Maize - from maize plots only.		

Fallows

09-Apr-14	a	Power-harrowed discard/unsown areas
22-Apr-14	a	Rotovated discard/unsown areas
19-May-14	a	Power-harrowed discard/unsown areas

Wilderness

04-Apr-14	a	Mowed Grass
14-May-14	a	Mowed grass
23-May-14	a	Cut Grass
13-Jun-14	a	topped middle grass
11-Dec-14	a	Stubbed area cut down

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

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14/R/BK/1

WHEAT

GRAIN TONNES/HECTARE

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

SECTION PLOT	2/W1	3/W2	5/W3	6/W37	0/W10	1/W48	9/W56	8/W6	Mean
01(FYM)N4	12.29	11.47	9.29	4.73	*	*	*	*	9.45
21FYMN3	12.08	12.08	10.44	5.61	8.31	7.04	8.43	3.18	8.40
22FYM	6.86	5.89	4.50	3.73	4.60	4.20	4.84	2.21	4.60
03Nil	2.34	0.88	0.75	0.56	1.61	1.37	1.08	0.97	1.19
05(P)KMg	2.02	1.12	0.58	0.73	1.14	1.47	1.01	1.31	1.17
06N1(P)KMg	5.47	4.49	2.82	2.42	3.21	3.29	2.77	1.21	3.21
07N2(P)KMg	8.56	7.47	5.08	3.59	4.41	4.71	4.37	0.94	4.89
08N3(P)KMg	11.07	9.23	6.19	3.94	6.63	5.91	6.11	0.85	6.24
09N4(P)KMg	12.04	10.85	6.42	4.43	7.14	7.51	6.87	0.91	7.02
10N4	10.21	8.26	2.94	1.54	1.56	2.34	2.05	1.80	3.84
11N4PMg	9.60	9.47	6.58	4.04	7.09	6.08	7.87	1.63	6.54
12N1+3+1(P)KMg	12.97	12.06	7.36	4.58	7.87	8.35	8.50	1.77	7.93
13N4PK	11.78	10.74	5.87	4.11	7.14	7.63	7.49	1.54	7.04
14N4PK*(Mg*)	11.17	9.90	4.80	3.85	5.33	5.48	7.63	3.46	6.45
15N5(P)KMg	12.62	11.85	6.25	4.04	7.07	8.12	8.09	1.39	7.43
16N6(P)KMg	12.99	12.60	9.27	4.40	7.24	7.65	8.45	2.73	8.17
17N1+4+1PKMg	12.77	13.28	10.36	4.56	8.11	8.19	7.86	1.02	8.27
18N1+2+1PKMg	11.98	11.19	9.30	4.22	6.89	6.02	8.23	2.11	7.49
19N1+1+1KMg	10.21	8.87	4.87	3.74	6.69	5.33	7.66	0.89	6.03
20N4KMg	*	*	*	*	2.17	1.02	*	*	1.60
Mean	9.95	9.04	5.98	3.62	5.48	5.35	6.07	1.66	5.92

GRAIN MEAN DM% 86.5

STRAW TONNES/HECTARE

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

SECTION PLOT	2/W1	3/W2	5/W3	6/W37	0/W10	1/W48	9/W56	8/W6	Mean
01(FYM)N4	5.83	*	*	*	*	*	*	*	5.83
21FYMN3	5.96	*	*	*	*	4.97	*	5.41	5.45
22FYM	3.36	*	*	*	*	3.15	*	4.35	3.62
03Nil	0.78	*	*	*	*	0.70	*	1.09	0.86
05(P)KMg	0.76	*	*	*	*	0.62	*	1.98	1.12
06N1(P)KMg	2.79	*	*	*	*	1.90	*	2.92	2.54
07N2(P)KMg	3.85	*	*	*	*	2.57	*	3.47	3.30
08N3(P)KMg	4.78	*	*	*	*	3.27	*	3.38	3.81
09N4(P)KMg	5.81	*	*	*	*	4.27	*	4.57	4.88
10N4	3.85	*	*	*	*	1.63	*	3.46	2.98
11N4PMg	4.52	*	*	*	*	3.59	*	4.17	4.09
12N1+3+1(P)KMg	7.03	*	*	*	*	5.26	*	5.06	5.78
13N4PK	5.65	*	*	*	*	4.05	*	5.02	4.91
14N4PK*(Mg*)	4.83	*	*	*	*	3.20	*	4.07	4.03
15N5(P)KMg	6.34	*	*	*	*	4.66	*	4.27	5.09
16N6(P)KMg	6.64	*	*	*	*	4.88	*	3.23	4.92
17N1+4+1PKMg	7.02	*	*	*	*	4.60	*	3.82	5.15
18N1+2+1PKMg	6.58	*	*	*	*	3.86	*	4.80	5.08
19N1+1+1KMg	5.32	*	*	*	*	3.62	*	3.26	4.07
20N4KMg	*	*	*	*	*	0.97	*	*	0.97
Mean	4.83	*	*	*	*	3.25	*	3.80	3.96

STRAW MEAN DM% 88.1

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14/R/BK/1

OATS

TONNES/HECTARE (85% DM)

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

Plot	Treatment	GRAIN	STRAW
14	01(FYM)[N4]	4.86	2.47
214	21[FYMN2]	6.26	3.46
224	22[FYM]	5.09	2.29
34	03Nil	1.44	0.38
54	05(P)KMg	2.00	0.63
64	06[N1](P)KMg	2.18	0.62
74	07[N2](P)KMg	2.52	0.82
84	08[N3](P)KMg	2.85	1.07
94	09[N4](P)KMg	2.90	1.11
104	10[N4]	5.42	2.32
114	11[N4]PMg	5.26	2.42
124	12[N1+3+1](P)KMg	3.22	1.45
134	13[N4]PK	2.86	1.03
144	14[N4]PK*(Mg*)	2.65	1.01
154	15[N5](P)KMg	3.59	1.61
164	16[N6](P)KMg	5.13	3.31
174	17[N1+4+1]PKMg	4.45	2.76
184	18[N1+2+1]PKMg	2.82	1.49
194	19[N1+1+1]KMg	2.56	1.23
	MEAN	3.58	1.66

PLOT AREA HARVESTED 0.00487

MAIZE

TONNES/HECTARE (100% DM)

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

Plot	Treatment	Whole Crop
17	01(FYM)N4	15.51
217	21FYMN3	18.04
227	22FYM	18.51
37	03Nil	1.69
57	05(P)KMg	4.95
67	06N1(P)KMg	9.06
77	07N2(P)KMg	11.52
87	08N3(P)KMg	10.00
97	09N4(P)KMg	10.45
107	10N4	3.26
117	11N4PMg	5.09
127	12N2+3(P)KMg	12.96
137	13N4PK	11.17
147	14N4PK*(Mg*)	13.22
157	15N5(P)KMg	11.73
167	16N6(P)KMg	10.02
177	17N2+4PKMg	10.49
187	18N2+2PKMg	10.48
197	19N2+1KMg	5.28
MEAN	10.18	

PLOT AREA HARVESTED 0.00162

ERRATUM
see 2016 page16 (supplied)

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Maize Yields (100% DM) shown in previous yield books (2009-2015) were found to be in error because an increase in the crop row spacing from 0.6m to 0.7m was not accounted for.
The corrected yields are given below:

Year	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***	***2015***
Treatment/ Section	***7***	***4***	***5***	***3***	***2***	***7***	***4***
01(FYM)N4	11.81	14.37	8.67	14.32	3.51	13.30	14.31
21FYMN3	13.84	15.32	9.26	18.24	6.65	15.46	16.61
22FYM	12.37	12.78	11.95	11.21	8.75	15.87	12.12
03Nil	0.58	1.73	1.49	1.65	1.34	1.45	2.63
05(P)KMg	5.20	3.82	2.86	3.56	3.32	4.25	4.05
06N1(P)KMg	7.12	6.82	5.05	5.75	5.90	7.77	7.13
07N2(P)KMg	8.51	9.67	7.90	8.85	4.48	9.87	8.88
08N3(P)KMg	8.25	10.15	5.27	10.85	6.14	8.57	10.85
09N4(P)KMg	8.34	10.10	5.83	10.16	4.52	8.96	10.12
10N4	0.94	2.15	1.09	0.96	2.07	2.79	2.83
11N4PMg	5.19	6.97	3.88	5.44	4.36	4.36	7.71
12N2+3(P)KMg	8.55	12.42	7.32	9.33	6.52	11.11	14.64
13N4PK	8.89	11.21	7.20	10.72	8.80	9.58	15.00
14N4PK*(Mg*)	8.76	11.69	7.01	9.82	9.52	11.33	14.47
15N5(P)KMg	7.82	12.19	5.63	9.94	7.03	10.06	13.15
16N6(P)KMg	7.40	10.93	4.33	9.13	6.57	8.59	14.18
17N2+4PKMg	8.18	10.52	5.19	9.13	3.46	8.99	12.35
18N2+2PKMg	8.45	9.85	5.88	11.46	5.95	8.98	11.94
19N2+1KMg	3.49	4.28	2.56	5.43	3.10	4.53	5.10
Mean	7.56	9.31	5.70	8.73	5.37	8.73	10.42
Mean DM%	20.90	29.50	18.80	25.90	25.10	29.80	23.20
Plot Area Harvested	0.00189						

Note: In 2013 herbicide was applied accidentally to maize. Consequently, the maize yields given above for 2013 are unreliable.

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SECTION 8: CLEAN GRAIN (2-3.5mm), TONNES/HA AFTER REMOVING WEED SEEDS.

YEAR	2012	2013	2014
SECTION	8/W4	8/W5	8/W6
PLOT			
2.1 FYMN2	0.63	3.28	2.85
2.2 FYM	0.59	2.71	1.76
03 Nil	0.71	1.53	0.87
05 (P)KMg	0.46	2.42	0.84
06 N1(P)KMg	0.52	3.29	0.83
07 N2(P)KMg	1.08	3.44	0.81
08 N3(P)KMg	1.28	3.40	0.71
09 N4(P)KMg	1.46	3.14	0.65
10 N4	0.46	1.33	1.42
11 N4PMg	0.43	2.27	1.48
12 N1+3+1(P)K2Mg2	0.85	3.38	1.57
13 N4PK	1.43	1.72	1.37
14 N4PK*(Mg*)	1.02	2.36	3.10
15 N5(P)KMg	0.63	4.40	1.22
16 N6(P)KMg	0.34	3.50	2.41
17 N1+4+1PKMg	0.63	4.40	0.85
18 N1+2+1PKMg	0.70	3.14	1.91
19 N1+1+1KMg	1.10	1.03	0.72

Note: Clean grain yields reported here for 2012 & 2013 are about 5% less than those reported in the 2013 yield book because they exclude small (<2mm) grains. In future, all clean grain yields for section 8 will be reported for the 2-3.5mm grain size fraction, excluding grain <2mm, as was the practice prior to 2012.

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14/R/HB/2

HOOS BARLEY

Object: To study the effects of organic manures and inorganic fertilizers on continuous s. barley. From 1968 to 1978 a rotation of potatoes, beans and s. barley was practised on parts of the experiment. The rotation was discontinued in 1979 and the whole experiment reverted to continuous s. barley. The experiment was modified for 2003. The main plots continue as previously. The Silicate Test plots continue but are not split to test rates of N (basal N is applied). The remaining plots are to be used to study the effect on yield of P residues, (basal N applied).

The 163rd year, s. barley.

For previous years see 'Details' 1967 and 1973, Station Report for 1966 and Yield Books for 74-13/R/HB/2.

