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Yields of the Field Experiments 1984



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Rothamsted Research

Rothamsted Research (1985) *Default Title*; Yields Of The Field Experiments 1984, pp 1 - 347 - **DOI:** https://doi.org/10.23637/ERADOC-1-32

Rothamsted Experimental Station

Harpenden

Lawes Agricultural Trust

YIELDS

of the

FIELD

EXPERIMENTS

1984

This report is produced by members of the Statistics Department and of the Field Experiments Section. It includes only experiments conducted at Rothamsted, Woburn and Saxmundham. Only those experiments which have the determination of crop yields as an object are included. For many of these, other determinations are of equal or greater importance.

Price: £10.00

Published 1985



CONTENTS 1984

	CONTENTS 1984		
			Page
CONVENTIONS			7
EXPERIMENTS	CLASSICALS		
Broadbalk	W. wheat, potatoes	R/BK/1	9
Hoosfield	S. barley	R/HB/2	14
Wheat & Fallow	W. wheat	R/WF/3	18
Exhaustion Land	S. barley	R/EX/4	19
Park Grass	Old grass	R/PG/5	21
Agdell Barnfield	W. wheat	R/AG/6	26
Garden Clover	Ryegrass Clover	R/BN/7	29
Rotation I	Grass, w. beans, w. wheat,	R/GC/8	33
Notation 1	s. barley	S/RN/1	35
Rotation II	W. wheat, w. beans	S/RN/2	44
	no mode, ne podno	3/111/2	77
	ROTATIONS		
Ley/Arable	Old grass, leys,		
1 / 0 1.2	s. oats, w. wheat	R/RN/1&2	47
Ley/Arable	Leys, s. barley, s. beans,		
Market Garden	w. wheat	W/RN/3	57
Arable Reference Plots	Red beet, carrots, clover	W/RN/4	67
Alabie Reference Plots	W. barley, ley, potatoes, w. wheat, w. oats,		
	permanent grass	D/DN/E	76
Cultivation/Weedkiller	W. barley	R/RN/5 R/RN/8	76 81
Organic Manuring	S. beet, w. oats, ley	W/RN/12	85
Intensive Cereals	W. wheat, ley	W/RN/13	90
Effects of Deep PK	S. barley, s. oats	W/RN/16	92
Rates of P & K to the		.,,	
Subsoil	S. beans, w. wheat, potatoes,		
	s. barley	R/RN/17	96
	CROP SEQUENCES		
Long Term Liming	Fallow	R&W/CS/10	103
N Levels to Old Grass	Old grass	R/CS/13	104
Nematicides in Crop	2		
Sequence	Potatoes, w. wheat, s. barley	W/CS/34	107
Nematicides Dosage	Potatoes, w. wheat	W/CS/35	114
Dazomet & Nitrogen Effects of Breaks on	Maize	W/CS/66	122
Take-all	S. barley, s. wheat	W/CS/99	124
Control of Pathogens	Maize	R/CS/133	127
Chemical Reference Plots	S harley	D /00 /140	100
11003	S. barley	R/CS/140	129

CROP SEQUENCES (continued)

Seasonal Effects of			
Take-all	W. beans, s. beans	R/CS/212	133
Effects of Subsoiling			
& Deep PK	S. barley	R&W/CS/216	135
Minimum Cultivation & Deep PK	W wheat w banlow	11/05/045	100
Effects of Subsoiling	W. wheat, w. barley	W/CS/245	138
& Deep PK	S. barley	R/CS/246	149
Organic Matter &		11,03/240	143
Earthworm Inoculation	S. barley	R/CS/247	152
Intensive Potatoes	Potatoes, s. barley	W/CS/273	154
Nematicides & Stem Nematode	Lucana	2 (22 (27)	
Varieties & PCN	Lucerne	R/CS/279	161
Tolerance	Potatoes	W/CS/284	170
Nitrification		H/03/204	170
Inhibitors	W. wheat	W/CS/293	174
Nematicide Sprays &			
Stem Nematode	Lucerne	R/CS/298	178
Crops & <u>Rhizoctonia</u> Nitrification	W. wheat, w. barley	R/CS/299	183
Inhibitors	Ley	11/05/204	100
Factors Affecting Yield	W. wheat	W/CS/304	186
accord miccomy field	n · micac	S/CS/1	191

ANNUALS

WINTER WHEAT

Varieties	R&W/WW/1	196
Factors Limiting Yield	R/WW/3	201
Soil Compaction & Yield	W/WW/3	219
Weedkiller Rates	R/WW/4	228
Control of Slugs	R/WW/5	230
Seed Dressings & Take-all	R/WW/6	232
Aphid Control by Erynia	R/WW/7	234
Persistence of Aphicides	R/WW/12	236
Electrostatic Application of Post-Emergence Weedkiller	R/WW/13	238
Chloride & Take-all	R/WW/15	240

BARLEY

Factors Limiting Yield (w. barley) Mildew Study (w. & s. barley) Electrostatic Spraying & Foliar Diseases (w. barley) Sowing Dates & Insects (s. barley) Varieties & N (s. barley) Mildew Sensitivity (s. barley) Plot Sizes & Mildew Spread (s. barley) Interference Between Plots (s. barley) Sowing Dates & Insects (s. barley) Timing of Electrostatic Sprays (s. barley) Mildew Control by Electrostatic Sprayers (s. barley)	R/B/1 W/B/1 R/B/2 W/B/2 R&W/B/7 R/B/8 R/B/10 R/B/11 R/B/12 R/B/13 R/B/14	242 254 260 262 264 267 269 271 273 275 278
FIELD BEANS		
Effects of Pests & Pathogens (w. beans) Sowing Methods, Dates & Seed Rates (w. beans) Control of Sitona (w. beans) Varieties (w. beans) Sowing Methods & Nematode Control (w. beans) Effects of Pests & Pathogens (s. beans) Control of Pratylenchus (s. beans) Erynia & Aphid Control (s. beans) Control of Stem Nematode (s. beans) Varieties (s. beans) Seed Rates & Plant Health (s. beans) Control of Rust (s. beans) Fungicides for Rust Control (s. beans)	R/BE/1 R/BE/2 R/BE/3 R/BE/7 R/BE/8 R/BE/9 R/BE/10 R/BE/11 R/BE/12 R/BE/14 R/BE/15 R/BE/16 R/BE/18	280 282 285 287 289 291 293 295 297 299 301 303 307
PEAS		
Control of Pests & Diseases	R/PE/1	309
N, Rhizobium & Pest Control WINTER OILSEED RAPE	R/FE/1	311
Urea & Inhibitors Spring Nitrogen Inhibitors Methods of Applying Growth Regulator Mustard Oil	R/RA/2 R/RA/6 R/RA/7 R/RA/8	313 316 318 320
MAIZE		
Varieties, Sowing Dates & Polythene Covers	R/MA/1	322

POTATOES		
Varieties & Stem Canker Methods of Applying Fungicides to Seed Seed Health	R/P/1 R/P/2 R/P/3	326 333 336
MIXED CROPS		
Nitrogen, Sulphur & Storage Proteins (s. wheat & s. barley) MISCELLANEOUS DATA	W/M/1	340
METEOROLOGICAL RECORDS		
Rothamsted, Woburn & Saxmundham CONVERSION FACTORS	E/1	344

CONVENTIONS 1984

For each experiment current treatments are shown, together with the factor and level names which are used in the tables. The program used for the analyses of these experiments limits level names to eight characters, and factor names similarly, though a suffix of up to 3 digits in brackets may be appended.

For each experiment, other than annuals, references are given to previous years. These refer to the '(Numerical)(Results) Yields of the Field Experiments' - (t) indicates a year when treatments were described. Since 1973 treatments have been described annually for all experiments and (t) is not used for these years.

For the classical and some long-term experiments reference is made to 'Details' - separate publications, giving full descriptions of treatments until 1967 & 1973, with full titles 'Details of the Classical and Long Term Experiments up to 1967' and 'Details of the Classical and Long Term Experiments up to 1973'.

The following conventions are observed unless otherwise stated.

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

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

All yields and plant numbers are per hectare.

The following abbreviations are used in variate headings:

Wheat, barley, oats, beans etc.

Grain:

Grain (at 85% dry matter)

Straw:

Straw (at 85% dry matter)

Sugar beet

Roots:

Roots (washed)

Sugar %:

Sugar percentage of washed roots

All crops

Mean D.M. %:

Mean dry matter % as harvested

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

'Nitro-Chalk' refers to the grade containing 26% N unless otherwise stated.

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

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

Harvest areas for cereals

On most of those cereal experiments at Rothamsted and Woburn (but not Saxmundham) which are harvested by combine the 'blank-row' technique is used to distinguish the areas taken for yield from the discard areas. When seed is drilled in rows 7 in. (18 cm) apart (a common arrangement), appropriate coulters are prevented from sowing and 8 or 16 rows are left for yield according to the cutter-bar width of the combine to be used. If the row-spacing is other than 7 in. a similar arrangement is used but with a different number of rows.

The ends of plots are separated from each other or from headlands by 3 ft (91 cm) fallow paths made after the crop has established.

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

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

A series of experiments at Rothamsted showed that on average the yield of 16 rows (50 ft (15 m) long) was 7.8% greater with blank rows than without. (Experimental Husbandry 23 pp 16-20 (1972)).

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

width of cutter bar x length of rows.

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

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

We do not apply the adjustment used by some workers who take the harvested areas as width x length where each is measured to the centre of 'paths' up to a maximum of 18 in. (46 cm).

Tables of means

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

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

Standard errors

NOTES: (1) This report gives standard errors of differences, not of means.

(2) Annotations (e.g. * min rep, max-min, max rep) to S.E.Ds are only explained the first time they occur in any experiment.

BROADBALK

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

The 141st year, w. wheat, fallow, potatoes.

For previous years see 'Details' 1967 and 1973, Station Report for 1966, pp. 229-231, Station Report for 1968, Part 2, and 74-83/R/BK/1.

Areas harvested:

Wheat:	Section	
	0	0.00434
	1	0.00798
	2,3,5,and 6	0.00659
	8 and 9	0.00694
Potatoes:	7	0.00659

Treatments:

Whole plots

PLOT			and organic manures:-	
		Treatments	Treatments	Changes
	Plot	until 1967	from 1968	from 1980
01DN2PK	01	_	D N2 P K	
21DN2	21	D	D N2	-
22D	22	D	D	
030	03	None	None	_
05F	05	P K Na Mg	P K (Na) Mg	_
06N1F	06	N1 P K Na Mg	N1 P K (Na) Mg	-
07N2F	07	N2 P K Na Mg	N2 P K (Na) Mg	_
08N3F	80	N3 P K Na Mg	N3 P K (Na) Mg	_
09N4F	09	N*1 P K Na Mg	N4 P K (Na) Mg	_
10N2	10	N2	N2	
11N2P	11	N2 P	N2 P	_
12N2PNA	12	N2 P Na	N2 P Na	_
13N2PK	13	N2 P K	N2 P K	_
14N2PKMG	14	N2 P Mg	N2 P K Mg	
15N3F	15	N2 P K Na Mg	N3 P K (Na) Mg	_
16N2F	16	N*2 P K Na Mg	N2 P K (Na) Mg	_
17N1+3FH	17	N2(A)	N2 1/2(P K (Na) Mg)	N1+3 1/2(PK (Na) Mg)+
18N0+3FH	18	P K Na Mg(A)	N2 1/2(P K (Na) Mg)	
19C	19	C	C (,,	/=(/// (//// //// //// //// //// ////
20NKMG	20	N2 K Na Mg	N2 K (Na) Mg	-

(A) Alternating

⁺ To w. wheat only; autumn N alternates. Potatoes receive N3 $1/2(PK\ (Na)\ Mg)$ on both plots 17 and 18.

N1,N2,N3,N4: 48, 96, 144, 192 kg N (as sulphate of ammonia until 1967, except N* which was nitrate of soda. All as 'Nitro-Chalk' in spring from 1968).

NO+3; N1+3: None in autumn + 144 kg N in spring; 48 kg N in autumn + 144 kg N in spring.

P: 35 kg P as single superphosphate (triple superphosphate in 1974)

K: 90 kg K as sulphate of potash

Na: 55 kg Na as sulphate of soda

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

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

D: Farmyard manure at 35 tonnes C: Castor meal to supply 96 kg N F: P K (Na) Mg H: Half rate

Strips of sub-plots: Until 1967 wheat alone was grown on the experiment, with some bare fallowing on strips of sub-plots.

From 1968, ten sub-plots were started with the following cropping:-

				70,									
					74,								
		2000	1400000	and	and	and							
SECTION	Section	68	69	76	77	78	79	80	81	82	83	84	
SCO/W33	0	W	W	W	W	W	W	W	W	W	W	W	
SC1/W18	1	W	W	W	W	W	W	W	W	W	W	W	
SC2/W1P	2	BE	W	P	BE	W	F	P	W	F	P	W	
SC3/W5	3	W	W	F	W	W	F	W	W	W	W	W	
-	4	W	P	BE	W	P	P	W	F	P	W	F	
SC5/W6	5	W	F	W	W	F	W	W	W	W	W	W	
SC6/W7	6	F	W	W	F	W	W	W	W	W	W	W	
POTATOES	7	P	BE	W	P	BE	W	F	P	W	F	P	
SC8/W3	8*	W	W	W	W	W	W	W	F	W	W	W	
SC9/W26	9	W	W	W	W	W	W	W	W	W	W	W	

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

NOTES: (1) For a fuller record of treatments see 'Details' etc.
(2) Since autumn 1975 chalk is applied at 2.9 t each
autumn to sets of Sections on a three-year cycle.
Year 1: Sections 1,2,3. Year 2: Sections 6,7,8 and 9.
Year 3: Sections 0,4,5. Chalk is applied to all plots
of each section.

Standard applications:

W. wheat: Manures: Sections 0 and 5 only: Chalk at 2.9 t. Weedkillers: (not applied to section 8): Chlortoluron at 3.5 kg in 250 l. Cyanazine at 0.30 l and mecoprop at 2.0 l in 250 l. Fungicide: Propiconazole at 0.25 kg in 250 l. Insecticide: Pirimicarb at 0.14 kg in 500 l.

^{*} No weedkillers

Potatoes: Weedkillers: Linuron at 1.3 kg and paraquat at 0.50 kg ion in 500 l. Fungicide: Fentin hydroxide at 0.28 kg, on six occasions, the first in 250 l and the remainder in 200 l, applied with the insecticide on the first and third occasions. Insecticide: Pirimicarb at 0.14 kg on two occasions.

Fallow: Manures: Chalk at 2.9 t.

Seed: W. wheat: Flanders, dressed chlorfenvinphos, sown at 210 kg. Potatoes: Pentland Crown.

Cultivations, etc.:-

All Sections: Sulphate of potash, sulphate of soda, kieserite and castor meal applied: 6 Sept, 1983. Superphosphate applied: 7 Sept. FYM applied: 8 Sept. Ploughed: 9 Sept. Spring-tine cultivated: 4 Oct.

Cropped Sections: W. wheat: Chalk to sections 0 and 5: 31 Aug, 1983.

Autumn N applied: 7 Sept. Rotary harrowed, seed sown: 6 Oct.

Chlortoluron applied (except Section 8): 1 Dec. Cyanazine and
mecoprop applied (except Section 8): 10 Apr, 1984. Spring N applied:
13 Apr. Fungicide applied: 11 June. Insecticide applied: 28 June.

Combine harvested: 14 Aug.

Potatoes: Chisel ploughed: 13 Dec, 1983. N applied: 3 Apr, 1984.
Rotary harrowed, potatoes planted: 4 Apr. Rotary ridged: 10 Apr.
Weedkillers applied: 3 May. Fentin hydroxide with the insecticide applied: 19 June, 16 July. Fentin hydroxide applied: 3 July, 30 July, 13 Aug, and 28 Aug. Haulm mechanically destroyed: 3 Sept.
Lifted: 4 Sept.

Fallow: Chalk applied: 31 Aug, 1983. Chisel ploughed: 13 Dec. Ploughed: 1 May, 1984. Heavy spring-tine cultivated: 8 May. Ploughed: 18 June. Spring-tine cultivated: 25 June. Rotary cultivated: 23 July.

NOTE: The percentage weights of weed seeds in the recorded grain yields of plots in Section 8 were measured. Only five plots exceeded 3% (Plots 05 and 06 10%; Plot 19 5%; Plots 07 and 16 4%) and no adjustments have been made.

84/R/BK/1 W.WHEAT

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

SECTION PLOT	SC2/W1P	SC8/W3	SC3/W5	SC5/W6	SC6/W7	SC1/W18	SC9/W26	SCO/W33	MEAN
01DN2PK	8.92	*	8.27	8.04	7.89	*	*	*	8.28
21DN2	9.26	4.08	8.32	9.41	8.31	8.67	8.42	8.90	8.17
22D	8.56	5.03	6.62	7.11	6.30	6.59		7.13	6.83
030	3.55	1.74	2.10	1.63	1.43	2.11	1.95	2.26	2.10
05F	3.60	2.35	1.90	1.91	1.78	1.97	1.79	2.40	2.21
06N1F	5.67	2.52	3.41	3.67	3.46	3.89	4.14	4.47	3.90
07N2F	7.24	2.28	5.50	5.19	5.38	5.92	5.62	5.76	5.36
08N3F	7.90	2.90	6.19	6.28	6.27	6.82	6.58	6.87	6.23
09N4F	8.33	3.37	6.75	6.69	6.39	6.61	6.82	6.71	6.46
10N2	5.46	3.37	4.26	5.00	4.15	3.58	2.95	3.64	4.05
11N2P	6.41	2.14	3.42	4.25	4.13	3.86	2.02	4.02	3.78
12N2PNA	6.68	2.94	4.73	4.56	5.03	4.78	3.97	5.04	4.72
13N2PK	7.25	2.23	5.09	5.11	5.21	5.43	5.91	5.39	5.20
14N2PKMG	7.22	2.67	5.32	5.11	5.10	5.56	5.50	5.60	5.26
15N3F	7.79	2.59	6.03	5.86	6.21	6.23	6.10	6.44	5.91
16N2F	7.31	1.96	5.40	5.16	5.18	5.44	5.58	5.68	5.21
17N1+3FH	8.01	3.30	6.31	6.56	6.60	6.76	6.31	6.16	6.25
18N0+3FH	8.02	2.95	5.68	6.10	6.09	6.13	5.87	6.05	5.86
19C	5.52	3.14	3.45	4.04	2.85	4.00	4.15	3.89	3.88
20NKMG	*	*	*	*	*	4.03	*	3.91	3.97

GRAIN MEAN DM% 84.7

STRAW TONNES/HECTARE

**** TABLES OF MEANS ****

SECTION PLOT	SC2/W1P	SC1/W18	MEAN
01DN2PK	6.65	*	6.65
21DN2	7.43	7.65	7.54
22D	6.59	5.22	5.91
030	2.04	1.46	1.75
05F	2.20	1.52	1.86
06N1F	3.04	2.39	2.72
07N2F	4.04	3.10	3.57
08N3F	4.70	3.54	4.12
09N4F	5.30	3.84	4.57
10N2	2.20	2.32	2.26
11N2P	2.91	1.86	2.39
12N2PNA	3.19	1.80	2.49
13N2PK	3.92	2.60	3.26
14N2PKMG	3.85	2.56	3.20
15N3F	4.69	3.23	3.96
16N2F	3.90	2.79	3.35
17N1+3FH	4.98	4.05	4.52
18N0+3FH	4.15	3.09	3.62
19C	3.36	3.34	3.35
20NKMG	*	2.45	2.45

STRAW MEAN DM% 78.5

POTATOES

**** TABLES OF MEANS ****

	TOTAL TUBERS	% WARE
	TONNES/	3.81 CM(1.5
PLOT	HECTARE	INCH) RIDDLE
O1DN2PK	21.8	91.4
21DN2	28.6	91.9
22D	29.1	95.8
030	7.4	89.5
05F	13.7	94.6
06N1F	18.0	93.6
07N2F	21.9	92.1
08N3F	25.3	93.1
09N4F	27.9	94.4
10N2	8.4	90.3
11N2P	9.4	88.0
12N2PNA	11.7	86.0
13N2PK	17.3	91.5
14N2PKMG	20.8	93.2
15N3F	24.2	95.2
16N2F	24.2	95.2
17N3FH	19.8	93.5
18N3FH	22.2	94.6
190	16.4	94.8

HOOSFIELD

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

The 133rd year, s. barley.

For previous years see 'Details' 1967 and 1973, Station Report for 1966 and 74-83/R/HB/2.

Treatments: All combinations of:-

1. MANURE Fertilizers and organic manures:

	Form of N 1852-1966	Additional treatments 1852-1979	Changes since 1980
	None	-	
-P-	None	P	
K	None	K(Na)Mg	_
-PK	None	PK(Na)Mg	
A	A	- "(""	
AP-	A	P	_
A-K	A	K(Na)Mg	_
APK	A	PK(Na)Mg	
N	N	()9	_
NP	N	P	-
N-K	N	K(Na)Mg	_
NPK	N	PK(Na)Mg	_
NS-	N	Si	Si omitted
NP-S-	N	P Si	II OIII CCC C
N-KS-	N	K(Na)MgSi	11
NPKS-	N	PK(Na)MgSi	II .
NS	N	-	Si added
NPS	N	P	II added
N-K-S	N	K(Na)Mg	II .
NPK-S	N	PK(Na)Mg	н
NSS	N	Si	-
NP-SS	N	P Si	-
N-KSS	N	K(Na)MgSi	-
NPKSS	N	PK(Na)MgSi	_
C()	C	-	PKMg omitted
C(P-)		P	II III
C(-K)	C C	K(Na)Mg	II .
C(PK)	С	PK(Na)Mg	11
D	None	D	_
(D)	(D)	-	-
(A)	(Ashes)	-	_
-	None	-	_

Form of N: A, sulphate of ammonia: N, nitrate of soda - each to supply

48 kg N: C, castor meal to supply 96 kg N

K: 90 kg K as sulphate of potash

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

Mg: 35 kg Mg, as kieserite every third year since 1974 (sulphate of magnesia annually until 1973)

P: 35 kg P as single superphosphate (triple superphosphate in 1974)

Si: Silicate of soda at 450 kg

D: Farmyard manure at 35 tonnes. (D): until 1871 only (Ashes): Weed ash 1852-1916, furnace ash 1917-1932, none since

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

0

48 96 144

There are four extra plots testing all combinations of:-

1. MANURE Fertilizers other than magnesium:

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

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

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

35

NOTES: (1) For a fuller record see 'Details' etc.

(2) Chalk was applied at 2.9 t to all plots in 6th barley after potatoes.

Basal applications: Weedkillers: 3, 6-dichloropicolinic acid at 0.05 kg and bromoxynil at 0.24 kg with mecoprop (as 'CMPP' at 3 1) applied with the fungicide in 250 l. Fungicide: Tridemorph at 0.52 kg.

Seed: Triumph, dressed triadimenol and fuberidazole, sown at 160 kg.

Cultivations, etc.:- Chalk applied: 14 Sept, 1983. P, K and silicate of soda applied: 15 Nov. FYM applied, ploughed: 16 Nov. Spring-tine cultivated: 7 Mar, 1984. Seed sown: 8 Mar. N applied: 16 Apr. Weedkillers and fungicide applied: 16 May. Combine harvested: 18 Aug.

BARLEY

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

N MANURE	0	48	96	144	MEAN
	1.25	2.00	2.04	2.00	1.82
-P-	1.53	2.64	3.68	2.83	2.67
K	1.72	2.91	3.15	3.42	2.80
-PK	2.06	3.77	5.34	4.95	4.03
A	0.81	1.50	1.96	1.97	1.56
AP-	1.99	2.40	2.29	2.07	2.19
A-K	1.49	2.53	3.05	2.92	2.50
APK	2.13	3.54	5.23	5.31	4.05
N	1.57	1.76	2.31	2.23	1.97
NP	1.91	3.16	2.98	2.75	2.70
N-K	1.62	2.64	2.54	3.26	2.52
NPK	2.26	4.36	5.32	5.51	4.36
NS-	2.11	3.02	2.95	3.27	2.84
NP-S-	2.36	3.66	4.57	3.83	3.61
N-KS-	2.19	3.52	4.62	4.37	3.67
NPKS-	2.54	4.51	5.77	6.11	4.73
NS	1.44	1.95	2.89	2.81	2.27
NPS	2.21	4.29	4.73	4.30	3.88
N-K-S	1.90	3.16	3.35	3.05	2.86
NPK-S	2.72	4.61	5.92	6.16	4.86
NSS	1.84	2.36	2.56	2.68	2.36
NP-SS	2.47	4.04	4.51	4.71	3.93
N-KSS	1.89	3.33	4.02	4.03	3.32
NPKSS	2.99	4.56	6.14	6.27	4.99
C()	1.65	2.81	3.53	3.24	2.81
C(P-)	2.20	3.81	4.52	3.88	3.60
C(-K)	2.03	3.53	4.25	4.74	3.64
C(PK)	2.55	4.57	5.63	5.76	4.63
Ď	7.29	7.60	7.76	7.55	7.55
(D)	2.54	3.23	4.19	3.44	3.35
(A)	1.82	3.31	3.56	4.18	3.22
-	1.71	2.71	2.63	2.92	2.49
MEAN	2.14	3.45	4.13	4.08	3.45

GRAIN MEAN DM% 84.0

BARLEY

STRAW TONNES/HECTARE

**** TABLES OF MEANS ****

N	0	48	96	144	MEAN
MANURE					
	0.19	0.58	0.59	0.39	0.44
-P-	0.39	0.79	1.37	0.98	0.88
K	0.39	0.98	0.98	1.17	0.88
-PK	0.78	1.18	2.36	1.95	1.57
A	0.39	0.39	0.39	0.39	0.39
AP-	0.39	0.59	0.78	0.58	0.59
A-K	0.39	0.59	0.98	0.78	0.68
APK	0.39	1.36	1.77	2.34	1.47
D	3.13	3.09	3.67	3.64	3.38
(D)	0.78	1.05	1.56	1.05	1.11
(A)	0.52	0.78	1.05	1.30	0.91
-	0.52	0.78	1.05	1.04	0.85
MEAN	0.69	1.01	1.38	1.30	1.10

STRAW MEAN DM% 93.8

PLOT AREA HARVESTED 0.00007

BARLEY

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

MANURE MGNESIUM	551AN2PK	561PK	571NN2	581NN2	MEAN
0	4.83	1.27	3.07	2.10	2.82
35	5.27	1.75	3.22	2.65	3.22
MEAN	5.05	1.51	3.15	2.38	3.02

GRAIN MEAN DM% 85.8

PLOT AREA HARVESTED 0.00331

84/R/WF/3

WHEAT AND FALLOW

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

The 129th year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-83/R/WF/3.

Whole plot dimensions: 9.60 x 211.

Treatments:

Each year there are two plots, one is sown to w. wheat, one is fallow; they alternate in successive years. The comparison of effects of three-year and one-year fallow, started in 1932, was made for the last time in 1982.

Standard applications:

Wheat plot: Weedkillers: Chlortoluron at 3.5 kg in 250 l. 3, 6-dichloropicolinic acid at 0.07 kg and bromoxynil at 0.34 kg with mecoprop (as 'CMPP' at 4.2 l) in 200 l. Insecticide: Pirimicarb at 0.14 kg in 200 l.

Seed: Flanders, dressed chlorfenvinphos, sown at 210 kg.

Cultivations, etc:-

Wheat plot: Ploughed: 12 Sept, 1983. Spring-tine cultivated: 6 Oct. Rotary harrowed, seed sown: 7 Oct. Chlortoluron applied: 1 Dec. 3, 6-dichloropicolinic acid, bromoxynil and mecoprop applied: 17 Apr, 1984. Insecticide applied: 28 June. Combine harvested: 14 Aug. Fallow plot: Ploughed: 12 Sept, 1983. Spring-tine cultivated: 6 Oct. Heavy spring-tine cultivated: 27 Apr, 1984. Ploughed: 2 May. Rolled, heavy spring-tine cultivated: 8 May. Ploughed: 18 June. Rolled, spring-tine cultivated: 25 June.

GRAIN AND STRAW TONNES/HECTARE

YIELD		GRAIN 1.95	STRAW 1.21	
MEAN	DM%	84.4	86.8	
PLOT	AREA	HARVESTED	0.060090	

84/R/EX/4

EXHAUSTION LAND

Object: To study the residual effects of manures, applied 1856-1901, on the yield of continuous s. barley - Hoosfield.

The 129th year, s. barley.

For previous years see 'Details' 1967, 1973 and 74-83/R/EX/4.