Main plots

Treatments:
Whole plots

1. MANURE	Plot	Fertilizers and Organic Manures		
		Form of N 1852-1966	Additional treatments 1852-2002	Treatments since 2003
---	11	None	-	-
-P-	21	None	P	(P)
--K	31	None	K (Na) Mg	K(Mg)
-PK	41	None	PK (Na) Mg	(P) K (Mg)
A--	12	A	-	-
AP-	22	A	P	(P)
A-K	32	A	K (Na) Mg	K(Mg)
APK	42	A	PK (Na) Mg	(P) K (Mg)
D1852	72	None	D	D
(D)	71	None	(D)	(D)
(A)	62	None	(Ashes)	(Ashes)
-	61	None	-	-
D2001 [(a)]	73[(a)]	-	D	D
P2KMg [(a)]	63 [(a)]	-	P2KMg	P2KMg

[(a)] Plots 63 and 73 started in 2001

Form of N: A, sulphate of ammonia to supply 48kg N
P: 35 kg P as triple superphosphate in 1974 and from 1988 to 2002, single superphosphate in other years
(P): (none), P application to be reviewed for 2017
P2: 44kg P as triple superphosphate
K: 90 kg K as sulphate of potash
(Na): (none), 16 kg Na as sulphate of soda until 1973
Mg: 35kg 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.
(Mg): (none), Mg application to be reviewed for 2017

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D1852: Farmyard manure at 35t since 1852
D2001: Farmyard manure at 35t since 2001
(D): Farmyard manure 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

Silicate Test plots

Treatments:

Whole plots

MANURE	Plot	Fertilizers: Additional treatment 1852-1979	Changes since 1980	Treatments since 2003
N----	131	-	-	N3
NP---	231	P	-	N3 (P)
N-K--	331	K(Na)Mg	-	N3 K(Mg)
NPK--	431	PK(Na)Mg	-	N3(P)K(Mg)
N—S-	134	Si	Si omitted	N3 (Si)
NP-S-	234	P Si	Si omitted	N3(P) (Si)
N-KS-	334	K(Na)MgSi	Si omitted	N3 K(Mg)(Si)
NPKS-	434	PK(Na)MgSi	Si omitted	N3(P)K(Mg)(Si)
N---S	132	-	Si added	N3 Si
NP--S	232	P	Si added	N3(P) Si
N-K-S	332	K(Na)Mg	Si added	N3 K(Mg) Si
NPK-S	432	PK(Na)Mg	Si added	N3(P)K(Mg) Si
N--SS	133	Si	-	N3 Si
NP-SS	233	P Si	-	N3(P) Si
N-KSS	333	K(Na)MgSi	-	N3 K(Mg) Si
NPKSS	433	PK(Na)MgSi	-	N3(P)K(Mg) Si

N: From 1852-1966 whole plots received 48kg N as nitrate of soda. Between 1968-2002 whole plots were split to test 4 rates of N as "Nitro-chalk" (cumulative applications until 1973, on a cyclic system from 1974).
N3: Basal N, 144kg as "Nitro-chalk" since 2003
Si: Silicate of soda at 450kg (Note: S also refers to silicate of soda)
(Si): Silicate of soda omitted since 1980
P, (P), K, Mg, (Mg), (Na): as above

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14/R/HB/2

P Test plots

Treatments:

Since 2003 the remaining plots [ex-Castor meal (plots 14, 24, 34 & 44) and those testing combinations of NPK with and without Mg (plots 55, 56, 57 & 58)] have been used to study the effect of P residues on yield. Previous treatments have resulted in different levels of available P in the soil. Large dressing of K were applied to some plots to increase levels of exchangeable K in the soil such that K should not limit yield; plots 141 and 241 were sacrificed and used as discard areas so that the K application did not encroach on adjacent no K plots on the Silicate Test. Other plots received the normal rate of K. The level of exchangeable Mg in the soil is such that Mg should not limit yield; the need to apply Mg will be reviewed for 2015.

Whole plots
Manure

Plot	Treatment since 2003
142	N3K*
143	N3K*
144	N3K*
242	N3K*
243	N3K*
244	N3K*
341	N3K
342	N3K
343	N3K
344	N3K
441	N3K
442	N3K
443	N3K
444	N3K
551	N3K
552	N3K
561	N3K
562	N3K
571	N3K*
572	N3K*
581	N3K*
582	N3K*

N3: Basal N, 144kg as “Nitro-chalk”
K: 90kg K as sulphate of potash
K*: 450kg K as sulphate of potash

In 2005 the extra dressings of K (i.e. K*) was stopped and all of the P test plots reverted to K dressings of 90 kg K/ha/year.

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14/R/HB/2

Experimental Diary

Date		Application	Rate	Units
08-Oct-13	p	Sprayed Weedazol surrounds only	2.0	l/ha
24-Oct-13	f	Applied TSP - Plots 634 - 631	215	kg/ha
24-Oct-13	f	Applied SOP - Plots 634 - 631, 551-582, 444-411, 344-311, 244-241, 144-141	217	kg/ha
24-Oct-13	f	Applied Kieserite - Plots 634-631	233	kg/ha
03-Dec-13	a	Applied Chalk - Plots 734-711, 634-611, 551-582, 444-411, 344-311, 244-241, 144-141	4	t/ha
03-Dec-13	f	Applied Silicate of Soda - Plots 433-133 432-132	450	kg/ha
04-Dec-13	f	Applied FYM - Plots 721-734	35	t/ha
06-Dec-13	a	Started Ploughing – finished 09 Dec, soil thrown south	-	-
10-Mar-14	a	Flexitined ploughed ground - drill prep	-	-
12-Mar-14	a	Power-harrowed - All site and all Plots.	-	-
14-Mar-14	s	Drilled Spring Barley - var. Tipple	350	seed/m^2
14-Mar-14	a	Rolled	-	-
14-Mar-14	p	Sprayed Crystal - pre emergent	2.0	l/ha
29-Apr-14	a	Rotavated Paths	-	-
30-Apr-14	f	Applied Nitrochalk by hand - Plots 113,124,211,222,313,321,412,421,611,621, 631,712,721,732.	0	kg N/ha
30-Apr-14	f	Applied Nitrochalk by hand - Plots 112,123,212,223,314,324,414,422,613, 624,634,711,722,731.	48	kg N/ha
30-Apr-14	f	Applied Nitrochalk by hand - Plots 114,122,213,224,312,323,411,424,612, 622,632,714,723,733.	96	kg N/ha
30-Apr-14	f	Applied Nitrochalk by hand - Plots 111,121,214,221,311,322,413,423,614,623, 633,713,724,734.	144	kg N/ha
30-Apr-14	f	Applied Nitram @ 35%N - Plots 131-134,141-144,231-234,241-244,331-334,341-344, 431-434, 441-444,551-582	417	kg/ha
18-Jun-14	p	Sprayed Mobius - Sp Barley only	400	ml/ha
10-Jul-14	a	Removed wild oats from trial - 46 in total	-	-
05-Sep-14	a	Cut discard areas and baled straw with Class round baler; removed grain and straw.	-	-
06-Sep-14	a	Sampo - harvested all plots for grain yields	-	-
08-Sep-14	a	Baled and weighed straw for yields	-	-

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14/R/HB/2

MAIN PLOTS

Grain tonnes/hectare

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

N	0	48	96	144	Mean
MANURE					
---	0.87	1.47	1.60	2.54	1.62
-P-	1.80	3.65	4.14	3.65	3.31
--K	0.64	1.78	2.35	3.03	1.95
-PK	1.80	4.00	5.28	6.51	4.40
A--	1.20	1.51	1.64	1.68	1.51
AP-	2.15	3.64	4.33	3.42	3.39
A-K	0.75	1.93	2.39	1.99	1.76
APK	1.70	4.10	6.15	6.89	4.71
FYM1852onwards	5.51	7.63	8.32	8.58	7.51
FYM1852-1871	0.94	1.87	5.49	3.29	2.90
(A)	1.12	3.21	2.31	2.39	2.26
-	0.82	1.11	1.51	1.94	1.35
FYM2001onwards	3.99	6.87	6.71	7.16	6.18
P2K	2.20	3.01	6.05	6.53	4.45

Grain Mean DM% 90.2

Straw tonnes/hectare

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

N	0	48	96	144	Mean
MANURE					
---	0.21	0.64	0.62	1.12	0.65
-P-	0.64	1.58	1.67	1.60	1.37
--K	0.28	0.55	0.87	1.55	0.81
-PK	0.75	1.77	2.56	3.40	2.12
A--	0.38	0.55	0.70	0.75	0.60
AP-	0.60	1.58	1.99	1.56	1.43
A-K	0.11	0.79	1.15	0.60	0.66
APK	0.63	1.91	3.08	3.18	2.20
FYM1852onwards	2.09	3.93	4.65	5.09	3.94
FYM1852-1871	0.55	1.04	2.03	1.31	1.23
(A)	0.22	1.10	0.94	0.91	0.79
-	0.50	0.28	0.68	1.14	0.65
FYM2001onwards	1.54	2.95	3.38	4.20	3.02
P2K	0.52	0.93	2.79	2.96	1.80
Mean	0.47	0.94	1.14	1.37	0.98

Straw Mean DM% 81.8

Plot area harvested 0.0192, 0.00256

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14/R/HB/2

PHOSPHATE PLOTS

Grain tonnes/hectare

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

PLOTS	
142	3.25
143	3.53
144	3.19
242	6.59
243	6.89
244	6.77
341	4.03
342	4.64
343	5.14
344	5.77
441	6.62
442	7.34
443	7.27
444	7.09
551	6.82
552	6.63
561	6.91
562	6.60
571	3.70
572	4.65
581	1.49
582	1.39
Mean	5.29

Grain Mean DM% 83.3

Plot area harvested 0.00256

SILICATE PLOTS

Grain tonnes/hectare

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

PK	N3--	N3P-	N3-K	N3PK
Silicate				
(-)-	2.41	4.70	2.42	7.44
(Si)-	2.28	5.31	3.81	7.35
(-)Si	3.22	4.82	3.90	7.91
(Si)Si	3.13	4.70	4.72	7.70

Grain Mean DM% 83.2

Plot area harvested 0.00256

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14/R/WF/3

WHEAT AND FALLOW

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

The 159th year, w. wheat.
For previous years see 'Details' 1967, 1973 and Yield Books for 74-12/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

Date		Application	Rate	Units
01-Oct-13	a	Topping	-	-
09-Oct-13	a	Ploughed	-	-
10-Oct-13	a	Cultipressed	-	-
18-Oct-13	s	Drilled All plots - var. Crusoe	400	seeds/m^2
27-Nov-13	p	Applied Major Slug Pellets	4	kg/ha
27-Nov-13	p	Sprayed Hallmark	50	ml/ha
27-Nov-13	p	Sprayed Liberator	600	ml/ha
27-Nov-13	p	Sprayed Stomp	1.7	l/ha
03-Apr-14	p	Sprayed Artemis	1.0	l/ha
03-Apr-14	p	Sprayed Bravo 500	1.0	l/ha
03-Apr-14	p	Sprayed BASF 3C 720	1.75	l/ha
04-Apr-14	a	Rotavated All Fallow Plots	-	-
09-Apr-14	a	Power-harrowed - Fallows and Fallow plots	-	-
28-Apr-14	a	Sprayed Kingdom	1.25	l/ha
21-Aug-14	a	Harvested		

Grain and straw tonnes/hectare

	Grain	Straw
Yield	1.532	0.6383
DM%	84.83	90.37

Plot area harvested 0.04431

Note: Unground grain and straw was archived.

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14/R/EX/4

EXHAUSTION LAND

Object: To study the residual effects of manures applied 1856 - 1901, and of additional phosphate applied since 1986 (P test) and of additional potassium since 2007 (K test); on the yield of continuous s. barley up to 1991, w. wheat since – Hoosfield.

The 159th year, w. wheat.