Treatments: All combinations of:-

Whole plots

```
    PLOTFERT(01)

                     Plot numbers and manuring 1876-1901:
                     Plot 1 None
   2-
                     Plot 2 None
                     Plot 3 D
Plot 4 D
Plot 5 N
   3D
   4D
   5N
                     Plot 6 N*
   6N*
                     Plot 7 N P K Na Mg
   7NMIN
                     Plot 8 N* P K Na Mg
   8N*MIN
                     Plot 9 P
   9P
                     Plot 10 P K Na Mg
   10MIN
N - 96 kg N as ammonium salts
   - 34 kg P as superphosphate
```

N - 96 kg N as ammonium salts
N* - 96 kg N as nitrate of soda
P - 34 kg P as superphosphate
K - 137 kg K as sulphate of potash
Na - 16 kg Na as sulphate of soda
Mg - 11 kg Mg as sulphate of magnesia
D - Farmyard manure at 35 tonnes
MIN - P K Na Mg

Sub plots

2. N Nitrogen fertilizer (kg N) as 'Nitro-Chalk' (basal until 1975, on a cyclic system since 1976):

0
48
96
144

For a fuller record of treatments see 'Details' 1967 etc.

Basal applications: Weedkillers: 3, 6-dichloropicolinic acid at 0.07 kg with bromoxynil at 0.34 kg and mecoprop (as 'CMPP' at 4.2 1) in 500 l. Fungicide: Tridemorph at 0.52 kg in 250 l.

Seed: Triumph, seed dressed triadimenol and fuberidazole sown at 160 kg.

Cultivations, etc.:- Ploughed: 12 Sept, 1983. Spring-tine cultivated: 8 Mar, 1984. Seed sown: 10 Mar. N treatments applied: 19 Apr. Weedkillers applied: 25 May. Fungicide applied: 6 June. Combine harvested: 17 Aug.

NOTE: PLOTFERT(01) 2- was severely grazed by hares, no yields.

84/R/EX/4	84	/R	/E	X/4
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GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

N	0	48	96	144	MEAN
PLOTFERT(01)					
1-	0.78	0.54	0.79	0.82	0.73
2-	*	*	*	*	*
3D	2.09	2.99	3.07	2.95	2.78
4D	1.22	1.65	2.34	2.65	1.96
5N	0.90	1.19	1.13	1.23	1.11
6N*	0.84	0.48	0.75	1.09	0.79
7NMIN	1.77	2.17	2.26	2.37	2.14
8N*MIN	1.38	1.69	1.69	2.10	1.71
9P	2.34	2.26	1.64	2.46	2.17
1 OMIN	1.82	2.16	2.59	2.82	2.35
MEAN	1.46	1.68	1.81	2.05	1.75

GRAIN MEAN DM% 83.0

STRAW TONNES/HECTARE

**** TABLES OF MEANS ****

N	0	48	96	144	MEAN
PLOTFERT(01)					
1-	0.34	0.21	0.27	0.41	0.31
2-	*	*	*	*	*
3D	0.54	1.16	1.64	1.44	1.20
4D	0.41	0.53	0.86	1.28	0.77
5N	0.28	0.41	0.41	0.41	0.38
6N*	0.35	0.14	0.21	0.34	0.26
7NMIN	0.48	0.96	1.11	1.30	0.96
N *MIN	0.48	0.62	0.67	0.82	0.65
9P	0.62	0.96	0.89	1.42	0.97
10MIN	0.55	1.08	1.47	1.32	1.10
MEAN	0.45	0.67	0.84	0.97	0.73

STRAW MEAN DM% 84.7

SUB PLOT AREA HARVESTED 0.00728

84/R/PG/5

PARK GRASS

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

The 129th year, hay.

For previous years see 'Details' 1967 and 1973 and 74-83/R/PG/5.

Treatments: Combinations of:-

Whole plots

1.	MANURE	Fertilizers a	nd organic manures:
	N1	Plot 1	N1
	0(D)	Plot 2	None (D until 1863)
	O/PLOT3	Plot 3	None
	P	Plot 4-1	P
	N2P	Plot 4-2	N2 P
	NIMIN	Plot 6	N1 P K Na Mg
	MIN	Plot 7	P K Na Mg
	PNAMG	Plot 8	P Na Mg
	N2MIN	Plot 9	N2 P K Na Mg
	N2PNAMG	Plot 10	N2 P Na Mg
	N3MIN	Plot 11-1	N3 P K Na Mg
	N3MINSI	Plot 11-2	N3 P K Na Mg Si
	0/PLOT12	Plot 12	None
	D/F	Plot 13	D/F
	N2*MIN	Plot 14	N2* P K Na Mg
	MIN(N2*)	Plot 15	P K Na Mg (N2* until 1875)
	N1*MIN	Plot 16	N1* P K Na Mg
	N1*	Plot 17	N1*
	N2KNAMG	Plot 18	N2 K Na Mg
	D	Plot 19	D
	D/N*PK	Plot 20	D/N*P K
	N1, N2, N3:	48, 96, 14	4 kg N as sulphate of ammonia
	N1*, N2*:		N as nitrate of soda (30 kg N to Plot 20,
	0.		years with no farmyard manure)
	P:		5 kg P to Plot 20, only in years with no
			d manure) as single superphosphate (triple
	K:		osphate in 1974)
	K:		45 kg K to Plot 20, only in years with no
	Na:		d manure) as sulphate of potash
	Mg:		s sulphate of soda
	Si:		of soda at 450 kg
	D:		nanure at 35 tonnes every fourth year
	F:		every fourth year to supply 63 kg N
	MIN:	P K Na Mg	creij rodi dii jedi do supprij os ky ii
		i k na ng	

84/R/PG/5

Sub plots

2.	LIME	Liming:
	Α	a Ground chalk applied as necessary to achieve pH7
	В .	b Ground chalk applied as necessary to achieve pH6
	C	c Ground chalk applied as necessary to achieve pH5
	D	d None

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

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

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

Since 1965 Plot 18-1 has been split into two for treatments 'c' and 'd' above and Plot 18-3 split into two for treatments 'a' and 'b'. The remaining sub plots of Plots 18, 19 and 20 are treated as 'a'.

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

Cultivations, etc.:- Mineral fertilizers (other than superphosphate) applied: 23 Nov, 1983. Superphosphate applied: 29 Nov. N treatments applied: 5 Apr, 1984. Cut: 7 June, 19 Nov.

84/R/PG/5

1ST CUT (7/6/84) DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

LIME MANURE	Α	В	C	D	MEAN
N1	1.66	1.77	1.27	0.52	1.31
O(D)	1.49	1.69	1.28	1.20	1.42
O/PLOT3	1.55	1.99	0.98	1.08	1.40
P	1.80	2.13	1.67	1.71	1.83
N2P	3.11	2.76	3.13	1.89	2.72
NIMIN	4.37	4.17			4.27
MIN	3.07	3.21	2.16	1.59	2.51
PNAMG	1.58	1.47	1.57	1.66	1.57
N2MIN	4.91	4.74	3.85	2.84	4.08
N2PNAMG	3.38	3.37	3.15	1.98	2.97
N3MIN	5.24	. 5.05	4.40	2.53	4.30
N3MINSI	5.29	5.17	4.83	2.82	4.53
0/PL0T12	1.74	1.54	1.16	1.22	1.42
D/F	3.35	2.92	2.19	2.41	2.72
N2*MIN	4.67	4.71	4.92	4.57	4.72
MIN(N2*)	3.14	3.03	2.41	2.06	2.66
N1*MIN	3.80	4.54	3.40	3.36	3.78
N1*	2.13	2.15	2.22	2.19	2.17
N2KNAMG0			0.42	0.21	0.31
N2KNAMG2	2.03				2.03
N2KNAMG1	1.48	1.42			1.45
DO	2.11				2.11
D2	2.86				2.86
D1	2.68				2.68
D/N*PKO	3.80				3.80
D/N*PK2	3.67				3.67
D/N*PK1	3.51				3.51

1ST CUT MEAN DM% 21.3

84/R/PG/5

2ND CUT (19/11/84) DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

LIME	Α	В	C	D	MEAN
MANURE					
N1	0.79	0.98	0.41	0.16	0.59
O(D)	0.55	0.49	0.34	0.39	0.44
O/PLOT3	0.46	0.67	0.20	0.36	0.42
Р	0.48	0.47	0.63	0.68	0.57
N2P	0.84	1.56	0.92	0.87	1.05
NIMIN	1.91	1.58			1.75
MIN	1.34	1.46	0.91	0.47	1.05
PNAMG	0.47	0.58	0.78	0.89	0.68
N2MIN	1.40	1.71	1.08	1.57	1.44
N2PNAMG	0.60	0.81	0.63	0.45	0.62
N3MIN	1.66	1.23	1.06	2.49	1.61
N3MINSI	2.23	1.49	1.32	2.45	1.87
O/PLOT12	0.42	0.42	0.44	0.40	0.42
D/F	1.65	1.34	1.09	0.82	1.23
N2*MIN	1.83	1.79	1.66	1.35	1.66
MIN(N2*)	1.74	1.51	0.86	0.91	1.25
N1*MIN	1.44	1.46	1.29	1.43	1.40
N1*	0.51	0.95	1.87	1.69	1.25
N2KNAMG0			0.11	0.13	0.12
N2KNAMG2	0.80				0.80
N2KNAMG1	0.73	0.64			0.69
DO	0.76				0.76
D2	1.06				1.06
D1	1.07				1.07
D/N*PKO	1.46				1.46
D/N*PK2	1.61				1.61
D/N*PK1	1.54				1.54
5/11 1112	1.01				

2ND CUT MEAN DM% 20.1

84/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

LIME MANURE	Α	В	C	D	MEAN
MANURE N1	2.45	2.75	1.68	0.69	1.89
0(D)	2.45	2.19	1.62	1.59	1.86
O/PLOT3	2.03	2.65	1.17	1.45	1.82
P	2.28	2.61	2.30	2.39	2.39
N2P	3.95	4.32	4.05	2.75	3.77
N1MIN	6.28	5.75	4.03	2.75	6.02
MIN	4.41	4.68	3.06	2.06	3.55
PNAMG	2.05	2.05	2.35	2.55	2.25
N2MIN	6.31	6.44	4.93	4.41	5.52
N2PNAMG	3.98	4.18	3.78	2.43	3.59
N3MIN	6.91	6.28	5.45	5.02	5.92
N3MINSI	7.52	6.66	6.14	5.27	6.40
0/PL0T12	2.16	1.96	1.60	1.62	1.84
D/F	5.00	4.26	3.29	3.23	3.94
N2*MIN	6.50	6.50	6.58	5.92	6.38
MIN(N2*)	4.88	4.53	3.27	2.97	3.91
N1*MIN	5.24	6.01	4.69	4.78	5.18
N1*	2.65	3.10	4.09	3.88	3.43
N2KNAMGO	2.03	3.10	0.53	0.33	0.43
N2KNAMG2	2.83		0.00	0.00	2.83
N2KNAMG1	2.22	2.06			2.14
DO	2.87	2.00			2.87
D2	3.93				3.93
D1	3.75				3.75
D/N*PKO	5.26				5.26
D/N*PK2	5.29				5.29
D/N*PK1	5.05				5.05
0/11 1111	0.00				

TOTAL OF 2 CUTS MEAN DM% 20.7

PLOT AREA HARVESTED 0.00002

84/R/AG/6

AGDELL

Object: To study, by crop yields and soil analyses, the residual values of phosphate and potash applied in the period 1848-1951 and further dressings since 1964.

The 15th year of revised scheme, w. wheat.

For previous years see 'Details' 1967 and 1973, and 74-83/R/AG/6.

Treatments: All combinations of:-

Whole plots

1. OLDRESD Fertilizers and organic manures applied to roots every fourth year, in the period 1848-1948:

NONE None
PKNAMG PKNAMG
NPKNAMGC NPKNAMGC

N: 48 kg N as sulphate of ammonia
P: 41 kg P as superphosphate
K: 224 kg K as sulphate of potash
Na: 16 kg Na as sulphate of soda
Mg: 11 kg Mg as sulphate of magnesia
C: Castor meal at 2240 kg supplying about 112 kg N

2. RN CROP Rotation 1848-1951 and crop in 1984:

F/WHEAT With fallow: Roots (turnips or swedes), s. barley, fallow, w. wheat 1848-1951. Wheat in 1984 (after fallow)

L/FALLOW With legume: Roots, s. barley, legume (clover or beans), w. wheat 1848-1951. Fallow in 1984.

Half plots

3. 1964RESD Residues of 1964 treatments:

K

Quarter plots

4. PREVCROP Previous cropping 1958-69 on P-test half plots, 1958-70 on K-test half plots:

ARABLE Arable or fallow GRASS Grass

84/R/AG/6

Sixteenth plots

5.	P ₂ 0 ₅ 64	K ₂ 0 64	Rates of 1964 tr P ₂ 0 ₅ to P-test	reatments (kg): K ₂ 0 to K-test
			half plots	half plots
	0 500	0 315		
	1000 2000	630 1260		

Thirty second plots

6.	To RN CROP F/WHEAT. Residues of P ₂ O ₅ applied
	1970-72 (kg) and in 1979, 1981 and 1983 (kg):
P ₂ 0 ₅ 723	
(0)0 (375)450	None 375 total in 1970-72, 150 in 1980, 1981 and 1983
	To RN CROP F/WHEAT. Residues of K ₂ O applied
	1973-76 (kg) and in 1979, 1981 and 1983 (kg):
K ₂ 0 763	
(0)0 (870)900	None 870 total in 1973-76, 300 in 1980, 1982 and 1983

NOTE: Treatment combinations to thirty second plots of L/FALLOW plots are not shown above.

Standard applications:
W. wheat: Manures: 'Nitro-Chalk' at 130 kg followed by 750 kg. Weedkillers: Chlortoluron at 3.5 l in 250 l. Mecoprop at 2.0 kg with ioxynil at 0.25 kg and bromoxynil at 0.25 kg in 200 l. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg in 200 l. Triadimefon at 0.12 kg with captafol at 1.3 kg in 500 l. Insecticide: Pirimicarb at 0.14 kg in 250 1.

870 total in 1973-76, 300 in 1980, 1982 and 1983

Seed: Avalon, dressed chlorfenvinphos, sown at 200 kg.

Cultivations, etc.:-

W. wheat: Heavy spring-tine cultivated: 27 Sept, 1983. Rotary harrowed, seed sown: 28 Sept. Chlortoluron applied: 29 Sept. First N applied: 16 Feb, 1984. Second N applied: 9 Apr. Prochloraz and carbendazim applied: 14 Apr. Mecoprop, ioxynil and bromoxynil applied: 19 Apr. Triadimefon and captafol applied: 13 June. Insecticide applied:

27 June. Combine harvested: 15-17 Aug. Fallow: Ploughed: 29 Nov, 1983. Heavy spring-tine cultivated: 20 Mar, 1984, 27 Apr, 9 May. Spring-tine cultivated: 20 June. Rotary cultivated: 12 July.

84/R/AG/6

WHEAT P PLOTS

GRAIN TONNES/HECTARE

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

	OLDRESD	NONE		PKNAMG		NPKNAMGC	
	P205 723	(0)0	(375)450	(0)0	(375)450	(0)0	(375)450
PREVCROP	P205 64	, ,	, ,	(-/-	(0.0).00	(0)0	(0/0)/100
ARABLE	0	7.25	8.78	9.47	9.90	7.85	6.74
	500	7.90	9.19	9.80	10.39	8.25	8.29
	1000	8.83	9.87	9.78	10.44	8.53	9.31
	2000	8.76	9.06	10.32	10.32	9.21	9.71
GRASS	0	6.46	9.54	6.26	9.17	7.77	9.15
	500	7.64	8.61	9.42	10.66	6.66	8.15
	1000	8.30	9.57	9.03	9.99	7.40	8.88
	2000	8.79	9.61	10.62	10.72	6.85	8.23

GRAIN MEAN DM% 82.6

PLOT AREA HARVESTED 0.00140

WHEAT K PLOTS

GRAIN TONNES/HECTARE

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

	OLDRESD	NONE		PKNAMG		NPKNAMGC	
20542222	K20 763	(0)0	(870)900	(0)0	(870)900	(0)0	(870)900
PREVCROP	K20 64						
ARABLE	0	9.60	9.19	10.73	10.39	10.42	10.28
	315	8.99	9.74	10.84	10.88	10.93	10.63
	630	8.94	10.03	10.53	10.17	10.42	10.28
	1260	9.26	9.24	10.94	10.51	10.38	9.79
GRASS	0	9.49	9.90	10.66	11.09	10.15	10.39
	315	9.44	9.71	10.99	10.72	10.55	11.03
	630	9.83	9.39	10.98	10.95	9.97	10.14
	1260	9.28	9.78	10.88	10.81	9.76	9.90

GRAIN MEAN DM% 82.7

PLOT AREA HARVESTED 0.00140

BARNFIELD

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

Sections 1 and 2 the first year of grass/clover. The tenth year of grass on the rest of the experiment.

For previous years see 'Details' 1967 and 1973 and 74-83/R/BN/7.

Plot dimensions: Grass: 10.7 x 55.9.

Treatments to Grass: All combinations of:-

Whole plots

1. MANURE Fertilizers and organic manures:

D D D P K P K (Na) Mg P P F K P K P K P MG P (Na) Mg

P: 35 kg P as single superphosphate (triple superphosphate in 1974)

K: 225 kg K as sulphate of potash

(Na): 90 kg Na as sodium chloride until 1973

Mg: 90 kg Mg as kieserite every fourth year since 1974 (sulphate of

magnesia until 1973)

D: Farmyard manure at 35 tonnes (until 1975).

Quarter plots

2. N PERCUT	Nitrogen fertilizer in 1984 (kg N per cut) as 'Nitro-
	Chalk' and residues of forms of N previously each supplying 96 kg N per annum:

75	75, previously nitrate of soda
100	100, previously sulphate of ammonia
125	125, previously sulphate of ammonia + castor meal
150	150, previously castor meal

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

Plus one plot MANURE KMG 100

NOTES: (1) P K and D treatments were applied to Sections 1 and 2 until 1980 but not since.

(2) Yields were not taken from sections 1 and 2.

Standard applications:

Grass/clover (Sections 1 and 2): Weedkillers: 2, 4-DB, MCPA and benazolin (as 'Legumex Extra' at 7.0 1) in 500 1.

Seed: Grass: S.215 Meadow fescue at 12 kg, Climax timothy at 12 kg, mixture sown at 24 kg.

Grass/clover: Creeping red fescue at 9 kg, timothy at 9 kg, New Zealand Huia white clover at 4 kg, mixture sown at 22 kg.

Cultivations, etc.:-

Grass: P and K applied: 22 Nov, 1983. N applied: 7 Mar, 1984. Cut: 31 May. N applied: 6 June. Cut: 19 July. N applied: 26 July. Cut: 15 Nov.

Grass/clover (Sections 1 and 2): Ploughed: 21 Oct, 1983. Heavy springtine cultivated: 22 Mar, 1984. Rotary harrowed: 25 Apr. Seed sown: 26 Apr. Weedkillers applied: 3 July. Topped: 23 July.

1ST CUT (31/5/84) DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

N PERCUT	75	100	125	150	MEAN
MANURE					
D	5.54	6.19	6.18	5.78	5.92
DPK	5.52	6.45	6.33	6.81	6.28
PKMG	4.68	5.69	6.39	6.66	5.85
P	4.27	5.06	5.49	4.80	4.90
PK	4.61	5.73	6.69	6.11	5.79
PMG	4.50	4.73	4.92	4.51	4.67
0	3.93	4.56	4.45	3.93	4.22
MEAN	4.72	5.49	5.78	5.52	5.38

MANURE KMG 100 5.91

GRAND MEAN 5.39

1ST CUT MEAN DM% 19.6

2ND CUT (19/7/84) DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

N	PERCUT	75	100	125	150	MEAN
	MANURE					
	D	3.40	3.85	3.68	3.57	3.62
	DPK	3.51	3.77	3.65	3.95	3.72
	PKMG	3.20	3.44	3.39	3.56	3.40
	Р	2.75	2.42	2.40	2.23	2.45
	PK	3.30	3.43	3.36	3.45	3.39
	PMG	2.85	2.24	1.87	2.06	2.26
	0	2.52	2.36	1.93	1.74	2.14
	MFAN	3.08	3.07	2.90	2.94	3.00

MANURE KMG 100 2.73

GRAND MEAN 2.99

2ND CUT MEAN DM% 28.0

3RD CUT (15/11/84) DRY MATTER TONNES/HECTARE

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

N PERCUT MANURE	75	100	125	150	MEAN
D	1.83	2.41	2.49	2 16	2 22
DPK	2.22	2.29	2.54	2.16	2.22
PKMG	1.59	2.43	2.58	2.66	2.32
Р	1.65	2.17	1.59	1.92	1.83
PK	1.55	2.53	2.40	2.57	2.26
PMG	1.51	1.86	1.80	1.80	1.74
0	1.37	1.45	1.70	1.22	1.43
MEAN	1.68	2.16	2.16	2.11	2.03

MANURE KMG 100 2.19

GRAND MEAN 2.03

3RD CUT MEAN DM% 13.5

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

N	MANURE	75	100	125	150	MEAN
	D	10.77	12.44	12.35	11.51	11.77
	DPK	11.26	12.51	12.52	13.18	12.37
	PKMG	9.47	11.56	12.36	12.88	11.57
	P	8.67	9.65	9.48	8.95	9.19
	PK	9.46	11.70	12.45	12.13	11.44
	PMG	8.86	8.83	8.60	8.37	8.67
	0	7.82	8.37	8.08	6.89	7.79
	MEAN	9.47	10.72	10.83	10.56	10.40

MANURE KMG 100 10.82

GRAND MEAN 10.41

TOTAL OF 3 CUTS MEAN DM% 20.3

SUB PLOT AREA HARVESTED 0.00568

84/R/GC/8

GARDEN CLOVER

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

Sponsor: J. McEwen.

The 131st year, red clover.

For previous years see 'Details' 1967 and 1973, and 74-83/R/GC/8.

Design: 2 blocks of 2 plots.

Whole plot dimensions: 1.02 x 1.42.

Treatments:

FUNGCIDE Fungicide to control Sclerotinia trifoliorum:

NONE None

BENOMYL Benomy1 at 0.6 kg in 800 l on 18 Oct, 1983; 18 Nov, 28 Dec,

22 Jan, 1984; 20 Feb.

Basal applications: Manures: Chalk at 1.25 t. (0:18:36) at 420 kg. Mg at 50 kg, as Epsom Salts. K_20 at 150 kg as muriate of potash in spring and after each cut except the last. Nematicide: Aldicarb at 10 kg.

Seed: Hungaropoly, sown at 34 kg in April 1983, gaps resown at 34 kg in April, 1984.

NOTE: FUNGCIDE NONE plots required about 85% of row length re-sown and FUNGCIDE BENOMYL about 8%.

Cultivations, etc.:- Chalk, PK and Mg applied: 27 Oct, 1983. Gaps resown and aldicarb applied: 4 Apr, 1984. K applied: 5 Apr. Cut and K applied: 12 June, 19 July, 20 Aug. Cut: 12 Oct.

84/R/GC/8

1ST CUT (12/6/84) DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

FUNGCIDE NONE BENOMYL MEAN 2.74 6.13 4.44

1ST CUT MEAN DM% 18.6

2ND CUT (19/7/84) DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

FUNGCIDE NONE BENOMYL MEAN 3.07 4.01 3.54

2ND CUT MEAN DM% 20.5

3RD CUT (20/8/84) DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

FUNGCIDE NONE BENOMYL MEAN 1.11 1.26 1.18

3RD CUT MEAN DM% 19.6

4TH CUT (12/10/84) DRY MATTER TONNES/HECTARE

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

FUNGCIDE NONE BENOMYL MEAN 0.90 1.13 1.02

4TH CUT MEAN DM% 18.1

TOTAL OF 4 CUTS DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

FUNGCIDE NONE BENOMYL MEAN 7.82 12.53 10.17

TOTAL OF 4 CUTS MEAN DM% 19.2

PLOT AREA HARVESTED 0.00010

84/S/RN/1

ROTATION I

Object: To compare nutrient cycles, uptakes of nutrients and responses to fresh P and K. To obtain an estimate of the rate of release of nutrients, particularly K, from Saxmundham soil - Saxmundham.

Sponsor: A.E. Johnston.

The 85th year, grass, w. wheat, w. beans, s. barley.

For previous years see 'Details' 1967 and 1973, and 74-83/S/RN/1.

Whole plot dimensions (original treatments): 5.49 x 40.2.

Treatments: From 1899 to 1969 the experiment followed a four-course rotation of w. wheat, roots, s. barley, legumes. Each phase of the rotation was present each year on a separate block. From 1966 each plot was divided. A small area at the south end continued under the original treatment until 1979, these plots were sown to grass in 1970, the treatments were discontinued after 1979 and yields no longer taken although the plots remain in grass. Modified treatments (NEWTREAT) were applied on the larger sub-plots from 1966 (see below).

In 1970 the rotation was stopped and each pair of blocks was divided for lucerne and grass (the original treatment sub-plots formed part of the grass area). In 1977 lucerne was ploughed on one pair of blocks to start an arable rotation testing fresh K to plots previously given none since $1899 \, (S/RN/1-2)$. In 1978 lucerne on the other pair of blocks was replaced by a grass/clover mixture; this was ploughed in 1979 for a continuing test of subsoil loosening and incorporation of PK to the subsoil (S/RN/1-3).

Since autumn 1980 the four sections of NEWTREAT grass have been ploughed up progressively to start a sequence of arable crops (S/RN/1-1) measuring the effects of soil K depletion. The sequence of crops has been:

Section	1970-80	1981	1982	1983	1984
(a)	G	W	BE	W	W
(b)	G	G	G	BE	W
(c)	G	G	G	G	BE
(d)	G	G	G	G	G

G = NEWTREAT grass, W = w. wheat, BE = w. beans.

Treatments to crops in these sections were:

TREATMENT	NEWTREAT	W. wheat and
1899-1965	Grass	w. beans
	1966-1984	1984
	MANURE	MANURE
D	(D)N	(D)P2
В	BN	В
N	(N)P2N	(N)P2
P	(P)PIN	(P)P1
K	(K)P2KN	(K)P2K
_	(-)P2N	(-)P2
PK	(PK)P1KN	(PK)P1K
NK	(NK)P2KN	(NK)P2K
NP	(NP)P1N	(NP)P1
NPK	(NPK)P1KN	(NPK)P1K

Farmyard manure at 15 tonnes

Farmyard manure at 30 tonnes, 60 tonnes in autumn 1969, none since. (D):

B: Bone meal at 0.5 tonnes

N:

1899-1965, 38 kg N as nitrate of soda. Since 1970, 100 kg N as 'Nitro-Chalk' per cut of grass 1899-1965, 40 kg P $_2^0$ as single superphosphate. 1966-79, 50 kg P $_2^0$ 5 P:

as triple superphosphate P1,P2: 50, 100 kg P_2^{0} as triple superphosphate

1899-1965, 63 kg K₂0 as muriate of potash. Since 1966, 126 kg K₂0

W. wheat in Sections (a) and (b) tested in addition to MANURE all the combinations with the following nitrogen rates (kg N) applied in spring as 'Nitro-Chalk' (40 kg N applied on 9 March, 1984, remainder on 10 Apr):

N(NC)

120

160

200

240

Part of the w. wheat in Section (b) tested in addition to MANURE all the combinations with the following nitrogen rates (kg N) applied on 17 Apr as prilled urea:

N(PU)

160 200

NOTE: All w. wheat in Sections (a) and (b) was given 50 kg N to the seedbed, as prilled urea, in addition to the spring nitrogen rates.