For previous years see 'Details' 1977, 1973 and Yield Books for 74-12/R/EX/4

Treatments: All combinations of:-

Whole plots (P test)

1. **OLD RES** Residues of manures applied annually 1876 – 1901:

O	None
D	Farmyard manure at 35 t
N	96 kg N as ammonium salts
P	34 kg P as superphosphate
NPKNAMG	N and P as above plus 137 kg K as sulphate of potash, 16 kg Na as sulphate of soda, 11 kg Mg as sulphate of magnesia

2. **P** Maintenance P (20 kg P) applied annually from 2000 to maintain existing levels of available P In the soil. In 2009 maintenance P applications were changed from 20 kg P/ha to 15 kg P/ha. This was not recorded in the yield books for 2009-13. (P1) (P2) and (P3) are residues of P applied annually 1986–1992:

	2009-Present	2000-08	1986-92
O	None	None	None
P (P1)	15 kg P	20 kg P	44 kg P
P (P2)	15 kg P	20 kg P	87 kg P
P (P3)	15 kg P	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

1. 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

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14/R/EX/4

2. K Potassium applied annually from 2007 as muriate of potash

O	None
K1	75 kg K_2O (62.2 kg K)
K2	150 kg K_2O (124.5 kg K)

Whole plots
Nitrogen: 50 kg N as ammonium sulphate (to supply sufficient S) during first two weeks in March, 200 kg N as ammonium nitrate at GS31/mid-April (whichever comes first) and 50 kg N as ammonium nitrate at GS37 (not later than mid-May)

Experimental diary

Date		Application	Rate	Units
30-Sep-13	f	Applied MOP Fertiliser - Plots 023, 043, 063, 083, 103	125	kg/ha
30-Sep-13	f	Applied MOP Fertiliser - Plots 011, 012, 013, 014, 024, 031, 032, 033, 034, 044, 051, 052, 053, 054, 064, 071, 072, 073, 074, 084, 091, 092, 093, 094, 104	250	kg/ha
30-Sep-13	f	Applied TSP - All Plots except Plots 014, 034, 054, 074, 094	75	kg/ha
01-Oct-13	a	Topping	-	-
02-Oct-13	a	Applied Chalk - Plots 013, 014, 041, 043, 051, 054, 072	2	t/ha
02-Oct-13	a	Applied Chalk - Plots 021, 042, 044, 081, 071, 074, 091, 102, 104	4	t/ha
02-Oct-13	a	Applied Chalk - Plots 011, 012, 022, 023, 024, 031, 052, 053, 061, 062, 063, 064, 082, 083, 084, 101, 103	6	t/ha
09-Oct-13	a	Ploughed	-	-
10-Oct-13	a	Cultipressed	-	-
18-Oct-13	s	Drilled All Plots - var. Xi19	400	seeds/m^2
27-Nov-13	p	Applied Major Slug Pellets	4	kg/ha
27-Nov-13	p	Sprayed Hallmark	50	ml/ha
27-Nov-13	p	Sprayed Liberator	600	ml/ha
27-Nov-13	p	Sprayed Stomp	1.7	l/ha
10-Mar-14	f	Applied sulphate of ammonia - All Plots	238	kg/ha
01-Apr-14	f	Applied Nitram Fertilizer - All Plots	580	kg/ha
03-Apr-14	p	Sprayed Artemis	1.0	l/ha
03-Apr-14	p	Sprayed Bravo 500	1.0	l/ha
03-Apr-14	p	Sprayed BASF 3C 720	1.75	l/ha
09-Apr-14	f	Applied Kieserite - All Plots	80	kg/ha
28-Apr-14	p	Sprayed Kingdom	1.25	l/ha
28-Apr-14	p	Sprayed Bravo 500	1.0	l/ha
13-May-14	f	Applied Nitram - All Plots	145	kg/ha
16-May-14	p	Sprayed Simba	30	g/ha
16-May-14	p	Sprayed Vortex	1.5	l/ha

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06-Jun-14	p	Sprayed Cello	550	ml/ha
25-Jun-14	a	Rotavated Fallow Areas (discard surrounds)	-	-
31-Jul-14	a	Cut Paths - in and around experiment	-	-
19-Aug-14	a	Claas Harvested OE's	-	-
21-Aug-14	a	Sampo - Harvested All Plots	-	-
24-Aug-14	a	Sampled, Baled and Weighed Straw - all plots	-	-
04-Sep-14	a	Claas Combine - Harvesting Leftover Wheat from Trial	-	-

Note: Samples of grain and straw were taken for chemical analysis. The yield strips on plots 031, 034, 071, 074, 091 & 094 were made smaller this year to avoid areas where the crop had already been sampled by S. McGrath et al.

P TEST

Grain tonnes/hectare

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

P_RES	O	P1	P2	P3	Mean
OLD_RES					
O	3.63	7.34	7.91	8.06	6.74
D	6.36	8.43	8.80	8.80	8.10
N	2.79	8.33	8.32	8.65	7.02
P	6.89	8.68	8.83	9.01	8.35
NPKNAMG	5.45	8.41	8.71	9.73	8.07
Mean	5.02	8.24	8.51	8.85	7.66

Grain mean DM% 86.0

Straw tonnes/hectare

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

P_RES	O	P1	P2	P3	Mean
OLD_RES					
O	2.24	4.55	4.98	4.98	4.19
D	3.28	4.90	5.33	5.56	4.77
N	1.76	4.81	5.13	5.22	4.23
P	3.56	4.88	5.07	5.62	4.78
NPKNAMG	3.34	5.08	5.17	6.02	4.90
Mean	2.83	4.85	5.14	5.48	4.57

Straw mean DM% 91.0

Plot area harvested 0.00538, 0.00252.

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14/R/EX/4

K TEST

Grain tonnes/hectare

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

K_Test	K0	K1	K2	Mean
OLD_RES				
O	7.93	9.11	9.41	8.60
D	8.56	10.01	9.84	9.25
N*	8.27	9.17	9.17	8.72
PK	9.16	9.57	9.45	9.34
N*PK	8.88	9.99	10.11	9.47
Mean	8.56	9.57	9.60	9.07

Grain mean DM% 86.2

Straw tonnes/hectare

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

K_Test	K0	K1	K2	Mean
OLD_RES				
O	3.97	5.31	5.55	4.70
D	4.34	5.55	5.84	5.02
N*	4.38	5.43	5.61	4.95
PK	5.13	5.29	5.46	5.25
N*PK	4.53	5.39	5.59	5.01
Mean	4.47	5.39	5.61	4.99

Straw mean DM% 90.9 Plot area harvested 0.00538

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14/R/PG/5

PARK GRASS

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

The 159th year, hay.
For previous years see 'Details' 1977 and 1973 and Yield Books for 74-13/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)
None (FYM)	Plot 2/2	None (FYM until 1863)
None	Plot 3	None
P	Plot 4/1	P
N2P	Plot 4/2	N2 P
N1PKNaMg	Plot 6	N1 P K Na Mg
(P)KNaMg	Plot 7/1	K Na Mg (P until 2012)
PKNaMg	Plot 7/2	P K Na Mg (P continued)
PNaMg	Plot 8	P Na Mg
PKNaMg(N2)	Plot 9/1	P K Na Mg (+ N2 until 1989)
N2PKNaMg	Plot 9/2	N2 P K Na Mg
N2PNaMg	Plot 10	N2 P Na Mg
N3PKNaMg	Plot 11/1	N3 P K Na Mg
N3PKNaMgSi	Plot 11/2	N3 P K Na Mg Si
None	Plot 12	None
(FYM/F)	Plot 13/1	None (FYM/F until 1993/1995)
FYM/PM	Plot 13/2	FYM/PM (FYM/F until 1999)
PKNaMg (N2*)	Plot 14/1	P K Na Mg (+ N2* until 1989)
N2*PKNaMg	Plot 14/2	N2* P K Na Mg
N3*PKNaMg (N2*)	Plot 15	N3*P K Na Mg (N2* until 1875; P K Na Mg 1876-2012)
N1*PKNaMg	Plot 16	N1* P K Na Mg
N1*	Plot 17	N1*
N2KNaMg	Plot 18	N2 K Na Mg
FYM	Plot 19	FYM
FYM/N*PK	Plot 20	FYM/N*P K

N1, N2, N3:	48, 96, 144 kg N as sulphate of ammonia
N1*, N2*, N3*:	48, 96, 144 kg N as nitrate of soda (30 kg N to plot 20 in years with no farmyard manure). In 2013 plot 15 started to receive 144 kg N/ha as nitrate of soda to provide a comparison with plot 11/1, which receives 144 kg N/ha as sulphate of ammonia.
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
(P):	In 2013 plot 7 was split into 7/1 & 7/2. P was withheld from plot 7/1 to evaluate the effect of withholding P on plant biodiversity in 2013-2015. 7/2 continues to receive P as above.

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14/R/PG/5

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
FYM:	Farmyard manure at 35 t every fourth year
F:	Fishmeal every fourth year to supply 63 kg N (stopped 1999; replaced by PM)
PM	Pelleted poultry manure at 2 t, every fourth year to supply 63 kg N (started 2003)

Sub-plots

2.	**Lime**	Liming plots 1-18 (excluding 18/2):
	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 2011-2012; the seventh 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.]

NOTE: Differential rates of lime were applied to sub-plots 2 and 3 regularly 1920-1964. 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

Date		Application	Rate	Units
13-Nov-13	a	Cut Paths	-	-
05-Dec-13	f	Applied TSP - Plots 4-1, 4-2, 6, 7-2, 8, 9-1, 9-2, 10, 11-1, 11-2, 14/1, 14/2, 15 & 16	171	kg/ha
05-Dec-13	f	Applied TSP - Plot 20	73	kg/ha
10-Dec-13	f	Applied Sulphate of Potash - Plots 2-1, 6, 7/1, 7/2, 9-1, 9-2, 11-1, 11-2, 14-1, 14-2, 15, 16, 18.	542	kg/ha
10-Dec-13	f	Applied Sulphate of Potash - Plots 20	108	kg/ha
10-Dec-13	f	Applied Sulphate of Soda - Plots 6, 7/1, 7/2, 8, 9-1, 9-2, 10, 11-1, 11-2, 14-1, 14-2, 15, 16, 18	43	kg/ha
10-Dec-13	f	Applied Sulphate of Magnesia (Epsom Salts) - Plots 6, 7/1, 7/2, 8, 9-1, 9-2, 10, 11-1, 11-2, 14-1, 14-2, 15, 16, 18	111	kg/ha
10-Dec-13	f	Applied Silicate of Soda - Plots 11-2	450	kg/ha
19-Feb-14	a	Clearing Fallen trees and branches	-	-

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14-Apr-14	f	Applied Ammonium Sulphate Fertiliser @ 21%N – Plots 1 and 6	229	kg/ha
14-Apr-14	f	Applied Ammonium Sulphate Fertiliser @ 21%N - Plot 4/2, 9/2, 10, 18	457	kg/ha
14-Apr-14	f	Applied Ammonium Sulphate Fertiliser @ 21%N - Plot 11/1 and 11/2	686	kg/ha
15-Apr-14	f	Applied Sodium Nitrate @ 16%N - Plot 16 and 17	300	kg/ha
15-Apr-14	f	Applied Sodium Nitrate @ 16%N - Plot 14/2	600	kg/ha
15-Apr-14	f	Applied Sodium Nitrate @ 16%N - Plot 15	900	kg/ha
15-Apr-14	f	Applied Sodium Nitrate @ 16%N - Plot 20	188	kg/ha
14-May-14	a	Mowed surrounds of trial & cut paths	-	-
23-Jun-14	a	Started Cutting Plots For Yield	-	-
24-Jun-14	a	Completed cutting plots for yield	-	-
24-Jun-14	a	Mowed all field discards	-	-
25-Jun-14	a	Mowed Discards	-	-
25-Jun-14	a	turned all cuttings on field	-	-
26-Jun-14	a	turned all cuttings on field	-	-
27-Jun-14	a	turned all hay on field, baled and removed grass	-	-
11-Nov-14	a	Cut All Paths with Iseki and Mower	-	-
19-Nov-14	a	2nd Cut - Started Cutting Plots For Yield	-	-
20-Nov-14	a	2nd Cut - Completed cutting plots for yield	-	-

NOTE: Samples of herbage (1st and 2nd Cut) were taken for chemical analysis. Unground herbage samples from all plots were archived.