S/RN/1-2 tested all combinations of the following:

Whole plots

1. MANURE Manures as defined above for arable crops:

Sub plots

2. K Potassium (kg K₂0) as muriate of potash, total applied

0 440

3. N Nitrogen fertilizer (kg N) in spring as 'Nitro-Chalk' in addition to 50 kg N to the seedbed, as prilled urea:

40 on 9 March, 1984 + 120 on 10 Apr 40+120 40+160 40 on 9 Mar + 160 on 10 Apr

S/RN/1-3 tested all combinations of:

Whole plots

1. MANURE Manures as defined above for arable crops:

Sub plots

2. TREATMNT Cultivations etc in May, 1979 only:

CNVNTIAL Conventional, mouldboard ploughed SUBDUG Subsoil dug by Wye double digger SUBDUG+F Subsoil dug by Wye double digger incorporating 374 kg P and 712 kg K (as 0:20:20) into the subsoil at time of working

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

30+30	30 on 19 Mar, 1984, 30 top dressed on 10 Apr	
30+60	30 on 19 Mar, 1984, 60 top dressed on 10 Apr	
30+90	30 on 19 Mar, 1984, 90 top dressed on 10 Apr	
30+120	30 on 19 Mar, 1984, 120 top dressed on 10 Ap	

Standard applications:

W. wheat, on S/RN/1-1 and S/RN/1-2. Weedkillers: Chlortoluron at 2.5 kg with mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 1) applied with the permethrin in 220 1. Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 2.1 1) in 220 1 applied with the prochloraz. Fungicides: Prochloraz at 0.40 kg. Carbendazim at 0.15 kg with maneb at 1.6 kg and tridemorph at 0.37 kg plus captafol at 1.1 kg applied with the pirimicarb in 220 1. Insecticides: Permethrin at 0.06 kg. Pirimicarb at 0.14 kg.

W. beans, on S/RN/1-1: Weedkiller: Simazine at 1.1 kg in 220 1.

Fungicide: Benomyl at 0.56 kg in 220 l.

Grass, on S/RN/1-1: Manures: N at 100 kg on two occasions, as ammonium nitrate on the first as 'Nitro-Chalk' on the second.

S. barley, on S/RN/1-3: Manures: N at 30 kg, as ammonium nitrate. Fungicides: Carbendazim at 0.15 kg, maneb at 1.6 kg and tridemorph at 0.37 kg with the pirimicarb in 220 1. Insecticide: Pirimicarb at 0.14 kg.

Seed: W. wheat: Norman, sown at 200 kg. W. beans: Banner, sown at 250 kg.

S. barley: Triumph, seed dressed with triadimenol and fuberidazole, sown at 190 kg.

Cultivations, etc.:-

- W. wheat: P, K and bonemeal treatments applied: 30 Aug, 1983. Ploughed: 9 Sept. Power harrowed, seed sown, seedbed N as prilled urea applied: 27 Sept. Chlortoluron, 'Brittox' and permethrin applied: 19 Oct. 'Brittox' with prochloraz applied: 17 Apr. Carbendazim, maneb, tridemorph, captafol and pirimicarb applied: 27 June. Combine harvested: 21 Aug.
- W. beans: P, K and bonemeal treatments applied: 30 Aug, 1983. Ploughed: 13 Sept. Power harrowed, seed sown: 18 Oct. Weedkiller applied: 19 Oct. Fungicide applied: 17 Apr, 1984. Combine harvested: 9 Oct.
- Grass section: P, K and bonemeal treatments applied: 31 Aug, 1983. First N, applied: 19 Mar, 1984. Cut: 11 June. Second N applied: 22 June. Cut: 23 Aug.
- S. barley: P, K and bonemeal treatments applied: 31 Aug, 1983. Ploughed: 9 Sept. Power harrowed, seed sown: 19 Mar, 1984. Fungicides and insecticide applied: 22 June. Combine harvested: 22 Aug.

84/S/RN/1-1

GRASS

DRY MATTER: TONNES/HECTARE

**** TABLES OF MEANS ****

	1ST CUT(11/6/84)	2ND CUT(23/8/84)	TOTAL OF 2 CUTS
MANURE			2.07
(D)N	2.03	1.94	3.97
BN	1.50	1.53	3.03
(N)P2N	1.71	1.45	3.16
(P)P1N	1.32	1.74	3.06
(K)P2KN	1.73	2.85	4.58
(-)P2N	1.42	1.77	3.19
	1.80	2.50	4.30
(PK)P1KN	1.82	2.53	4.35
(NK)P2KN	1.43	1.45	2.88
(NP)P1N (NPK)P1KN	2.08	2.13	4.21
(NPK)PIKN	2.00		
MEAN	1.68	1.99	3.67
MEAN DM%	35.6	32.8	34.2

W.WHEAT AFTER W.WHEAT

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

N(NC)	120	160	200	240	MEAN
MANURE					
(D)P2	10.63	10.77	10.76	11.92	11.02
В	7.99	9.24	9.22	8.62	8.77
(N)P2	7.27	9.19	9.46	8.16	8.52
(P)P1	9.50	9.20	8.14	10.01	9.21
(K)P2K	9.96	10.63	11.06	10.67	10.58
(-)P2	9.99	9.63	8.66	10.03	9.58
(PK)P1K	10.74	11.09	10.69	10.90	10.86
(NK)P2K	11.47	10.28	11.17	11.76	11.17
(NP)P1	9.44	10.06	10.73	10.74	10.24
(NPK)P1K	11.22	10.82	11.06	11.41	11.13
MEAN	0.02	10.00	10 10	10 42	10 11
MEAN	9.82	10.09	10.10	10.42	10.11

MEAN DM% 86.3

PLOT AREA HARVESTED 0.00075

W.WHEAT AFTER W.BEANS

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

120	160	200	240	MEAN
9 21	11 98	12.17	10.76	11.03
8.30			8.74	9.53
10.12	7.50	8.03	10.66	9.08
10.60	8.05	8.70	11.60	9.74
9.98	11.60	11.76	10.14	10.87
9.93	11.73	11.03	9.34	10.51
11.17	12.29	11.92	11.49	11.72
12.00	11.47	11.01	12.41	11.72
9.88	11.52	10.62	11.36	10.84
11.49	11.87	11.87	12.29	11.88
10.27	10.88	10.74	10.88	10.69
	9.21 8.30 10.12 10.60 9.98 9.93 11.17 12.00 9.88 11.49	9.21 11.98 8.30 10.78 10.12 7.50 10.60 8.05 9.98 11.60 9.93 11.73 11.17 12.29 12.00 11.47 9.88 11.52 11.49 11.87	9.21 11.98 12.17 8.30 10.78 10.31 10.12 7.50 8.03 10.60 8.05 8.70 9.98 11.60 11.76 9.93 11.73 11.03 11.17 12.29 11.92 12.00 11.47 11.01 9.88 11.52 10.62 11.49 11.87 11.87	9.21 11.98 12.17 10.76 8.30 10.78 10.31 8.74 10.12 7.50 8.03 10.66 10.60 8.05 8.70 11.60 9.98 11.60 11.76 10.14 9.93 11.73 11.03 9.34 11.17 12.29 11.92 11.49 12.00 11.47 11.01 12.41 9.88 11.52 10.62 11.36 11.49 11.87 11.87 12.29

MEAN DM% 86.2

W.WHEAT AFTER W.BEANS

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

N(PU)	0	160	200	MEAN
MANURE				
(D)P2	9.64	11.85	10.79	10.48
В	7.42	8.64	10.15	8.41
(N)P2	7.25	7.52	10.50	8.13
(P)P1	7.71	10.08	8.99	8.63
(K)P2K	7.49	9.96	11.13	9.02
(-)P2	7.74	10.51	9.85	8.96
(PK)P1K	7.90	11.52	10.64	9.49
(NK)P2K	8.50	11.74	11.17	9.98
(NP)P1	8.35	9.72	10.63	9.26
(NPK)P1K	7.95	10.88	10.77	9.39
MEAN	8.00	10.24	10.46	9.17

MEAN DM% 85.2

W.WHEAT

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

INDEES OF	HEARS			
K	0	440	MEA	V
MANURE				
(D)P2	10.48	9.80	10.14	4
В	8.29	8.44	8.36	
(N)P2	8.80	8.38	8.59	
(P)P1	8.04	8.47	8.26	
(K)P2K	9.79	8.93	9.30	
(-)P2	8.72	8.91	8.82	
(PK)P1K	9.21			
		8.84	9.03	
(NK)P2K	9.08	10.12	9.60	
(NP)P1	8.90	8.90		
(NPK)P1K	8.94	9.52	9.23	3
MEAN	9.03	9.03	9.03	3
N	40+120	40+160	MEAN	V
MANURE				
(D)P2	9.96	10.32	10.14	1
В	8.22	8.50	8.36	5
(N)P2	8.78	8.41	8.59	9
(P)P1	7.64	8.88	8.26	5
(K)P2K	9.22	9.50	9.36	5
(-)P2	8.86	8.77	8.82	
(PK)P1K	9.01	9.04	9.03	
(NK)P2K	9.68	9.52	9.60	
(NP)P1	8.43	9.37		
(NPK)P1K	9.37	9.08	9.23	
MEAN	8.92	9.14	9.03	3
N	40+120	40+160	MEAN	1
K				
0	8.89	9.16	9.03	3
440	8.94	9.12	9.03	3
MEAN	8.92	9.14	9.03	3
v				
K	0	10.150	440	
N	40+120	40+160	40+120	40+160
MANURE				
(D)P2	9.99	10.96	9.93	9.67
В	8.36	8.21	8.08	8.79
(N)P2	8.76	8.85	8.80	7.97
(P)P1	7.28	8.80	8.00	8.95
(K)P2K	10.03	9.54	8.40	9.45
(-)P2	9.24	8.20	8.47	9.34
(PK)P1K	7.81	10.62	10.21	7.47
(NK)P2K	9.88	8.28	9.49	10.75
(NP)P1	8.80	9.00	8.06	9.74
(NPK)P1K	8.75	9.12	10.00	9.04
GRAIN MEAN DM%	84.1 PLC	T AREA HA	RVESTED	0.00075

84/S/RN/1-3

S.BARLEY

GRAIN TONNES/HECTARE

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

TREATMNT	CNVNTIAL	SUBDUG	SUBDUG+F	MEAN	
MANURE	4 44	4 71	4 05		
(D)P2	4.44	4.71	4.95	4.70	
В	3.61	4.46	4.15	4.08	
(N)P2	3.90	3.71	4.06	3.89	
(P)P1	3.74	3.08	3.44	3.42	
(K)P2K	4.42	4.23	4.04	4.23	
(-)P2	4.17	3.64	3.81	3.88	
(PK)P1K	3.88	3.53	3.71	3.71	
(NK)P2K	4.04	4.04	4.19	4.09	
(NP)P1	3.18	3.86	3.86	3.63	
(NPK)P1K	3.66	3.85	3.67	3.73	
MEAN	3.91	3.91	3.99	3.93	
N	30+30	30+60	30+90	30+120	MEAN
MANURE					
(D)P2	3.96	4.43	5.26	5.14	4.70
В	3.38	3.91	4.13	4.89	4.08
(N)P2	3.29	3.61	3.91	4.75	3.89
(P)P1	2.37	3.20	4.12	3.98	3.42
(K)P2K	3.31	4.24	4.21	5.17	4.23
(-)P2	2.93	3.18	4.43	4.96	3.88
(PK)P1K	2.59	3.52	4.28	4.45	3.71
(NK)P2K	2.61	4.39	4.18	5.20	4.09
(NP)P1	2.71	3.74	3.86	4.23	3.63
(NPK)P1K	3.69	2.34	3.93	4.94	3.73
(MK) IK	3.03	2.54	3.93	4.94	3./3
MEAN	3.08	3.66	4.23	4.77	3.93
N	30+30	30+60	30+90	30+120	MEAN
TREATMNT					
CNVNTIAL	3.17	3.75	4.06	4.64	3.91
SUBDUG	3.00	3.71	4.18	4.76	3.91
SUBDUG+F	3.08	3.51	4.45	4.91	3.99
MEAN	3.08	3.66	4.23	4.77	3.93

S.BARLEY

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

MANURE TREATMNT (D)P2 CNVNTIAL 3.59 4.25 4.99 4.9 SUBDUG 4.43 4.72 5.04 4.6 SUBDUG+F 3.86 4.32 5.76 5.8 B CNVNTIAL 2.91 3.21 4.00 4.3 SUBDUG+F 3.42 4.13 3.85 5.2 SUBDUG+F 3.42 4.13 3.85 5.2 SUBDUG+F 3.42 4.13 3.85 5.2 SUBDUG+F 3.03 4.13 4.39 4.6 SUBDUG+F 3.64 3.24 2.9 SUBDUG+F 1.55 2.76 4.83 4.6 SUBDUG+F 3.64 3.43 4.24 4.8 SUBDUG+F 3.65 4.30 4.02 4.63 5.0 SUBDUG+F 3.45 2.23 4.63 4.9 SUBDUG+F 3.45 2.23 4.63 4.9 SUBDUG+F 3.45 2.23 4.63 4.9 SUBDUG+F 2.67 3.53 4.63 5.9 SUBDUG-F 2.67 3.50 4.90 4.18	30+6	+30	N 30-		
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SUBDUG 2.69 3.70 4.18 4.	4.4	2.75	SUBDUG+F 2		
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SUBDUG 3.97 2.74 3.56 5.		3.97	SUBDUG		,
SUBDUG+F 3.36 1.63 4.72 4.	1.	3.36	SUBDUG+F		

GRAIN MEAN DM% 86.9

ROTATION II

Object: To measure, by crop yields and soil analysis, the residual value of P applied as FYM or superphosphate in the periods 1899-1964 and 1965-1967 and of fresh dressings since - Saxmundham.

Sponsor: A.E. Johnston.

The 15th year of revised scheme, w. wheat, w. beans.

For previous years see 'Details' 1967 and 1973, and 74-83/S/RN/2.

Whole plot dimensions: 5.49 x 39.8.

Treatments: From 1899-1964 the experiment tested farmyard manure and nitrogen and phosphate fertilizers applied to a rotation of crops. Since 1965 the treatments have been changed to evaluate old residues of P (from FYM and superphosphate) and new residues from treatments applied 1965-1967. All crops of the rotation - potatoes, s. barley, sugar beet, s. barley - were grown until 1974. The whole experiment was sown to s. barley in 1975 and 1976, alternating w. wheat and s. barley from 1977 to 1979, alternating w. beans and w. wheat in 1980 and 1981, w. wheat alone in 1982 and 1983, w. wheat and w. beans in 1984. Combinations of the following treatments were tested on w. beans and on a third wheat after beans in 1981:

Whole plots

1.	RESIDUE	Residues	of	previous	treatments:-
T .	MEDIDOL	Mesitudes	UI	PICAIOUS	CI Cacillelles -

		Approximate total dressing 1899-1964	Total dressing 1965-1967
(0)0 (D)0	Plot 1 Plot 2	None 400 tonnes FYM	Non e None
(DP)0	Plot 3	400 tonnes FYM, 2.7 tonnes P205	None
(DP)D2	Plot 4	400 tonnes FYM, 2.7 tonnes P205	100 tonnes FYM
(DP)D2P1	Plot 5	400 tonnes FYM, 2.7 tonnes P205	100 tonnes FYM, 0.56 tonnes P205
(DP)P1	Plot 6	400 tonnes FYM, 2.7 tonnes P205	0.56 tonnes P205
(DP)P2	Plot 7	400 tonnes FYM, 2.7 tonnes P205	1.13 tonnes P205
(DP52)0	Plot 8	326 tonnes FYM, 4.3 tonnes P205 (until 1952 only)	None

Sub plots

2. P Phosphate (total P205 applied in each period (kg)):

	1969-71	1973-75	1978*	1980*	1982*	1984*
(0)(0)0	0	0	0	0	0	0
(0)(3)0	0	378	0	0	0	0
(1)(3)1	126	378	120	120	120	120
(2)(3)1	252	378	120	120	120	120
(3)(3)0	378	378	0	0	0	0

^{* 1978, 1980 , 1982} and 1984 are the years of application for beans in 1984. Years of application for third wheat in 1984 were 1979, 1981 and 1983.

and, for wheat only, some of the combinations of 2 with:-

3. N Nitrogen fertilizer in spring (kg N) as 'Nitro-Chalk' in addition to 50 kg N at sowing:

80 120

160

200

NOTE: Plots with the combinations of RESIDUE (DP)D2, (DP)D2P1, (DP)P1, (DP)P2 with P(3)(3)(0) were used for N15 studies, yields not taken.

Standard applications:

- Both crops: Manures: K₂0 at 150 kg as muriate of potash.

 W. wheat: Weedkillers: Isoproturon at 2.5 kg with mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) applied with the permethrin in 220 1. Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 2.1 1) in 220 1 applied with the prochloraz. Fungicides: Prochloraz at 0.40 kg. Carbendazim at 0.15 kg, maneb at 1.6 kg and tridemorph at 0.37 kg plus captafol at 1.1 kg applied with the pirimicarb in 220 l. Insecticides: Permethrin at 0.06 kg. Pirimicarb at 0.14 kg.
- W. beans: Weedkiller: Simazine at 1.1 kg in 220 1. Fungicide: Benomyl at 0.56 kg in 220 1.

Seed: W. wheat: Hustler, sown at 400 seeds per m². W. beans: Banner, sown at 250 kg.

Cultivations, etc.:-

Both crops: Muriate of potash applied: 18 Aug, 1983. Ploughed: 29 Aug. W. wheat: Power harrowed, seed sown: 28 Sept. Isoproturon, 'Brittox' and permethrin applied: 19 Oct. N applied: 10 Apr, 1984. 'Brittox' with prochloraz applied: 17 Apr. Carbendazim, maneb, tridemorph, captafol and pirimicarb applied: 27 June. Combine harvested: 22 Aug.

W. beans: P applied: 18 Aug, 1983. Power harrowed, seed sown: 18 Oct. Weedkiller applied: 19 Oct. Fungicide applied: 17 Apr, 1984. Combine harvested, yields not recorded: 12 Oct.

3RD W.WHEAT AFTER BEANS

GRAIN TONNES/HECTARE

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

RESIDUE	N P	80	120	160	200
(0)0	(0)(0)0	3.01	3.71		
(0)0	(0)(3)0			2.84	5.39
(0)0	(1)(3)1		7.36		8.66
(0)0	(2)(3)1	6.83		7.98	
(0)0	(3)(3)0	5.57		7.09	
(D)0	(0)(0)0			4.73	6.16
(D)0	(0)(3)0	6.11	6.30		
(D)O	(1)(3)1	7.17		8.36	
(D)O	(2)(3)1		7.98		9.50
(D)0	(3)(3)0		7.78		7.66
(DP)0	(0)(0)0	6.27	6.20		
(DP)0	(0)(3)0			7.71	7.62
(DP)O	(1)(3)1		7.83		8.92
(DP)0	(2)(3)1	7.23		8.39	0.52
(DP)0	(3)(3)0	5.66		8.00	
(DP)D2	(0)(0)0	0.00		8.20	8.94
(DP)D2	(0)(3)0	6.14	7.90	0.20	0.34
(DP)D2	(1)(3)1	0.14	7.67		9.09
(DP)D2	(2)(3)1	7.37	7.07	9.48	3.03
(DP)D2P1	(0)(0)0	7.59	7.63	3.40	
(DP)D2P1	(0)(3)0	7.33	7.03	8.35	9.26
(DP)D2P1	(1)(3)1		8.22	0.33	
(DP)D2P1	(2)(3)1	7.73	0.22	0 62	9.88
(DP)P1	(0)(0)0	7.73	7.93	8.63	
(DP)P1	(0)(3)0	7.09	7.93	0 50	0.00
		6 60		8.58	9.08
(DP)P1	(1)(3)1	6.68	0.00	9.54	0 67
(DP)P1	(2)(3)1		8.06	0.00	9.67
(DP)P2	(0)(0)0	6 00	0.00	8.83	9.53
(DP)P2	(0)(3)0	6.83	8.00		
(DP)P2	(1)(3)1	7.04		9.20	
(DP)P2	(2)(3)1		8.70		9.50
(DP52)0	(0)(0)0			8.16	8.17
(DP52)0	(0)(3)0	5.63	7.09		
(DP52)0	(1)(3)1	6.17		8.18	
(DP52)0	(2)(3)1		7.38		8.77
(DP52)0	(3)(3)0		6.32		8.32

GRAIN MEAN DM% 85.1

84/R/RN/1 and 84/R/RN/2

LEY ARABLE

Object: To study the effects of three-year leys on the fertility of the soil as measured by a sequence of three arable test crops. From 1968, continuous w. wheat was grown on some blocks after the three test crops to study the build-up and decline of take-all (Gaeumannomyces graminis) after the different cropping sequences. From 1977 new crop sequences were introduced on these blocks - Highfield and Fosters.

Sponsors: A.E. Johnston, R. J. Gutteridge.

The 36th year, old grass, leys, oats, w. wheat.

For previous years see 'Details' 1967 and 1973 and 74-83/R/RN/1 and 2.

The experiment is duplicated on:-

HIGHFIELD A site with much organic matter initially (ploughed out from permanent grass) (84/R/RN/1)

FOSTERS A site with little organic matter initially (84/R/RN/2)

ROTATION Treatments: The experiment originally tested four six-course rotations, with all phases present each year. For many years these rotations were:-

	Treatment crops	Test crops
LUCERNE	LU, LU, LU	W, P, B
CLOGRA	LC, LC, LC	W, P, B
GRASS	LN, LN, LN	W, P, B
ARABLE	H, SB, 0	W, P, B

LU = lucerne, LC = clover-grass ley, no nitrogen fertilizer, LN = all-grass ley with nitrogen fertilizer, H = 1-year seeds hay,

SB = sugar beet, O = s. oats, W = w. wheat, P = potatoes, B = s. barley.

From 1968 the order of test crops was changed to P, W, B except for those phases that had already started the sequence W, P, B.

From 1975 the s. barley test crop was changed to w. wheat.

RESEEDED On both fields in the first three years other plots were sown with long-term reseeded grass

OLDGRASS On Highfield plots of the old turf were left initially unploughed, for comparison with the three-year leys

In 1962 and 1963 some of the old and reseeded grass plots were divided for management identical to:-

C Clover-grass ley
N All-grass ley

From 1963 (reseeded) and 1968 (old grass) some grass plots were ploughed and cropped with the same test crops as above, thereafter these plots followed the ARABLE rotation. In 1973 some of these plots were returned to reseeded grass.

84/R/RN/1 and 84/R/RN/2

From 1968 only two phases on each field continued in the original six-course rotation (the museum blocks). The four other phases (the new sequence blocks) were sown to w. wheat every year at the end of the test-crop cycle. In 1977, 1978, 1979 and 1980 one phase, fallowed in the previous year started new sequences of treatment cropping:

SEQUENCE		Treatment crops	Test crops
LUCERNE	(previously LUCERNE)	LU, LU, LU	W, W, W, W
CLOGRA	(previously CLOGRA)	LC, LC, LC	W, W, W, W
GRASS/G	(previously GRASS)	R, R, R	W, W, W, W
ARABLE/A	(previously ARABLE)	0, P, BE	W, W, W, W
ARABLE/R	(previously RESEEDED)	B, B, W	W, W, W, W
GRASS/OG	(previously OLDGRASS)	R, R, R	W, W, W, W

R = ryegrass, BE = s. beans. Other symbols as above. All ploughed at the end of the treatment crop cycle except GRASS/OG - direct drilled to 1st and 2nd w. wheats, ploughed thereafter. Treatment crop cycles started after nine previous cereals followed by one fallow. In 1984 yields were taken from 3rd and 4th test crops only.

Additional treatments to 3rd test crop w. wheat in the museum blocks:-

Sub plots

FYMRES70 Farmyard manure residues, last applied 1970:

NONE

FYM 30 tonnes on each occasion

None

Sub plots

N Nitrogen fertilizer in 1984 (kg N) as 'Nitro-Chalk':

0 50 100

150

Additional treatments to 3rd and 4th test crops w. wheat in the new sequence blocks:

Sub plots

N Nitrogen fertilizer in 1984 (kg N) as 'Nitro-Chalk':

0 50

100

150

84/R/RN/1 and 84/R/RN/2

Standard applications:

3rd Treatment crops in museum blocks:

Lucerne: Manures: (0:18:36) at 630 kg.

All-grass ley: Manures: (0:18:36) at 420 kg. (25:0:16) at 300 kg in spring and after each cut except the last.

Clover-grass ley: Manures: (0:18:36) at 420 kg. Oats: Manures: (20:10:10) at 350 kg. Weedkillers:

3, 6-dichloropicolinic acid at 0.07 kg and bromoxynil at 0.34 kg with mecoprop (as 'CMPP' at 4.2 1) applied with the fungicide in 250 1. Fungicide: Tridemorph at 0.52 kg.

3rd Test crop wheat in museum blocks and 3rd and 4th test crops wheat in new sequence blocks:

W. wheat: Manures: (0:24:24) at 210 kg. Weedkillers: Glyphosate at 1.4 kg in 250 l. Chlortoluron at 3.5 kg in 250 l. Cyanazine at 0.24 kg and mecoprop at 1.6 kg in 250 l (Highfield), cyanazine at 0.30 kg and mecoprop at 2.0 kg in 250 l (Fosters).

at 0.30 kg and mecoprop at 2.0 kg in 250 l (Fosters).

Reseeded grass and old grass: Manures: (0:18:36) at 420 kg. All-grass half plots: (25:0:16) at 300 kg in spring and after each cut except the last.

Seed: S. oats: Trafalgar, sown at 180 kg. W. wheat: Flanders, sown at 200 kg.

Cultivations, etc.:-

3rd Treatment crops in museum blocks:

Lucerne: PK applied: 21 Nov, 1983. Cut: 11 June, 1984, 18 July. Topped: 10 Sept.

All-grass ley and clover-grass ley: PK applied: 21 Nov, 1983. NK applied to all-grass ley only: 7 Mar, 1984, 4 June. Cut: 30 May, 18 July.

S. oats: Ploughed: 14 Dec, 1983. NPK applied: 16 Mar, 1984. Heavy spring-tine cultivated, rotary harrowed: 20 Mar. Rotary harrowed, seed sown: 21 Mar. Weedkillers and fungicide applied: 23 May. Combine harvested: 30 Aug.

3rd Test crop wheat in museum blocks and 3rd and 4th test crops wheat in new sequence blocks: Glyphosate applied: 20 Sept, 1983. Ploughed: 4 Oct (Fosters), 5 Oct (Highfield). Heavy spring-tine cultivated: 13 Oct (Fosters only). Heavy spring-tine cultivated (Highfield only), PK applied: 17 Oct. Spring-tine cultivated, rotary harrowed, seed sown: 18 Oct. Chlortoluron applied: 20 Oct (Highfield), 21 Oct (Fosters). N applied: 12 Apr, 1984. Cyanazine and mecoprop applied: 14 Apr. Combine harvested: 13 Aug (Fosters), 14 Aug (Highfield).

Re-seeded grass and old grass: PK applied: 21 Nov, 1983. NK applied to all-grass half plots: 7 Mar, 1984, 4 June, 27 July. Cut: 30 May, 18 July, 16 Nov (Highfield), 19 Nov (Fosters).

NOTE: On Highfield 4th test crop wheat three plots were lost because the combine broke down, these plots had treatment combinations

ARABLE/A ARABLE/A ARABLE/A 50 150

estimated values were used in the analysis.