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14/R/PG/5

1ST CUT (23-24/6-14) DRY MATTER TONNES/HECTARE

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

1ST CUT (25-26/6-13) DRY MATTER TONNES/HECTARE

Grand mean 3.81

Manure	Lime	a	b	c	d	Mean
N1	1	2.56	2.41	1.69	1.25	1.98
K	2/1	2.09	2.36	1.72	1.27	1.86
None(FYM)	2/2	2.68	2.72	2.01	2.26	2.42
None	3	2.55	2.84	1.46	1.68	2.13
P	4/1	3.32	3.33	2.68	2.74	3.02
N2P	4/2	3.47	3.82	3.71	2.06	3.26
N1PKNaMg	6	5.38	5.33			5.35
(P)KNaMg	7/1	4.74	5.28	5.17	3.05	4.56
PKNaMg	7/2	5.05	5.21	5.22	3.84	4.83
PNaMg	8	3.22	3.08	2.78	2.97	3.01
PKNaMg(N2)	9/1	5.18	5.27	4.30	0.89	3.91
N2PKNaMg	9/2	5.16	5.17	4.52	4.60	4.86
N2PNaMg	10	3.82	3.68	3.84	2.65	3.50
N3PKNaMg	11/1	5.74	5.34	4.92	5.15	5.29
N3PKNaMgSi	11/2	6.21	6.04	5.85	5.84	5.99
None	12	3.00	2.54	2.44	2.21	2.55
(FYM/F)	13/1	3.73	3.81	3.48	3.67	3.67
FYM/PM	13/2	4.23	4.69	5.43	5.36	4.93
PKNaMg(N2*)	14/1	4.66	4.57	4.50	4.63	4.59
N2*PKNaMg	14/2	4.63	4.12	4.40	4.42	4.39
N3*PKNaMg(N2*)	15	4.89	5.08	5.11	6.00	5.27
N1*PKNaMg	16	4.53	4.61	4.60	3.32	4.27
N1*	17	2.41	2.94	2.52	2.57	2.61
N2KNaMg	18	2.83	3.15	2.96	0.88	2.45
N2KNaMg	18/2					3.60
FYM	19/1					4.99
FYM	19/2					4.87
FYM	19/3					4.45
FYM/N*PK	20/1					4.94
FYM/N*PK	20/2					5.42
FYM/N*PK	20/3					5.34

1ST CUT MEAN DM% 26.4

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14/R/PG/5

***** Tables of means

2ND CUT (19-20-Nov-14) DRY MATTER TONNES/HECTARE

Grand mean 0.89

Manure	Lime	a	b	c	d	Mean
N1	1	0.56	0.55	0.29	0.22	0.40
K	2/1	0.56	0.46	0.43	0.32	0.44
None(FYM)	2/2	0.51	0.50	0.42	0.66	0.52
None	3	0.52	0.64	0.46	0.57	0.55
P	4/1	0.85	0.77	0.68	0.79	0.77
N2P	4/2	0.60	0.65	0.69	0.61	0.64
N1PKNaMg	6	0.74	0.83			0.78
(P)KNaMg	7/1	0.68	0.90	0.75	0.69	0.76
PKNaMg	7/2	1.03	1.00	0.81	0.63	0.87
PNaMg	8	1.03	0.85	0.60	0.83	0.83
PKNaMg(N2)	9/1	0.96	1.07	0.50	0.09	0.65
N2PKNaMg	9/2	1.21	1.30	0.78	0.67	0.99
N2PNaMg	10	0.55	0.67	0.90	0.78	0.72
N3PKNaMg	11/1	1.17	0.95	0.85	1.63	1.15
N3PKNaMgSi	11/2	1.66	1.24	0.97	1.73	1.40
None	12	0.82	0.54	0.59	0.63	0.64
(FYM/F)	13/1	1.52	1.24	0.71	0.57	1.01
FYM/PM	13/2	1.74	1.99	1.52	1.30	1.64
PKNaMg(N2*)	14/1	1.24	1.15	1.16	0.98	1.13
N2*PKNaMg	14/2	0.80	1.10	1.56	1.41	1.22
N3*PKNaMg(N2*)	15	1.37	1.35	1.46	1.06	1.31
N1*PKNaMg	16	1.26	1.42	1.18	1.17	1.26
N1*	17	0.67	0.60	0.48	0.67	0.61
N2KNaMg	18	0.34	0.45	0.40	0.34	0.38
N2KNaMg	18/2					0.52
FYM	19/1					1.34
FYM	19/2					1.86
FYM	19/3					1.34
FYM/N*PK	20/1					1.32
FYM/N*PK	20/2					1.63
FYM/N*PK	20/3					1.53

2ND CUT MEAN DM% 18.74

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14/R/PG/5

***** Tables of means

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

Grand mean 4.70

Manure	Lime	a	b	c	d	Mean
N1	1	3.12	2.96	1.99	1.46	2.38
K	2/1	2.65	2.82	2.15	1.59	2.30
None(FYM)	2/2	3.18	3.22	2.43	2.91	2.94
None	3	3.08	3.47	1.93	2.25	2.68
P	4/1	4.18	4.10	3.36	3.53	3.79
N2P	4/2	4.07	4.47	4.40	2.67	3.90
N1PKNaMg	6	6.12	6.15			6.14
(P)KNaMg	7/1	5.42	6.18	5.92	3.75	5.32
PKNaMg	7/2	6.08	6.21	6.03	4.47	5.70
PNaMg	8	4.25	3.93	3.39	3.81	3.84
PKNaMg(N2)	9/1	6.14	6.34	4.80	0.98	4.56
N2PKNaMg	9/2	6.37	6.47	5.30	5.27	5.85
N2PNaMg	10	4.36	4.34	4.74	3.42	4.22
N3PKNaMg	11/1	6.91	6.29	5.77	6.78	6.44
N3PKNaMgSi	11/2	7.87	7.28	6.83	7.57	7.39
None	12	3.83	3.08	3.03	2.84	3.19
(FYM/F)	13/1	5.25	5.05	4.20	4.24	4.68
FYM/PM	13/2	5.98	6.67	6.95	6.65	6.57
PKNaMg(N2*)	14/1	5.90	5.72	5.66	5.61	5.72
N2*PKNaMg	14/2	5.43	5.22	5.96	5.83	5.61
N3*PKNaMg(N2*)	15	6.25	6.42	6.58	7.06	6.58
N1*PKNaMg	16	5.78	6.04	5.79	4.49	5.52
N1*	17	3.08	3.54	3.00	3.25	3.22
N2KNaMg	18	3.17	3.60	3.36	1.22	2.84
N2KNaMg	18/2					4.11
FYM	19/1					6.33
FYM	19/2					6.74
FYM	19/3					5.80
FYM/N*PK	20/1					6.26
FYM/N*PK	20/2					7.05
FYM/N*PK	20/3					6.88

TOTAL OF 2 CUTS MEAN DM% 22.58

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14/R/GC/8

GARDEN CLOVER

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

The 161 st year, red clover.

For previous years see `Details' 1967 and 1973, and Yield books for 74-12/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:

Date		Application	Rate	Units
09-Dec-13	f	Epsom Salts applied @ 50 kg Mg/ha	50	kg/ha
09-Dec-13	f	TSP applied @ 75 kg P2O5/ha	75	kg/ha
09-Dec-13	f	Potassium Sulphate applied @ 150 kg K2)'ha	150	kg/ha
09-Dec-13	f	Applied - Chalk	1.25	t/ha
06-May-14	a	Applied new Netting over experiment	-	-
28-Apr-14	a	First cut	-	-
18-Jun-14	a	Second cut	-	-
01-Aug-14	a	Third cut	-	-
09-Oct-14	a	Fourth cut	-	-

14/R/GC/8

```
1ST CUT (28/04/14) DRY MATTER TONNES/HECTARE

***** Tables of means

Grand mean 4.95

FUNG_RES      NONE    BENOMYL
               4.80      5.11


1st CUT MEAN DM% 13.8
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14/R/GC/8

```
2nd CUT (18/06/14) DRY MATTER TONNES/HECTARE

***** Tables of means

Grand mean 4.85

FUNG_RES     NONE   BENOMYL
              4.65     5.06

2ND CUT MEAN DM% 17.4


3rd CUT (01/08/14) DRY MATTER TONNES/HECTARE

***** Tables of means

Grand mean 2.85

FUNG_RES     NONE   BENOMYL
              2.83     2.87

3RD CUT MEAN DM% 25.6


4th CUT (09/10/14) DRY MATTER TONNES/HECTARE

***** Tables of means

Grand mean 2.19

FUNG_RES     NONE   BENOMYL
              2.12     2.25

4TH CUT MEAN DM% 22.3


TOTAL OF 4 CUTS DRY MATTER TONNES/HECTARE

***** Tables of means

Grand mean 14.85

 FUNG_RES     NONE   BENOMYL
             14.41    15.28


 TOTAL OF 4 CUTS MEAN DM% 19.7
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14/W/RN/3
LEY/ARABLE

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

Sponsors: A. J. Macdonald

The 77th year, leys, w. beans, w. wheat, w. rye

For previous years see 'Details' 1967 & 1973 and Yield Books for 74-13/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 1988 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

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

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14/W/RN/3

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.

From 2007 plots previously in the 1st cycle of testing eight-year leys followed by two arable test crops (i.e. those plots which were changed to eight-year ley treatments in 1976 or 1977) changed to a three-year arable rotation followed by two arable test crops. Plots were "phased in" but joined the relevant point in the rotation. From 2008 the second cycle 8-yr grass and grass/clover leys changed to 3-yr grass or grass/clover leys respectively. They were phased in between 2008 and 2012.
LLN/AO (Previously 1st cycle, 8-yr grass ley) R, BE, O, W, R
LLC/ABe (Previously 1st cycle, 8-yr grass/clover ley) R, O, BE, W, R
LLC/LC3 (Previously 2nd cycle, 8-yr grass ley) Lc 1, Lc 2, Lc 3, W, R
LLN/LN3 (Previously 2nd cycle, 8-yr grass/clover ley) Ln 1, Ln 2, Ln 3, W, R

From 2009 W oats (O) replaced forage maize (M) in the AM and ABe rotations on block III and were phased in on blocks V, IV, II and I in subsequent years. The AM treatment was re-named AM/AO.

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
   LLC/LC3 not yet in phase
   LLN/LN3 not yet in phase
   LLN/AO not yet in phase
   LLC/ABe not yet in phase
   AM/AO
   ABe

1/ 2 plots:

2. **NSPLIT(FYM res)** Farmyard manure residues, last applied 1960s:
   Split N v single N dressing to wheat, tested 2001-5

   Nsplit (noFYM)
   Nsingle(FYM)

1/8 plots:

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3. **N** Nitrogen fertilizer as split dressings in spring 2014 (kg N) as 34.5% N:

0	0	
80	40 + 40	) to be applied
160	40 + 120	) late-February/early-March
240	40+ 200	) and mid-April

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

Whole plots:

1. **ROTATION** Rotations before first test crop:
   LLN8
   LN 3
   LLC 8
   LC 3
   LLC/LC3 not yet in phase
   LLN/LN3 not yet in phase
   LLN/AO not yet in phase
   LLC/ABe not yet in phase
   AM/AO
   ABe

1/ 2 plots:

2. **NSPLIT(FYM res)** Farmyard manure residues, last applied 1960s:
   N split to wheat (no FYM)
   N single to wheat (FYM)

   1/8 plots:

3. **N** Nitrogen fertilizer in spring 2013 (kg N) as 34.5%:
   0
   50
   100
   150

Treatments to leys:

FYM RES Farmyard manure residues:

NONE
FYM 38 t on each occasion, last applied 1960s.

NOTE: Corrective K dressings (kg K_2O ha^{-1}) as muriate of potash, applied where necessary to first test crop w. wheat and long-term leys in the wheat block, applied 2014 (see date below).

Continuous rotations	No FYM	FYM Res
Before wheat	Half plots	Half plots
Abe/Be	430	430
AO/O	350	260
LLn/AO	220	180
Ln/Ln	10	10
None to other plots.		

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14/W/RN/3

Experimental Diary

Date		Application	Rate	Units
ALL				
07-Oct-13	f	Applied TSP - Arable plots	127	kg/ha
30-Oct-13	a	Ploughed		
30-Oct-13	a	Power harrowed		
14-Mar-14	a	Rolled - Rolled for wire worm		
01-Apr-14	p	Sprayed Sprinter - 147 l/ha water. Cereals only	1.5	l/ha
11-Apr-14	a	Cut paths		
15-Apr-14	f	Applied SOP - Applied to all arable plots	150	kg/ha
15-Apr-14	p	Sprayed Allay Max - 200 l/ha water.	40	g/ha
15-Apr-14	p	Sprayed Allay Hatchet Xtra - 200 l/ha water.	0.75	l/ha
15-Apr-14	p	Sprayed BASF 3C - 200 l/ha water.	2	l/ha
15-Apr-14	p	Sprayed Keystone - 200 l/ha water.	0.8	l/ha
30-Apr-14	p	Sprayed San 703 - 200 l/ha water volume	1.5	l/ha
30-Apr-14	p	Sprayed Hallmark with Zeon Technology - 200 l/ha water volume	75	ml/ha
11-Sep-14	p	Sprayed Firebrand - 200 l/ha water volume. Problem with "Auto control" on sprayer, switched to manual.	1	l/ha
11-Sep-14	p	Sprayed Samurai - 200 l/ha water volume. Problem with "Auto control" on sprayer, switched to manual.	4	l/ha
Grass ley and clover/grass leys (first year leys)				
07-Oct-13	f	Applied TSP - 1st year leys	213	kg/ha
25-Oct-13	f	Applied SOP - Applied to 1st year leys	140	kg/ha
29-Oct-13	f	Applied Nitram - Plots 77,78,79,80.	72.4	kg/ha
29-Oct-13	f	Applied Nitram - Plots 65,66,69,70	144.9	kg/ha
03-Nov-13	s	Drilled Grass and Clover plots - Grass and clover mix - Plots 77,78,79,80	30	kg/ha
03-Nov-13	s	Drilled Grass - Plots 69 and 70	30	kg/ha
13-Mar-14	p	Sprayed Samurai - plots 65 and 66 only, prep for grass plots.	4	l/ha
08-Apr-14	f	Applied Nitram Fertilizer - Grass only plots. Plots 65, 66, 69, 70	217	kg/ha
14-Apr-14	a	Springtyne - Plots 65 and 66 ready for drilling		
14-Apr-14	s	Drilled Grass plots 65 and 66	30	kg/ha
26-Jun-14	a	Cut grass plots for yield		
30-Jun-14	a	Mowed grass plots		
01-Jul-14	a	Turned hay		
02-Jul-14	a	Turned hay		
03-Jul-14	a	Baled and Removed hay		
03-Dec-14	a	Cut grass plots for yield		
10-Dec-14	a	Topped grass plots		
Grass ley and clover/grass leys (2nd and 3rd year leys)				
07-Oct-13	f	Applied TSP - 2,3 year leys	213	kg/ha
25-Oct-13	f	Applied SOP - Applied to 2nd & 3rd year leys	140	kg/ha
08-Apr-14	f	Applied Nitram Fertilizer - Grass only plots. Plots 11, 12, 13, 14, 37, 38, 43, 44	217	kg/ha

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15-Apr-14	f	Applied MOP - Applied to leys	167	kg/ha
26-Jun-14	a	Cut grass plots for yield		
30-Jun-14	a	Mowed grass plots		
01-Jul-14	a	Turned hay		
02-Jul-14	a	Turned hay		
03-Jul-14	a	Baled and Removed hay		
03-Dec-14	a	Cut grass plots for yield		
10-Dec-14	a	Topped grass plots		

W. Beans

03-Nov-13	s	Drilled Winter beans - var. Wizzard - Plots 1,2,15,16,35,36,39,40	30	seeds/m^2
15-Nov-13	p	Sprayed Nivana - Bean plots only	4	l/ha
15-Nov-13	p	Sprayed Dictate - Bean plots only	0.2	l/ha
15-Apr-14	p	Sprayed Laser - Beans only. 200 l/ha water	1	l/ha
15-Apr-14	p	Sprayed Zarado - Beans only. 200 l/ha water	1	l/ha
02-Jun-14	p	Sprayed San 703 - Beans only. 200 l/ha water vloume.	2	l/ha
03-Sep-14	a	Cut plots for yield		
06-Sep-14	a	Baled and Removed		

W. Wheat

29-Oct-13	f	Applied MOP - Corrective K applied to plots 17,18,19,20,21,22,27,28,31,32.		
31-Oct-13	s	Drilled var. Solstice tr Redigo Deter - Plots 17-32	400	seeds/m^2
14-Apr-14	f	Applied first split N as Nitram – Test plots only.	148	kg/ha
30-Apr-14	p	Sprayed Atlantis - wheat plots only. 200 l/ha water.	0.4	kg/ha
30-Apr-14	p	Sprayed Sekator - wheat plots only. 200 l/ha water.	0.2	kg/ha
30-Apr-14	p	Sprayed Cortez - wheat plots only. 200 l/ha water.	0.5	l/ha
30-Apr-14	p	Sprayed Biopower - wheat plots only. 200 l/ha water.	1	l/ha
02-May-14	f	Applied N treatment - as "main N". Test Plots 174,183,193,201,212,221,231,242,252,262,274,282,292,304,311,323	148	kg/ha
02-May-14	f	Applied N treatment - as "main N". Test Plots 171,182,194,204,214,223,234,241,251,263,272,283,294,303,314,321	444	kg/ha
02-May-14	f	Applied N treatment - as "main N". Test Plots 172,184,191,202,211,222,232,242,254,261,273,281,291,301,313,324	741	kg/ha
21-May-14	p	Sprayed Refine Max - Winter Wheat only. 150 l/ha water volume.	75	g/ha
21-May-14	p	Sprayed Refine Kingdom - Winter Wheat only. 150 l/ha water volume.	1.25	l/ha
21-May-14	p	Sprayed Refine Bravo 500 - Winter Wheat only. 150 l/ha water volume.	1	l/ha
21-May-14	p	Sprayed Refine Hatchet Xtra - Winter Wheat only. 150 l/ha water volume.	0.75	l/ha
06-Jun-14	p	Sprayed Cello - 150 l/ha water volume. Wheat only	0.55	l/ha
06-Jun-14	p	Sprayed Amistar - 150 l/ha water volume. Wheat only	0.25	l/ha
06-Jun-14	p	Sprayed Hallmark - 150 l/ha water volume. Wheat only	40	ml/ha
03-Sep-14	a	Cut plots for yield		
06-Sep-14	a	Baled and Removed		

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W. Rye

18-Oct-13	a	Applied Chalk - Applied to block 4.	5	t/ha
01-Nov-13	s	Drilled Rye - var. Kapitan - Plots 49 to 63, 67,68,71,72,73 to 76	400	seeds/m^2
08-Apr-14	f	Applied Nitram Fertilizer - Rye treatment plots. 67,68,71,72,73,74,75,76	290	kg/ha
06-May-14	f	Applied Nitrochalk by hand - Applied to Rye test crop. Plots 494,504,513,523,532,541,552,564,571,581,591,601,611,622,632,643	185	kg/ha
07-May-14	f	Applied Nitrochalk by hand - Applied to Rye test crop. Plots 491,501,511,521,531,542,553,562,574,583,592,602,612,623,633,642	370	kg/ha
08-May-14	f	Applied Nitrochalk by hand - Applied to Rye test crop. Plots 493,502,514,522,533,544,551,561,573,582,594,604,613,621,631,644	556	kg/ha
21-May-14	p	Sprayed Covershield - Rye plots only. 200 l/ha water volume	0.8	l/ha
13-Jun-14	p	Sprayed Fezan - Rye only.	0.75	l/ha
03-Sep-14	a	Cut plots for yield		
06-Sep-14	a	Baled and Removed		

W. Oats

01-Nov-13	s	Drilled Oats var. Gerald trt Redigo - Plots 5,6,9,10,45 to 48; Half of plots 65 and 66 were drilled with oats by accident too. These will be removed in the spring.	400	seeds/m^2
05-Mar-14	p	Sprayed Absolute with Zeon Tec. - Oats only	0.12	l/ha
05-Mar-14	p	Sprayed Hallmark with Zeon Tec. - Oats only	50	ml/ha
08-Apr-14	f	Applied Nitram Fertilizer - Oats - Plots 5, 6, 9, 10, 45 to 48	290	kg/ha
21-May-14	p	Sprayed Simba - Winter Oats. 200 l/ha water volume.	30	l/ha
21-May-14	p	Sprayed Cello - Winter Oats. 200 l/ha water volume.	0.6	l/ha
09-Jun-14	p	Sprayed Cello - Oats only. 150 l/ha water volume.	0.55	l/ha
09-Jun-14	p	Sprayed Hallmark - Oats only. 150 l/ha water volume.	40	ml/ha
03-Sep-14	a	Cut plots for yield		
06-Sep-14	a	Baled and Removed		

NOTE: Herbage and grain samples were taken for chemical analyses.

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14/W/RN/3

LEYS

1ST CUT (26/6-14) DRY MATTER TONNES/HECTARE

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

FYM_RES LEY	NONE	FYM	MEAN
LC1	2.14	2.27	2.21
LC2	4.98	4.89	4.93
LC3	5.25	4.54	4.89
LN1	1.46	1.79	1.62
LN2	7.83	8.48	8.16
LN3	6.47	6.39	6.43
(LLC/LC) LC1	2.81	2.19	2.50
(LLC/LC) LC2	4.82	4.78	4.80
(LLC/LC) LC3	5.15	5.45	5.30
(LLN/LN) LN1	4.54	4.16	4.35
(LLN/LN) LN2	6.85	6.15	6.50
(LLN/LN) LN3	7.08	7.01	7.04
MEAN	4.95	4.84	4.89

1ST CUT MEAN DM% 27.6

2ND CUT (3-Dec-14) DRY MATTER TONNES/HECTARE

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

FYM_RES LEY	NONE	FYM	MEAN
LC1	0.32	0.47	0.40
LC2	0.32	0.40	0.36
LC3	0.00	0.00	0.00
LN1	0.60	0.52	0.56
LN2	0.61	0.33	0.47
LN3	0.00	0.00	0.00
(LLC/LC) LC1	0.27	0.44	0.35
(LLC/LC) LC2	0.86	1.05	0.96
(LLC/LC) LC3	0.00	0.00	0.00
(LLN/LN) LN1	0.42	0.88	0.65
(LLN/LN) LN2	0.52	0.92	0.72
(LLN/LN) LN3	0.00	0.00	0.00
MEAN	0.33	0.42	0.37

2ND CUT MEAN DM% 31.8

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14/W/RN/3

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

FYM_RES LEY	NONE	FYM	MEAN
LC1	2.46	2.75	2.60
LC2	5.30	5.28	5.29
LC3	5.25	4.54	4.89
LN1	2.07	2.31	2.19
LN2	8.44	8.80	8.62
LN3	6.47	6.39	6.43
(LLC/LC)LC1	3.08	2.63	2.85
(LLC/LC)LC2	5.68	5.83	5.76
(LLC/LC)LC3	5.15	5.45	5.30
(LLN/LN)LN1	4.96	5.04	5.00
(LLN/LN)LN2	7.38	7.07	7.22
(LLN/LN)LN3	7.08	7.01	7.04
MEAN	5.28	5.26	5.27

TOTAL OF 2 CUTS MEAN DM% 29.1

ARABLE TREATMENT CROPS

BEANS

GRAIN (85% DRY MATTER) TONNES/HECTARE

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

FYMRES ROTATION	NONE	FYM	Mean
(AO)Be	1.81	2.16	1.98
(LLn/AO)Be	3.10	2.93	3.02
(LLc/ABe)Be	1.49	0.91	1.20
(ABe)Be	0.48	0.49	0.48
Mean	1.72	1.62	1.67

GRAIN MEAN DM% 83.9

PLOT AREA HARVESTED 0.00413

Note: In May 2014 the beans were accidentally sprayed with herbicide. Consequently, the above yields should not be used for future analysis.