84/R/RN/1 AND 84/R/RN/2					
MUSEUM BLOCKS					
DRY MATTER: TONNES/HECTARE					
**** TABLES OF MEANS ****					
CLOVER-GRASS LEY	HIGH	FIELD		FOSTERS	
TOTAL OF 2 CUTS	5.	.77		5.48	
MEAN DM%	2	1.1		25.2	
ALL GRASS LEY					
TOTAL OF 2 CUTS	7.	.32		7.57	
MEAN DM%	2	5.2		24.1	
LUCERNE					
TOTAL OF 2 CUTS	6.	.73		7.69	
MEAN DM%	19	9.5		17.6	
OLD GRASS		HIG	HFIELD		
TOTAL OF 3 CUTS 36TH EXPTL YEAR	C			N	
BLOCKS 1 & 4 BLOCK 2		.85 .39		7.97 8.13	
MEAN DM%	21	1.7		19.8	
RESEEDED GRASS					
TOTAL OF 3 CUTS	HIGHE	TELD	F	OSTERS	
36TH EXPTL BLOCKS	С	N	BLOCK	S C	N
YEAR 1 & 4 36TH EXPTL	3.84	8.56	1 & 3	5.00	8.44
YEAR 2 & 3 (SEEDED 1949 RESEEDED 1973)	4.36	8.80	2 & 4	5.61	7.95

21.3

20.7

19.7

19.9

MEAN DM%

84/R/RN/1 HIGHFIELD

W.WHEAT 3RD TEST CROP - MUSEUM BLOCKS

GRAIN TONNES/HECTARE

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

FYMRES70	NONE	FYM	MEAN		
SEQUENCE					
LUCERNE	7.11	7.12	7.11		
CLOGRA	7.03	7.30	7.17		
GRASS	7.05	6.54	6.79		
ARABLE	6.11	5.69	5.90		
MEAN	6.82	6.66	6.74		
N	0	50	100	150	MEAN
SEQUENCE					
LUCERNE	5.06	6.82	8.34	8.23	7.11
CLOGRA	5.39	7.57	7.43	8.27	7.17
GRASS	5.04	6.20	7.82	8.10	6.79
ARABLE	3.40	6.00	6.78	7.42	5.90
MEAN	4.72	6.65	7.59	8.01	6.74
N	0	50	100	150	MEAN
FYMRES70					
NONE	4.91	6.90	7.53	7.95	6.82
FYM	4.54	6.40	7.66	8.06	6.66
MEAN	4.72	6.65	7.59	8.01	6.74
	N	0	50	100	150
FYMRES70	SEQUENCE				
NONE	LUCERNE	5.73	7.30	7.91	7.50
	CLOGRA	5.06	7.54	7.54	7.97
	GRASS	5.30	6.75	7.67	8.46
	ARABLE	3.54	5.99	7.00	7.89
FYM	LUCERNE	4.40	6.34	8.77	8.97
	CLOGRA	5.73	7.59	7.32	8.57
	GRASS	4.78	5.65	7.97	7.75
	ARABLE	3.25	6.00	6.56	6.94
	ANADEL	0.20	0.00	0.00	0.54

GRAIN MEAN DM% 83.9

84/R/RN/2 FOSTERS

W.WHEAT 3RD TEST CROP - MUSEUM BLOCKS

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

FYMRES70	NONE	FYM	MEAN		
SEQUENCE	c 21				
LUCERNE	6.31	6.46	6.38		
CLOGRA	6.10	6.11	6.11		
GRASS	5.15	5.74	5.44		
ARABLE	5.07	4.85	4.96		
MEAN	5.66	5.79	5.72		
N	0	50	100	150	MEAN
SEQUENCE	4 70				
LUCERNE	4.72	6.28	6.88	7.65	6.38
CLOGRA	4.34	6.18	6.41	7.50	6.11
GRASS	4.25	4.45	6.42	6.65	5.44
ARABLE	2.84	4.53	5.99	6.50	4.96
MEAN	4.04	5.36	6.42	7.08	5.72
N	0	50	100	150	MEAN
FYMRES70					
NONE	3.77	5.23	6.56	7.07	5.66
FYM	4.30	5.49	6.29	7.08	5.79
MEAN	4.04	5.36	6.42	7.08	5.72
	N	0	50	100	150
FYMRES70	SEQUENCE				
NONE	LUCERNE	4.60	6.15	6.89	7.60
	CLOGRA	4.33	6.40	6.55	7.12
	GRASS	3.50	4.01	6.34	6.73
	ARABLE	2.66	4.34	6.45	6.84
FYM	LUCERNE	4.83	6.42	6.87	7.71
	CLOGRA	4.35	5.96	6.27	7.87
	GRASS	4.99	4.88	6.50	6.57
	ARABLE	3.02	4.71	5.53	6.16
			3 T.		

GRAIN MEAN DM% 82.4

84/R/RN/1 HIGHFIELD

W.WHEAT 3RD TEST CROP - NEW SEQUENCE BLOCKS

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

N	0	F.0			1000000
	U	50	100	150	MEAN
SEQUENCE					
LUCERNE	5.06	6.47	8.08	8.57	7.04
CLOGRA	6.00	6.98	8.49	8.68	7.54
GRASS/G	5.57		8.45	8.46	7.26
			6.74		6.20
			7.75	8.15	7.01
	6.63	7.31	7.75	9.26	7.74
MEAN	5 67	6 58	7 99	8 50	7.13
	LUCERNE	LÙCERNE 5.06 CLOGRA 6.00 GRASS/G 5.57 ARABLE/A 4.91 ARABLE/R 5.25 GRASS/OG 6.63	LÜCERNE 5.06 6.47 CLOGRA 6.00 6.98 GRASS/G 5.57 6.55 ARABLE/A 4.91 5.30 ARABLE/R 5.25 6.87 GRASS/OG 6.63 7.31	LÜCERNE 5.06 6.47 8.08 CLOGRA 6.00 6.98 8.49 GRASS/G 5.57 6.55 8.45 ARABLE/A 4.91 5.30 6.74 ARABLE/R 5.25 6.87 7.75 GRASS/OG 6.63 7.31 7.75	LÙCERNE 5.06 6.47 8.08 8.57 CLOGRA 6.00 6.98 8.49 8.68 GRASS/G 5.57 6.55 8.45 8.46 ARABLE/A 4.91 5.30 6.74 7.88 ARABLE/R 5.25 6.87 7.75 8.15 GRASS/OG 6.63 7.31 7.75 9.26

**** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SEQUENCE	ľ	N SEQUENCE N
SED EXCEPT WHEN SEQUENCE	0.261 COMPARING MEANS		l 0.501 LEVEL(S) OF: 0.493

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.261	3.7
BLOCK.WP.SP	18	0.493	6.9

GRAIN MEAN DM% 83.4

84/R/RN/1 HIGHFIELD

W.WHEAT 4TH TEST CROP - NEW SEQUENCE BLOCKS

GRAIN TONNES/HECTARE

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

N	0	50	100	150	MEAN
LUCERNE	4.11	5.72	6.56	7.49	5.97
CLOGRA	4.36	5.91	7.41	8.62	6.57
GRASS/G	3.86	5.90	6.65	7.59	6.00
ARABLE/A	3.72	4.70	6.19	6.30	5.23
ARABLE/R	4.68	6.09	7.56	7.98	6.58
GRASS/OG	5.40	6.58	7.59	7.97	6.89
MEAN	4.35	5.82	6.99	7.66	6.21
	SEQUENCE LUCERNE CLOGRA GRASS/G ARABLE/A ARABLE/R GRASS/OG	SEQUENCE LUCERNE 4.11 CLOGRA 4.36 GRASS/G 3.86 ARABLE/A 3.72 ARABLE/R 4.68 GRASS/OG 5.40	SEQUENCE LUCERNE 4.11 5.72 CLOGRA 4.36 5.91 GRASS/G 3.86 5.90 ARABLE/A 3.72 4.70 ARABLE/R 4.68 6.09 GRASS/OG 5.40 6.58	SEQUENCE LÜCERNE 4.11 5.72 6.56 CLOGRA 4.36 5.91 7.41 GRASS/G 3.86 5.90 6.65 ARABLE/A 3.72 4.70 6.19 ARABLE/R 4.68 6.09 7.56 GRASS/OG 5.40 6.58 7.59	SEQUENCE LUCERNE 4.11 5.72 6.56 7.49 CLOGRA 4.36 5.91 7.41 8.62 GRASS/G 3.86 5.90 6.65 7.59 ARABLE/A 3.72 4.70 6.19 6.30 ARABLE/R 4.68 6.09 7.56 7.98 GRASS/OG 5.40 6.58 7.59 7.97

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SEQUENCE	N	SEQUENCE N
SED	0.385	0.189	0.557
EXCEPT WHEN SEQUENCE	COMPARING MEANS WIT	TH SAME LE	VEL(S) OF: 0.464

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.385	6.2
BLOCK.WP.SP	15	0.464	7.5

GRAIN MEAN DM% 83.6

84/R/RN/2 FOSTERS

W.WHEAT 3RD TEST CROP - NEW SEQUENCE BLOCKS

GRAIN TONNES/HECTARE

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

N	0	50	100	150	MEAN
SEQUENCE		4.5	212		
LUCERNE	3.74	4.76	5.89	6.41	5.20
CLOGRA	3.69	5.17	5.65	6.48	5.25
GRASS/G	3.84	5.00	6.18	6.46	5.37
ARABLE/A	2.79	3.70	4.99	5.84	4.33
ARABLE/R	3.71	4.71	5.97	6.58	5.24
MEAN	3.56	4.67	5.74	6.35	5.08

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	SEQUENCE	N	SEQUENCE N
SED	0,610	0.149	0.674
	N COMPARING MEANS WI		
SEQUENCE			0.333

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%
BLOCK.WP	4	0.610	12.0
BLOCK.WP.SP	15	0.333	6.6

GRAIN MEAN DM% 82.6

84/R/RN/2 FOSTERS

W.WHEAT 4TH TEST CROP - NEW SEQUENCE BLOCKS

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

0	50	100	150	MEAN
2 26	1 27	F 20	6 56	4.87
				5.70
		5.56	6.34	5.15
3.30	4.31	5.05	6.77	4.86
4.56	5.95	6.42	6.97	5.98
3.86	4.87	5.74	6.77	5.31
	3.36 4.08 4.02 3.30 4.56	3.36 4.37 4.08 5.08 4.02 4.67 3.30 4.31 4.56 5.95	3.36 4.37 5.20 4.08 5.08 6.44 4.02 4.67 5.56 3.30 4.31 5.05 4.56 5.95 6.42	3.36 4.37 5.20 6.56 4.08 5.08 6.44 7.21 4.02 4.67 5.56 6.34 3.30 4.31 5.05 6.77 4.56 5.95 6.42 6.97

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	SEQUENCE	N	SEQUENCE N
SED EXCEPT WHEN SEQUENCE	0.401 COMPARING MEANS W	0.200 ITH SAME L	0.557 EVEL(S) OF: 0.446

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	4	0.401	7.6
BLOCK.WP.SP	15	0.446	8.4

GRAIN MEAN DM% 82.8

LEY/ARABLE

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

Sponsor: A.E. Johnston.

The 47th year, leys, s. barley, s. beans, w. wheat.

For previous years see 'Details' 1967 & 1973 and 74-83/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, P, W
CLO All legume ley: SA, SA, P, W until 1971 then CL, CL, CL, P, W

A Arable with roots: P, R, C, P, W until 1971 then P, B, B, P, W

A H Arable with hay: P, R, H, P, W until 1971 then P, B, H, P, W

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

Rotations themselves followed different cycles:

On four plots in each block the rotations were repeated

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

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

LN	3	(Previous	LEY) LN, LN, LN, W, B	3
LC	3	(Previous	CLO) LC, LC, LC, W, E	3
AF		(Previous	A) F, F, BE, W, B	
AB		(Previous	A H) B. B. BE, W. B	

LN = grass ley with N, LC = clover/grass ley no N, BE = s. beans (s. oats until 1980), F = fallow

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

LN 8 LN, LN, LN, LN, LN, LN, LN, W, B LC 8 LC, LC, LC, LC, LC, LC, LC, LC, W, B

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).

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

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

Whole plots

1. ROTATION Rotations:

LN 8

LN 3

LC 8 LC 3

AF

AB

1/2 plots

2. FYMRES63

Farmyard manure residues, last applied 1963:

NONE

FYM

None

38 tonnes on each occasion

1/8 plots

3. N

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

0 70

140

210

Treatments to second test crop s. barley, all combinations of:

Whole plots

1. ROTATION Rotations:

LN 8

LN 3

LC 8

LC 3

AF AB

1/2 plots

2. FYMRES62

Farmyard manure residues, last applied 1962:

NONE

None

FYM

38 tonnes on each occasion

1/8 plots

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

120 180

Treatments to leys:

FYM RES Farmyard manure residues NONE None

FYM 38 tonnes on each occasion, last applied 1966 to

1st year leys, 1965 to 2nd year leys, 1964 to 3rd year leys, 1963 to 4th year leys, 1962 to 5th year leys.

Corrective K dressings (kg K₂0) as muriate of potash, applied to first test crop w. wheat and long-term leys in the wheat block:

Continuous rotations	No FYM half plots	FYM half plots
LN	452	527
LC	301	364
AF	665	640
AB	653	753
Ex-alternating rotations		
LN 8 ploughed for w. wheat	489	326
LN 8 not ploughed	351	289
LC 8 ploughed for w. wheat	75	0
LC 8 not ploughed	289	376

Standard applications:-

Grass ley and clover/grass, 1st year: Manures: (0:18:36) at 420 kg. N at 75 kg as 'Nitro-Chalk' to grass ley only. Weedkiller: MCPB at 2.1 kg in 250 l.

Grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Manures:
Magnesian limestone at 5.0 t to 5th year only. (0:18:36) at 410 kg.
(25:0:16) at 300 kg in spring and after the first cut. Weedkillers:
MCPA with MCPB (as 'Trifolextra' at 7.0 1) in 250 1 to 2nd year only.

- Clover/grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Manures: Magnesian limestone at 5.0 t to 5th year only. (0:18:36) at 410 kg. K20 at 48 kg as muriate of potash in spring and after the first cut. Weedkillers: MCPA with MCPB (as 'Trifolex-tra' at 7.0 1) in 250 l to 2nd year only.
- S. barley, 1st and 2nd treatment crops: Manures: (20:10:10) at 400 kg. Weedkillers: 3, 6-dichloropicolinic acid at 0.07 kg with bromoxynil octanoate at 0.34 kg and mecoprop at 2.1 kg in 250 l. Fungicide: Tridemorph at 0.52 kg in 250 l.
- S. beans: 3rd treatment crop: Manures: (0:20:20) at 200 kg.
- W. wheat, 1st test crop: Manures: (0:20:20) at 310 kg. Weedkillers: Glyphosate at 1.8 kg in 280 l. Chlortoluron at 3.5 kg in 250 l. Nematicide: Aldicarb at 10 kg.

- S. barley, 2nd test crop: Manures: Magnesian limestone at 5.0 t. (0:20:20) at 310 kg. Weedkillers: 3, 6-dichloropicolinic acid at 0.07 kg bromoxynil octanoate at 0.34 kg and mecoprop at 2.1 kg in 250 l. Fungicide: Tridemorph at 0.52 kg in 250 l. Nematicide: Aldicarb at 10 kg.
- Seed: Grass ley: Climax timothy at 17 kg, meadow fescue at 17 kg, mixture sown at 34 kg.
 - Clover/grass ley: Climax timothy at 18 kg, meadow fescue at 15 kg, Huia white clover at 4 kg, mixture sown at 37 kg.
 - S. barley: Triumph, dressed with triadimenol and fuberidazole, sown at 160 kg.
 - S. beans: Minden, sown at 270 kg.
 - W. wheat: Avalon, sown at 200 kg.

Cultivations, etc.:- Treatment crops:

- Grass ley and clover/grass ley, 1st year: Ploughed: 3 Oct, 1983.

 Spring-tine cultivated: 21 Mar, 1984. PK applied, N applied to grass ley only: 6 Apr. Rotary harrowed, seeds sown: 10 Apr. Weedkiller applied: 1 Aug. Cut: 24 July, 10 Sept.