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14/W/RN/3

OATS

GRAIN (85% DRY MATTER) TONNES/HECTARE

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

FYMRES ROTATION	NONE	FYM	Mean
ABe	5.61	6.03	5.82
AO	5.31	5.48	5.39
LLc/ABe	6.44	6.11	6.27
LLn/AO	4.78	5.04	4.91
Mean	5.53	5.66	5.60

GRAIN MEAN DM% 85.7

PLOT AREA HARVESTED 0.00413

RYE

GRAIN (85% DRY MATTER) TONNES/HECTARE

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

FYMRES ROTATION	NONE	FYM	Mean
(ABe)R	5.34	4.80	5.07
(AO)R	4.66	4.42	4.54
(LLn/AO)R	5.36	4.81	5.08
(LLc/ABe)R	8.13	5.54	6.83
Mean	5.87	4.89	5.38

GRAIN MEAN DM% 83.6

PLOT AREA HARVESTED 0.00413

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14/W/RN/3

W. WHEAT

Grain tonnes/hectare

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

FYMRES ROTATION	none	FYM	Mean
(AO)W	5.71	4.77	5.24
(ABe)W	4.41	5.19	4.80
(LLn/AO)W	7.06	6.65	6.86
(LLc/ABe)W	5.02	4.64	4.83
(LN)W	6.01	5.89	5.95
(LLN/Ln)W	6.48	5.23	5.85
(LC)W	5.18	5.31	5.24
(LLc/Lc)W	7.09	6.33	6.71
Mean	5.87	5.50	5.69

N ROTATION	0	80	160	240	Mean
(AO)W	0.86	5.44	7.51	7.15	5.24
(ABe)W	0.50	4.49	6.62	7.60	4.80
(LLn/AO)W	1.54	6.11	9.66	10.12	6.86
(LLc/ABe)W	0.59	4.90	6.07	7.76	4.83
(LN)W	2.25	5.71	8.49	7.35	5.95
(LLN/Ln)W	1.66	6.40	7.17	8.19	5.85
(LC)W	1.96	4.90	6.57	7.54	5.24
(LLc/Lc)W	1.73	6.82	9.03	9.24	6.71
Mean	1.39	5.60	7.64	8.12	5.69

N FYMRES	0	80	160	240	Mean
none	1.37	6.01	7.61	8.49	5.87
FYM	1.40	5.19	7.67	7.75	5.50
Mean	1.39	5.60	7.64	8.12	5.69

N ROTATION	FYMRES	0	80	160	240
(AO)W	none	0.78	5.64	7.87	8.56
	FYM	0.95	5.24	7.15	5.75
(ABe)W	none	0.33	4.11	6.19	7.01
	FYM	0.66	4.87	7.04	8.18
(LLn/AO)W	none	1.47	6.92	10.05	9.81
	FYM	1.60	5.30	9.28	10.42
(LLc/ABe)W	none	0.66	5.02	5.95	8.46
	FYM	0.53	4.78	6.20	7.05
(LN)W	none	2.52	6.34	7.55	7.62
	FYM	1.97	5.09	9.42	7.09
(LLN/Ln)W	none	1.79	6.96	8.29	8.87
	FYM	1.53	5.84	6.04	7.52
(LC)W	none	1.48	5.32	6.69	7.23
	FYM	2.45	4.48	6.45	7.85
(LLc/Lc)W	none	1.94	7.77	8.32	10.32
	FYM	1.52	5.88	9.74	8.16

Grain mean DM% 83.9
Plot area harvested 0.00192

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14/W/RN/3

W. RYE

Grain tonnes/hectare

FYMRES	none	FYM	Mean
ROTATION			
(AO)R	2.95	3.14	3.05
(ABe)R	3.57	3.45	3.51
(LLn/AO)R	3.73	3.65	3.69
(LLc/ABe)R	3.60	3.85	3.73
(Ln)R	3.91	4.19	4.05
(LLn/Ln)R	4.25	4.25	4.25
(Lc)R	3.81	4.11	3.96
(LLc/Lc)R	4.64	4.09	4.37
Mean	3.81	3.84	3.82

N	0	50	100	150	Mean
ROTATION					
(AO)R	1.99	3.27	3.64	3.28	3.05
(ABe)R	1.98	3.56	4.29	4.20	3.51
(LLn/AO)R	2.43	4.04	4.53	3.76	3.69
(LLc/ABe)R	2.15	3.69	4.52	4.54	3.73
(Ln)R	2.65	4.10	4.76	4.69	4.05
(LLn/Ln)R	2.87	4.37	4.85	4.90	4.25
(Lc)R	2.85	4.24	4.73	4.04	3.96
(LLc/Lc)R	3.77	3.67	4.82	5.20	4.37
Mean	2.59	3.87	4.52	4.33	3.82

N	0	50	100	150	Mean
FYMRES					
none	2.73	3.87	4.44	4.18	3.81
FYM	2.44	3.86	4.60	4.47	3.84
Mean	2.59	3.87	4.52	4.33	3.82

N	0	50	100	150
ROTATION FYMRES				
(AO)R none	1.88	3.30	3.62	3.01
FYM	2.11	3.25	3.66	3.56
(ABe)R none	1.92	3.53	4.34	4.48
FYM	2.04	3.59	4.24	3.92
(LLn/AO)R none	2.64	4.07	4.45	3.74
FYM	2.21	4.00	4.61	3.77
(LLc/ABe)R none	2.12	3.66	4.42	4.19
FYM	2.17	3.71	4.63	4.90
(Ln)R none	2.69	4.10	4.66	4.18
FYM	2.60	4.11	4.85	5.20
(LLn/Ln)R none	2.92	4.35	4.72	5.00
FYM	2.83	4.39	4.99	4.81
(Lc)R none	2.96	4.14	4.44	3.72
FYM	2.73	4.34	5.02	4.36
(LLc/Lc)R none	4.72	3.84	4.86	5.16
FYM	2.83	3.49	4.79	5.25

Grain mean DM% 83.4

Plot area harvested 0.00192

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14/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.

Sponsors: A. J. Macdonald

The 49th year, S Barley and mustard

For previous years see 'Details' 1973 and Yield Books for 74-13/W/RN/12.

Design: 4 blocks of 8 plots

Whole plot dimensions: 8.0 x 29.5 (8.0 x 26.5 on Block III).

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 on 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.
For 2003 the experiment was modified to test further inputs of organic matter. An arable rotation (w. rye, s. barley, w. beans, w. wheat, forage maize) was started on seven plots within each block; the eighth was sown to a grass/clover ley.

Whole plots

1. **Treatment** (Not necessarily applied each year):

1966-1971/2	1979/82-1986/7	Since 2003
Fd	Fd	F
Ln	Lc6	F
St	St	St
Gm	Lc8	CC
Pt	Lc8	Co
Fs	Fs	Dg10
Dg	Dg	Dg25
Lc	Lc6	Lc

F: no organic amendment. St: chopped straw at 7.5t/ha. CC: cover crop prior to spring sown crops. Co: compost at 40t/ha. Dg10: FYM at 10t/ha. Dg25: FYM at 25t/ha. Dg: FYM at 50t/ha. Fd: fertilizers equivalent to FYM. Fs: fertilizers equivalent to straw (+P). Lc/Lc6/Lc8: grass/clover leys. Ln: grass ley + N. Gm: green manure. Pt: peat.

Since 2003, all treatments, except Dg25, have also received PKS fertilizers:
20 kg P/ha, 83 kg K/ha, 36 kg S/ha

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In addition in 2003 F and CC treatments received 120 kg N/ha, St received 90 kg N/ha. Dg10 received 60 kg N/ha. No N was applied to Dg25, Co or Lc treatments.

Nitrogen
In 2008 all plots, except Lc (permanent grass/clover), split into 6 to test rates of N. For crops receiving nitrogen rates rotate as follows:
N0 > N1 > N2 > N3 > N4 > N5 > N0 etc.

For 2009 s. barley crop nitrogen rates (kg N/ha) were:
0, 35, 70, 105, 140, 175 as nitro-chalk (27% N).

No N was applied to the beans in 2010

For 2011 W. wheat nitrogen rates (kg N/ha) were:
0, 50, 100, 150, 200, 250 as nitro-chalk (27% N).

For 2012 Forage Maize nitrogen rates were 0, 50, 100, 150, 200, 250 & 250 kg N/ha as Nitro-chalk (27% N)

For 2013 Winter rye nitrogen rates were 0,30,60,90,120,150 kg N/ha as Nitro-chalk (27% N)

For 2014 S Barley nitrogen rates were 0, 35, 70,105,140,175 kg N/ha as Nitro-chalk (27% N)

Experimental Diary

Date		Application	Rate	Units
10-Sep-13	s	Broadcast mustard cv. Asta undressed - Plots 4, 10,19 and 32	10	kg/ha
10-Sep-13	a	Power harrowed to cover mustard. Plots 4,10,19 and 32	-	-
10-Sep-13	a	Rolled plots 4, 10,19 and 32	-	-
27-Sep-13	p	Sprayed Samurai - Grass and Mustard plots NOT sprayed	4.0	l/ha
27-Sep-13	p	Sprayed Firebrand - Grass and Mustard plots NOT sprayed	1.0	l/ha
05-Mar-14	p	Sprayed Gallup 360. Prep for spring crop. Grass plots not sprayed.	1.0	l/ha
18-Mar-14	f	Applied FYM Plots 8, 14, 18, 28.	10	t/ha
18-Mar-14	f	Applied FYM Plots 5, 11, 23, 26.	25	t/ha
18-Mar-14	a	Applied straw Plots 3, 15, 17 and 31	7.5	t/ha
18-Mar-14	a	Applied compost Plots 7, 12, 21 and 27.	40	t/ha
20-Mar-14	a	Ploughed	-	-
01-Apr-14	s	Drilled Barley var. Tipple	350	seeds/m^2
15-Apr-14	f	Applied TSP - Applied to all plots apart from 5,11,23 and 26	97.5	kg/ha
15-Apr-14	f	Applied SOP - Applied to all plots apart from 5,11,23 and 26	200	kg/ha
30-Apr-14	p	Sprayed Hallmark with Zeon Technology in 200l/ha water volume	40	ml/ha
13-May-14	f	Applied Nitro Chalk applied by hand at rates given above.	-	-
21-May-14	p	Sprayed Refine Max in 150 l/ha water volume	75	g/ha

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21-May-14	p	Sprayed Kingdom in 150 l/ha water volume	1.25	l/ha
21-May-14	p	Sprayed Bravo 500 in 150 l/ha water volume	1.0	l/ha
21-May-14	p	Sprayed Hatchet Xtra in 150 l/ha water volume	0.75	l/ha
13-Jun-14	p	Sprayed Fezan - barley only	0.6	l/ha
14-Jun-14	p	Sprayed Hallmark - barley only	40	ml/ha
26-Jun-14	a	Cut grass plots for yield	-	-
30-Jun-14	a	Mowed grass plots	-	-
01-Jul-14	a	Turned hay	-	-
02-Jul-14	a	Turned hay	-	-
03-Jul-14	a	Baled and Removed hay	-	-
24-Aug-14	a	Combined plots for yield	-	-
06-Sep-14	a	Baled and Removed	-	-
11-Sep-14	p	Sprayed Firebrand in 200 l/ha water volume. Problem with "Auto control" on sprayer, switched to manual.	1.0	l/ha
11-Sep-14	p	Sprayed Samurai in 200 l/ha water volume. Problem with "Auto control" on sprayer, switched to manual.	4.0	l/ha
03-Dec-14	a	Cut grass plots for yield	-	-
10-Dec-14	a	Topped grass plots	-	-

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14/W/RN/12

SPRING BARLEY

GRAIN TONNES/HECTARE (100%DM)

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

Nitrogen Treatment	0kg	35kg	70kg	105kg	140kg	175kg	Mean
F(Fd)	2.14	4.53	5.93	6.64	7.36	7.36	5.66
F(Ln,Lc6)	2.63	5.18	6.99	7.39	7.54	8.10	6.31
St(St)	2.47	4.66	6.52	6.94	7.97	7.71	6.04
CC(Gm,Lc8)	1.77	4.08	5.07	6.06	6.28	6.49	4.96
Co(Pt,Lc8)	4.29	6.44	8.13	8.42	7.98	7.74	7.17
Dg10(Fs)	2.82	5.23	6.58	7.65	7.51	7.77	6.26
Dg25(Dg)	4.38	6.36	7.14	7.24	6.70	7.07	6.48
MEAN	2.93	5.21	6.62	7.19	7.33	7.46	6.13

Standard errors of differences of means

Table	Treatment	Nitrogen	Treatment Nitrogen
rep.	24	28	4
s.e.d.	0.254	0.119	0.383
d.f.	18	105	73.11

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

Treatment			0.314
d.f.			105

Grain Mean %DM 86.5

Plot area harvested (ha)
0.001766 0.001566

GRASS/CLOVER

DRY MATTER TONNES/HECTARE

***** Table of means *****

Year	1st Cut	2nd Cut	Total
2003	-	-	-
2004	1.82	-	1.82
2005	1.86	0.13	1.99
2006	4.07	-	4.07
2007	3.12	1.36	4.48
2008	5.72	1.65	7.37
2009	4.77	-	4.77
2010	4.41	-	4.41
2011	1.46	0.39	1.85
2012	4.11	0.64	4.75
2013	4.65	0.60	5.24
2014	4.09	0.91	5.01

Cut dry matter t/ha (26-Jun-14 & 03-Dec-14)

Note: See previous Yield Books (2004-12) for cutting dates

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14/R/CS/326 and 14/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: A Macdonald and M. J. Glendining,

The 28th year, w. wheat

For previous years see Yield Books for 87-13/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). 0.004 ha
3.0 x 14.5 (W).

Treatments:

STRAW Amounts of straw incorporated into the seedbed (t/ha), cumulative to previous annual dressings:

		R	W
NONE	None	-	-
NORMAL	Normal	3.50	2.56
2 NORMAL	Twice normal	7.00	5.12
4 NORMAL	Four times normal	14.00	10.24

Experimental Diary

Great Knott III (R)

Date		Application	Rate	Units
13-Aug-13	a	Straw baled, sampled and loaded on plots	See above	-
02-Oct-13	s	Drilled var Crusoe - exp site and immediate surrounds	350	seeds/m^2
03-Oct-13	a	Power-harrowed - Exp site and immediate surrounds	-	-
05-Oct-13	a	Rolled	-	-
05-Oct-13	p	Sprayed liberator + Defy	lib@0.6	l/ha
			def@2.0	l/ha
15-Oct-13	p	Applied Major Slug Pellets	4	kg/ha
02-Dec-13	p	Sprayed Hallmark	50	ml/ha
07-Mar-14	f	Applied Double Top Fertilizer (1st N application)	148	kg/ha
29-Mar-14	p	Sprayed Artemis, Bravo 500, Moddus and BASF 3C 720	Art@1	l/ha
			Bra@1	l/ha
			Mod@150	ml/ha
			BASF@1.25	l/ha
01-Apr-14	f	Applied Nitram Fertilizer (2nd N application)	261	kg/ha
23-Apr-14	f	Applied Nitram (3rd N application)	261	kg/ha
25-Apr-14	p	Sprayed Ally Max, Kindom, Bravo 500 and Hatchet Xtra	ally@30	g/ha
			king@1.25	l/ha
			bra@1.0	l/ha
			Hatc@1.0	l/ha
16-May-14	p	Sprayed Vortex	1.5	l/ha
20-Jun-14	a	Cut Paths with Iseki and mower	-	-
31-Jul-14	a	Cut Paths - In and around exp	-	-

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05-Sep-14	a	Sampo -Harvested All Plots for Grain Yield	-	-
08-Sep-14	a	Sampled, Baled and Weighed Straw - All plots with conventional baler	-	-
10-Sep-14	a	Baled and Removed all straw swath	-	-

Far Field I (W)

Date		Application	Rate	Units
11-Sep-13	a	Straw loaded	See above	-
13-Sep-13	a	Plough	-	-
20-Sep-13	s	Drilled var. Crusoe trt Redigo Deter	400	seeds/m^2
20-Sep-13	a	Power harrowed	-	-
22-Sep-13	a	Rolled	-	-
26-Sep-13	a	Put up Rabbit Fencing	-	-
30-Sep-13	p	Sprayed Crystal	4	l/ha
30-Sep-13	p	Sprayed Hurricane	0.1	l/ha
30-Sep-13	p	Sprayed Dictate	0.2	l/ha
18-Nov-13	p	Sprayed Hallmark with Zeon Technology	50	ml/ha
28-Mar-14	f	Applied Double Top Fertilizer (1st N application)	148	kg/ha
01-Apr-14	p	Sprayed Sprinter in 147 l/ha water volume	1.5	l/ha
15-Apr-14	p	Sprayed BASF 3C in 200 l/ha water volume.	1.25	l/ha
16-Apr-14	p	Sprayed Moddus in 200 l/ha water volume.	0.2	l/ha
17-Apr-14	p	Sprayed Kingdom in 200 l/ha water volume.	1.25	l/ha
18-Apr-14	p	Sprayed Bravo 500 in 200 l/ha water volume.	1	l/ha
19-Apr-14	p	Sprayed Hunter in 200 l/ha water volume.	1	l/ha
16-Apr-14	f	Applied Nitram (2nd N application)	203	kg/ha
07-May-14	f	Applied Nitram (3rd N application)	203	kg/ha
21-May-14	p	Sprayed Vortex in 150 l/ha water volume.	1.5	l/ha
06-Jun-14	p	Sprayed Cello in 150 l/ha water volume.	0.55	l/ha
06-Jun-14	p	Sprayed Amistar in 150 l/ha water volume.	0.25	l/ha
06-Jun-14	p	Sprayed Hallmark in 150 l/ha water volume.	40	l/ha
24-Aug-14	a	Combined plots for yield	-	-
06-Sep-14	a	Straw weights done	-	-
11-Sep-14	p	Sprayed Firebrand in 200 l/ha water volume. Problem with "Auto control" on sprayer, switched to manual.	1	l/ha
12-Sep-14	p	Sprayed Samurai in 200 l/ha water volume. Problem with "Auto control" on sprayer, switched to manual.	4	l/ha
02-Oct-14	p	Sprayed Gallup 360 in 200l/ha water volume	4	l/ha
02-Oct-14	p	Sprayed Firebrand in 200l/ha water volume	1	l/ha

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14/R/CS/326

GRAIN TONNES/HECTARE

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

Straw_	
-	9.19
1	9.26
2	9.18
4	9.01
Mean	9.16

Standard errors of differences of means

Table	Straw_
rep.	4
d.f.	9
s.e.d.	0.148

Stratum standard errors and coefficients of variation
==========

Variate: Grain85% Grain (at 85% dry matter) tonnes/hectare

Stratum	d.f.	s.e.	cv%
Blocks	3	0.211	2.3
Blocks.Plots	9	0.210	2.3

Grain mean dm% 84.8

STRAW TONNES/HECTARE

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

Straw_	
-	5.50
1	5.72
2	5.76
4	5.53
Mean	5.63

Standard errors of differences of means

Table	Straw_
rep.	4
d.f.	9
s.e.d.	0.306

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```
Stratum standard errors and coefficients of variation
=====================================================

Variate: Straw85% Straw (at 85% dry matter) tonnes/hectare

Stratum                    d.f.          s.e.         cv%

Blocks                        3         0.178         3.2
Blocks.Plots                  9         0.433         7.7


 Straw mean DM% 94.8


Plot area harvested 0.00284
```

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```
GRAIN TONNES/HECTARE

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

       Straw_
            -      7.92
            1      8.47
            2      7.71
            4      6.88

         Mean      7.75

Standard errors of differences of means
---------------------------------------

Table                Straw_
rep.                      3
d.f.                      6
s.e.d.                0.701


Stratum standard errors and coefficients of variation
=====================================================

Variate: Grain85% Grain (at 85% dry matter) tonnes/hectare

Stratum                    d.f.          s.e.         cv%

Blocks                        2         0.330         4.3
Blocks.Plots                  6         0.858        11.1


 Grain mean DM% 87.4
```


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```
STRAW TONNES/HECTARE

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

        Straw_
            -       4.30
            1       4.40
            2       4.51
            4       4.96

         Mean       4.54

Standard errors of differences of means
---------------------------------------

Table                Straw_
rep.                      3
d.f.                      6
s.e.d.                0.171


Stratum standard errors and coefficients of variation
=====================================================

Variate: Straw85% Straw (at 85% dry matter) tonnes/hectare

Stratum                   d.f.          s.e.         cv%

Blocks                       2         0.128         2.8
Blocks.Plots                 6         0.210         4.6


 Straw mean DM% 88.8


Plot area harvested 0.00305
```


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14/R/CS/477

CONTINUOUS MAIZE

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

Sponsors: A. J. Macdonald

The 18th year, forage maize and s. barley

For previous years see Yield Books for 97-13/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) S. barley, after ten years of Maize, straw removed
BT Continuous spring barley, straw removed plus 10 t maize tops incorporated
B Continuous spring barley, straw removed
Note: Cropping was changed from Maize to S. barley on the BM treatment in 2010, but returned to maize again in 2013.

Experimental diary

Date		Application	Rate	Units
01-Oct-13	a	Topping	-	-
08-Oct-13	a	ploughed	-	-
08-Oct-13	a	Applied Maize tops	10	t/ha
08-Oct-13	f	Applied MOP Fertiliser	181	kg/ha
08-Oct-13	f	Applied TSP Fertilizer	171	kg/ha
26-Mar-14	p	Sprayed Firebrand	1.0	l/ha
26-Mar-14	p	Sprayed Samurai	2.0	l/ha
31-Mar-14	p	Spring-tined All site and surrounds	-	-
31-Mar-14	p	Power-harrowed All site and surrounds	-	-
02-Apr-14	s	Drilled Barley var. Tipple	350	seeds/m^2
04-Apr-14	a	Rolled Barley Plots	-	-
16-Apr-14	a	Applied Doubletop N Fertilizer to all plots	356	kg/ha
15-May-14	a	Flexi-tined Maize Plots	-	-
15-May-14	a	Power-harrowed Maize Plots	-	-
16-May-14	s	Drilled Maize plots var. Hudson dr mesurol	11.5	seeds/m^2
20-May-14	p	Sprayed Simba SX - Barley only	20	g/ha
20-May-14	p	SprayedHatchet Xtra - Barley only	600	ml/ha
20-May-14	p	Sprayed Cello - Barley only	600	ml/ha
18-Jun-14	p	Sprayed Mobius - Barley only	400	ml/ha
19-Jun-14	p	Sprayed Samson Extra 6% - Maize only	500	ml/ha
19-Jun-14	p	Sprayed Callitso - Maize only	750	ml/ha
05-Sep-14	a	Claas Round Baler - Baled and Removed OE	-	-

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		Straw - This is the area that needs to be removed in order for the plots to be harvested.		
05-Sep-14	a	Sampo Harvested all barley plots for yield	-	-
30-Sep-14	a	Harvested all maize plots for yield - harvested by hand	-	-
30-Sep-14	a	Harvested and removed all leftover Maize - Maize plots only	-	-
01-Oct-14	a	Harvesting Leftover maize from Trial - all maize harvested and removed	-	-

NOTE: Samples of barley grain and maize (whole crop) were taken for chemical analyses.

```
MAIZE

WHOLE CROP TONNES/HECTARE (100% DM)

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

    Treatment
            M     10.71
           MT     11.24
         M(B)     14.04
         (B)M     14.83

         Mean     12.71
Standard errors of differences of means
---------------------------------------

Table            Treatment
rep.                     3
d.f.                     6
s.e.d.               1.458

Stratum standard errors and coefficients of variation
=====================================================

Variate: TPlDm Total plant dry matter tonnes/hectare

Stratum                   d.f.          s.e.         cv%

Blocks                       2         1.218         9.6
Blocks.Plots                 6         1.785        14.0

MEAN DM% 30.8

Plot area harvested 0.00108
```

Note: The barley yields were not recorded because of a problem with the Sampo plot-combine. Consequently, these yields have been excluded.

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14/W/CS/478

CONTINUOUS MAIZE

Object: To monitor the fate of organic carbon in the soil organic matter – Woburn, Stackyard AI

Sponsors: A. J. Macdonald

The 18th year, forage maize and s. barley

For previous years see Yield Books for 97-13/W/CS/478

Design: 3 randomised blocks of 6 plots.

Plot dimensions: 9.0 x 25.00

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) S. barley, after ten years of maize, straw removed
BT Continuous spring barley, straw removed plus 10 t maize tops incorporated
B Continuous spring barley, straw removed

Note: Cropping was changed from Maize to S. barley on the BM treatment in 2010, but returned again to maize in 2013.

NOTE: Samples of barley grain and maize (whole crop) were taken for chemical analyses.

Experimental diary

Date		Application	Rate	Units
07-Oct-13	f	Applied TSP Fertilizer	171	kg/ha
08-Oct-13	f	Applied MOP Fertiliser	181	kg/ha
16-Oct-13	a	Applied Maize tops to Plots 2,4,12,13,16 and 17.	10	t/ha
30-Oct-13	a	Ploughed	-	-
20-Jan-14	p	Sprayed Samurai in 200 l/ha water volume.	4.0	l/ha
24-Feb-14	p	Spring tined	-	-
13-Mar-14	s	Drilled Barley var. Tipple tr Raxil Star	350	seeds/m^2
14-Mar-14	a	Rolled	-	-
01-Apr-14	p	Sprayed Sprinter in 147 l/ha water	1.5	l/ha
30-Apr-14	p	Sprayed Hallmark with Zeon Technology in 200 l/ha water volume	40	ml/ha
12-May-14	f	Applied Doubletop N Fertilizer to all plots	356	kg/ha
19-May-14	a	Spring Tined. Maixe prep	-	-
20-May-14	s	Drilled Maize plots var. Hudson tr. Mesural	10.1	seeds/m^2
20-May-14	a	Rolled prior to drilling	-	-
21-May-14	p	Sprayed Refine Max - in 150 l/ha water volume barley only	75	g/ha
21-May-14	p	Sprayed Kingdom - in 150 l/ha water volume - barley only	1.25	l/ha
21-May-14	p	Sprayed Bravo 500 - in 150 l/ha water volume - barley only	1.0	l/ha

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21-May-14	p	Sprayed Hatchet Xtra - in 150 l/ha water volume - barley only	0.75	l/ha
13-Jun-14	p	Sprayed Fezan - Barley only	0.6	l/ha
13-Jun-14	p	Sprayed Hallmark - Barley only	40	ml/ha
01-Jul-14	p	Sprayed Callisto in 200 l/ha water volume	0.75	l/ha
01-Jul-14	p	Sprayed Samson Extra in 200 l/ha water volume	0.5	l/ha
24-Aug-14	a	Combined barley plots for yield	-	-
06-Sep-14	a	Baled and Removed	-	-
02-Oct-14	a	Cut Maize for yields	-	-
02-Oct-14	a	Mowed and Baled Discards	-	-
02-Oct-14	p	Sprayed Gallup 360 in 200 l/ha water volume.	4.0	l/ha
02-Oct-14	p	Sprayed Firebrand in 200 l/ha water volume.	1.0	l/ha

```
MAIZE WHOLE CROP TONNES/HECTARE (100% DM)

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

    Treatment
            M      2.69
           MT      5.52
         M(B)      3.54
         (B)M      5.68

         Mean      4.36

Standard errors of differences of means
---------------------------------------

Table            Treatment
rep.                     3
d.f.                     6
s.e.d.               0.949

Stratum standard errors and coefficients of variation
=====================================================
Stratum                  d.f.          s.e.         cv%

Blocks                      2         1.011        23.2
Blocks.Plots                6         1.162        26.7

Mean DM% 34.6

Plot area harvested 0.00108
```


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14/W/CS/478

SPRING BARLEY

GRAIN TONNES/HECTARE

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

Treatment	
BT	4.10
B	3.26
Mean	3.68

Standard errors of differences of means

Table	Treatment
rep.	3
d.f.	2
s.e.d.	0.516

Stratum standard errors and coefficients of variation
==========

Stratum	d.f.	s.e.	cv%
Blocks	2	0.105	2.9
Blocks.Plots	2	0.632	17.2

Grain mean DM% 84.8

Plot area harvested 0.00525

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Rothamsted Research

The Weather : Monthly Summary : 2014

(Departure from the 30 year means (1981 - 2010) in brackets)

	Sunshine		Mean temperatures °C								Rain		Rain	Drainage	Wind
			Maximum		Minimum		Dew point	Ground	In ground under grass		Tipping Bucket			20"	
	Hours	()	°C	()	°C	()	°C	frosts*	30 cm	100 cm	Total mm	()	days**	mm	km/hr***
January	59.9	(-2.10)	8.5	(+1.83)	2.9	(+1.66)	3.36	9	5.8	7.3	176.2	(+106.25)	28	201.9	10.5
February	93.1	(+12.88)	9.0	(+2.07)	3.2	(+2.31)	4.64	13	5.5	6.5	141.9	(+91.80)	23	125.0	12.3
March	180.8	(+65.91)	12.7	(+2.84)	3.4	(+0.73)	5.73	12	7.2	7.3	28.2	(-22.57)	16	9.9	8.6
April	162.7	(+1.51)	14.8	(+2.19)	6.1	(+2.12)	7.89	3	10.3	9.2	31.5	(-23.54)	14	0.1	8.4
May	173.6	(-20.98)	16.5	(+0.41)	8.3	(+1.39)	9.52	2	13.0	11.3	82.8	(+28.14)	18	15.7	7.7
June	227.7	(+29.53)	20.1	(+1.01)	10.6	(+0.88)	11.66	0	16.1	13.7	30.5	(-22.77)	14	0.7	6.0
July	233.4	(+28.25)	23.9	(+2.11)	13.3	(+1.40)	13.69	0	17.8	15.6	36.9	(-13.00)	14	0.2	7.0
August	168.9	(-27.38)	20.0	(-1.59)	11.4	(-0.44)	11.3	0	16.7	16.1	113.3	(+49.59)	22	34.7	7.8
September	118.9	(-24.46)	20.1	(+1.85)	11.6	(+1.71)	13.6	0	15.9	15.4	14.8	(-42.81)	13	0.2	5.5
October	98.9	(-12.84)	16.0	(+1.97)	9.8	(+2.63)	11.5	4	13.5	14.1	95.7	(+14.05)	24	44.8	7.8
November	56.3	(-14.48)	11.3	(+1.53)	5.9	(+2.06)	7.9	9	10.4	12.0	108.2	(+31.57)	27	77.6	6.5
December	94.7	(+40.85)	8.1	(+1.20)	2.1	(+0.41)	2.9	17	6.9	9.2	64.0	(-5.57)	24	38.3	11.0
Year	1669.0	(+76.69)	15.1	(+1.45)	7.4	(+1.40)	8.6	69.0	11.6	11.5	924.1	(+191.13)	237.0	549.1	8.3

* Number of nights grass minimum was below 0.0 °C

** Number of days rain was 0.2 mm or more

*** At 2 metres above the ground

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Woburn Experimental Farm

The Weather : Monthly Summary : 2014

(Departure from 30-year means (1981 - 2010) in brackets)

	Sunshine		Mean temperatures °C								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	74.2	(+14.14)	9.0	(+1.93)	2.7	(+1.39)	3.6	12	5.7	7.7	128.0	(+73.47)	28	9.7
February	94.2	(+19.31)	9.3	(+1.96)	3.6	(+2.67)	3.8	7	5.8	6.9	100.0	(+57.84)	23	12.7
March	171.7	(+58.22)	13.1	(+2.75)	3.0	(+0.37)	5.1	16	7.4	7.5	33.4	(-12.51)	16	8.0
April	142.0	(-8.89)	15.1	(+2.02)	5.1	(+1.33)	7.8	15	10.8	9.2	36.0	(-16.21)	14	6.7
May	181.0	(-6.18)	17.1	(+0.50)	7.5	(+0.95)	9.3	7	14.1	11.5	118.8	(+65.54)	18	6.9
June	227.8	(+39.90)	20.8	(+1.23)	9.8	(+0.44)	11.3	0	17.8	14.2	59.2	(+9.13)	15	5.4
July	243.3	(+46.23)	24.7	(+2.62)	12.6	(+0.93)	13.4	0	20.0	16.4	41.4	(-8.49)	11	6.2
August	181.6	(-7.23)	20.6	(-1.32)	11.2	(-0.37)	11.2	2	17.9	17.1	109.4	(+51.61)	18	8.4
September	113.0	(-24.10)	20.5	(+1.82)	9.9	(+0.29)	13.4	5	16.7	16.2	8.1	(-49.00)	6	4.3
October	101.9	(-9.90)	16.5	(+2.09)	9.7	(+2.78)	11.4	4	13.8	14.9	93.7	(+22.90)	24	8.3
November	53.5	(-12.77)	11.6	(+1.65)	5.0	(+1.24)	7.7	12	10.3	12.8	84.5	(+22.05)	25	5.2
December	84.8	(+39.16)	8.3	(+1.14)	1.9	(+0.46)	3.5	19	6.8	10.0	50.2	(-5.60)	20	11.2
Year	1668.9	(+147.89)	15.6	(+1.53)	6.9	(+1.03)	8.5	99.0	12.3	12.1	862.7	(+210.72)	218.0	7.7

* Number of nights grass minimum was below 0.0 °C

** Number of days rain was 0.2 mm or more

*** At 2 metres above ground

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