 Grass ley and clover/grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Weedkiller applied to 2nd year only: 22 Sept, 1983. Magnesian
- Grass ley and clover/grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Weedkiller applied to 2nd year only: 22 Sept, 1983. Magnesian limestone applied to 5th year only: 30 Sept. Corrective K applied to 4th year only: 4 Oct. PK applied: 15 Nov. NK applied to grass ley, K applied to clover/grass ley: 13 Mar, 1984, 20 June. Cut: 11 June, 10 Sept, and 13 Dec (except 3rd and 8th years ploughed before w. wheat).
- S. barley, 1st and 2nd treatment crops: Ploughed: 30 Sept, 1983. Spring-tine cultivated, NPK applied, rotary harrowed, seed sown: 21 Mar, 1984. Weedkillers applied: 24 May. Fungicide applied: 15 June. Combine harvested: 15 Aug.
- Fallow, 1st and 2nd treatment years: Ploughed: 30 Sept, 1983.
 Spring-tine cultivated: 21 Mar, 1984. Rotary cultivated: 28 June.
 Cultivated with thistlebar: 10 Aug.
 S. beans, 3rd treatment crop: Ploughed: 30 Sept, 1983. Spring-tine
- S. beans, 3rd treatment crop: Ploughed: 30 Sept, 1983. Spring-tine cultivated, PK applied: 21 Mar, 1984. Seed sown: 23 Mar. Combine harvested: 24 Aug.

Test crops:

- W. wheat, 1st test crop: Glyphosate applied to leys: 22 Sept, 1983. Ploughed: 30 Sept. Corrective K applied: 4 Oct. PK and aldicarb applied, spring-tine cultivated with crumbler attached, seed sown: 5 Oct. Chlortoluron applied: 6 Oct. N applied: 9 Apr, 1984. Combine harvested: 21 Aug.
- S. barley, 2nd test crop: Magnesian limestone applied: 30 Sept, 1983. Ploughed: 3 Oct. Spring-tine cultivated, PK and aldicarb applied, seed sown: 21 Mar, 1984. N applied: 23 Mar. Weedkillers applied: 24 May. Fungicide applied: 15 June. Combine harvested: 15 Aug.

LEYS

1ST CUT (11/6/84, OR 24/7/84 FOR 1ST YEAR LEYS) DRY MATTER TONNES/HECTARE

FYM RES	NONE	FYM	MEAN
LEY			
LC1	0.38	0.36	0.37
LC2	4.36	5.30	4.83
LC3	4.20	4.25	4.23
LN1	0.66	0.89	0.78
LN2	6.86	7.00	6.93
LN3	3.68	4.43	4.06
LLC1	0.64	0.79	0.72
LLC2	4.63	5.14	4.88
LLC3	4.33	4.28	4.30
LLC4	4.96	4.75	4.85
LLC5	7.10	7.05	7.08
LLC6	5.59	5.84	5.71
LLC7	5.39	4.91	5.15
LLC8	3.96	3.39	3.67
LLN1	0.64	0.92	0.78
LLN2	7.10	7.53	7.31
LLN3	4.81	5.27	5.04
LLN4	5.12	4.81	4.97
LLN5	5.35	5.16	5.26
LLN6	5.97	5.93	5.95
LLN7	6.35	6.68	6.52
LLN8	4.72	5.62	
LLNO	4.16	3.02	5.17
MEAN	4.40	4.56	4.48

1ST CUT MEAN DM% 16.7

LEYS

2ND CUT (10/9/84) DRY MATTER TONNES/HECTARE

FYM RES LEY	NONE	FYM	MEAN
LC1	1.04	1.25	1.15
LC2	0.54	0.71	0.62
LC3	0.52	0.65	0.58
LN1	0.85	0.87	0.86
LN2	2.68	2.54	2.61
LN3	1.31	0.85	1.08
LLC1	1.91	1.77	1.84
LLC2	1.04	1.02	1.03
LLC3	0.56	0.55	0.55
LLC4	0.74	1.14	0.94
LLC5	1.68	1.97	1.82
LLC6	1.87	1.85	1.86
LLC7	0.78	0.78	0.78
LLC8	0.20	0.27	0.24
LLN1	0.64	1.17	0.90
LLN2	2.27	2.16	2.21
LLN3	1.08	1.86	1.47
LLN4	1.24	1.15	1.19
LLN5	2.51	2.56	2.54
LLN6	3.31	3.16	3.23
LLN7	1.97	2.02	1.99
LLN8	0.82	1.24	1.03
MEAN	1.34	1.43	1.39

2ND CUT MEAN DM% 22.0

LEYS

3RD CUT (13/12/84) DRY MATTER TONNES/HECTARE

FYM RES LEY	NONE	FYM	MEAN
LC1	0.20	0.32	0.26
LC2	0.10		
LC3		0.14	0.12
	0.00	0.00	0.00
LN1	0.22	0.23	0.23
LN2	0.29	0.17	0.23
LN3	0.00	0.00	0.00
LLC1	0.11	0.27	0.19
LLC2	0.14	0.14	0.14
LLC3	0.08	0.18	0.13
LLC4	0.10	0.27	0.19
LLC5	0.03	0.04	0.03
LLC6	0.02	0.04	0.03
LLC7	0.07	0.13	0.10
LLC8	0.00	0.00	0.00
LLN1	0.09	0.18	0.14
LLN2	0.10	0.12	0.11
LLN3	0.05		
LLN4		0.04	0.05
	0.04	0.03	0.03
LLN5	0.03	0.06	0.04
LLN6	0.03	0.03	0.03
LLN7	0.05	0.10	0.07
LLN8	0.00	0.00	0.00
MEAN	0.10	0.14	0.12

3RD CUT MEAN DM% 13.6

LEYS

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

FYM RES	NONE	FYM	MEAN
LEY			
LC1	1.62	1.93	1.77
LC2	5.00	6.15	5.57
LC3	4.72	4.90	4.81
LN1	1.73	1.99	1.86
LN2	9.83	9.71	9.77
LN3	4.99	5.28	5.14
LLC1	2.65	2.83	2.74
LLC2	5.80	6.30	6.05
LLC3	4.97	5.01	4.99
LLC4	5.80	6.15	5.98
LLC5	8.81	9.06	8.93
LLC6	7.48	7.73	7.60
LLC7	6.24	5.82	6.03
LLC8	4.16	3.66	3.91
LLN1	1.37	2.27	1.82
LLN2	9.47	9.80	9.64
LLN3	5.93	7.17	6.55
LLN4	6.40	5.98	6.19
LLN5	7.89	7.78	
LLN6	9.31		7.84
		9.12	9.21
LLN7	8.37	8.80	8.58
LLN8	5.53	6.86	6.19
MEAN	5.82	6.10	5.96

TOTAL OF 3 CUTS MEAN DM% 24.4

BARLEY 2ND TEST CROP

GRAIN TONNES/HECTARE

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

FYMRES62 ROTATION	NONE	FYM	MEAN		
LN 8	6.65	6.68	6.67		
LN 3	6.73	6.63	6.68		
LC 8	6.89	7.10	6.99		
LC 3	6.61	6.82	6.72		
AF	5.81	6.19	6.00		
AB	5.54	5.32	5.43		
MEAN	6.37	6.46	6.41		
N	0	60	120	180	MEAN
ROTATION				200	712711
LN 8	6.17	7.22	6.74	6.54	6.67
LN 3	5.25	6.94	7.60	6.92	6.68
LC 8	6.28	7.56	6.83	7.30	6.99
LC 3	5.47	7.33	7.72	6.35	6.72
AF	3.50	6.57	6.88	7.07	6.00
AB	3.62	5.27	6.58	6.23	5.43
MEAN	5.05	6.81	7.06	6.74	6.41
N	0	60	120	180	MEAN
FYMRES62					
NONE	4.93	6.67	7.11	6.78	6.37
FYM	5.16	6.95	7.01	6.69	6.46
MEAN	5.05	6.81	7.06	6.74	6.41
	N	0	60	120	180
ROTATION	FYMRES62				
LN 8	NONE	6.18	6.73	6.73	6.98
	FYM	6.17	7.70	6.76	6.09
LN 3	NONE	5.15	7.05	7.59	7.14
	FYM	5.36	6.84	7.61	6.70
LC 8	NONE	6.00	7.09	7.42	7.05
	FYM	6.55	8.03	6.24	7.56
LC 3	NONE	5.18	7.18	7.70	6.40
	FYM	5.76	7.48	7.75	6.30
AF	NONE	3.38	6.55	6.30	7.02
	FYM	3.62	6.59	7.46	7.12
AB	NONE	3.71	5.46	6.91	6.07
	FYM	3.53	5.08	6.25	6.40

GRAIN MEAN DM% 84.4

WINTER WHEAT

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

	YMRES63	NONE	FYM	MEAN		
	LN 8	8.66	8.18	8.42		
	LN 3	8.92	7.41	8.17		
	LC 8	9.26	9.52	9.39		
	LC 3	10.19	9.13	9.66		
	AF	8.35	7.50	7.92		
	AB	7.02	6.66	6.84		
	MEAN	8.73	8.07	8.40		
	1167414	0.70	0.07	0.10		
	N	0	70	140	210	MEAN
F	ROTATION					
	LN 8	5.46	8.68	9.20	10.33	8.42
	LN 3	4.92	7.66	9.75	10.35	8.17
	LC 8	7.51	9.66	11.04	9.36	9.39
	LC 3	7.18	11.06	10.52	9.88	9.66
	AF	4.28	8.94	9.12	9.35	7.92
	AB	3.66	6.56	7.74	9.41	6.84
	MEAN	5.50	8.76	9.56	9.78	8.40
	N	0	70	140	210	MEAN
1	FYMRES63					
	NONE	5.69	8.98	9.91	10.35	
	FYM	5.31	8.54	9.21	9.21	8.07
	MEAN	5.50	8.76	9.56	9.78	8.40
		N	0	70	140	210
	ROTATION	FYMRES63				
	LN 8	NONE	5.61	8.55	9.67	10.80
		FYM	5.32	8.81	8.72	9.87
	LN 3	NONE	5.16	7.56	11.10	11.87
		FYM	4.67	7.76	8.39	8.83
	LC 8	NONE	7.13	9.34	10.67	9.92
		FYM	7.89	9.97	11.41	8.81
	LC 3	NONE	8.37	11.87	10.28	10.22
		FYM	6.00	10.24	10.75	9.54
	AF		4.02	10.14	9.58	9.67
		FYM	4.54	7.74	8.66	9.04
	AB		3.85	6.41	8.18	9.63
		FYM	3.46	6.70	7.30	9.18

GRAIN MEAN DM% 89.1

MARKET GARDEN

Object: The experiment compared the effects of fertilizers and organic manures applied annually in the period 1942 to 1967. Residual effects of the organic manures were studied in arable crops from 1968 to 1973. From 1974 until 1982 the site was maintained in grass without yields. A new sequence of arable cropping started in 1983 to study further the residual effects of the organic manures, particularly the availability of metals from sewage sludge - Woburn Lansome I.

Sponsor: S.P. McGrath.

The 43rd year, red beet, carrots, clover.

For previous years see 'Details' 1967 & 1973, 74-80/W/RN/4 and 83/W/RN/4.

Design: 2 series each of 4 blocks of 10 plots. On one series the plots are split, systematically, for red beet and carrots.

Whole plot dimensions: 8.15 x 5.18.

Treatments:

To Series A, red beet and carrots, all combinations of:-

1. OM RESID Residues of organic manures:

FYM Farmyard manure until 1967 SEWAGE Sewage sludge until 1962

SEW COM Sewage sludge, composted with straw, until 1962

VEG COM Vegetable compost until 1962, then farmyard manure until

1967

2. OM RATE Rates of organic manures (t per crop):

25 50

EXTRA plus one extra treatment (duplicated):

NONE No organic manures

To Series B, white clover, all combinations of:-

1. OM RESID Residues of organic manures:

FYM Farmyard manure to whole plot until 1964, to half plots

until 1967. Untreated half plots received a

balancing dressing in 1974

SEWAGE Sewage sludge until 1962

SEW COM Sewage sludge, composted with straw, until 1962

VEG COM Vegetable compost until 1962, then farmyard manure until

1965

2. OM RATE Rates of organic manures (t per crop):

25 50

EXTRA plus one extra treatment (duplicated):

PEAT Peat at 31 t per crop to half plots 1965 to 1967.
Untreated half plots received a balancing dressing in 1974.

NOTE: On series A red beet in 1984 followed carrots in 1983 and vice versa.

Basal applications:

Series A: Red beet: Manures: (0:20:20) at 750 kg, N at 200 kg as 'Nitro-Chalk'. Insecticide: Demeton-S-methyl at 0.24 kg in 250 l. Carrots: Manures: (0:20:20) at 750 kg, N at 70 kg as 'Nitro-Chalk'. Insecticides: Carbofuran (as 'Yaltox' granules at 94 kg). Demeton-S-methyl at 0.24 kg in 250 l.

Series B: Clover: Manures: (0:18:36) at 380 kg. Weedkiller: Paraquat at 0.4 kg ion in 250 l.

Seed: Red beet: Detroit Crimson Globe, sown by precision drill.
Carrots: Chantenay Red-cored Supreme, sown by precision drill.
Clover: Blanca white clover, sown at 8 kg and resown at 17 kg.

Cultivations, etc.:-

Series A: Red beet: Ploughed: 15 Feb, 1984. Spring-tine cultivated with crumbler attached, PK and N applied, power harrowed twice: 16 Apr. Seed sown: 18 Apr. Seed resown: 25 May. Hand hoed: 18-19 June. Insecticide applied: 27 June. Singled: 3-6 July. Hand hoed: 6 July. Hand harvested: 20 Aug. Carrots: Ploughed: 15 Feb, 1984. Spring-tine cultivated with crumbler attached, PK and N applied: 16 Apr. Carbofuran applied, power harrowed twice, seed sown: 18 Apr. Seed resown: 25 May. Hand hoed: 21-22 June, 6-9 July. Demeton-S-methyl applied: 27 June. Hand harvested: 21 Aug.

Series B: Clover: PK applied: 19 Sept, 1983. Ploughed: 20 Sept. Spring-tine cultivated with crumbler attached, seed sown: 11 Oct. Weedkiller applied: 17 Apr, 1984. Power harrowed: 18 Apr. Seed

resown: 19 Apr. Cut: 24 July, 1 Nov.

NOTES: (1) All crops failed at the first sowing and had to be resown.

(2) Crop samples were taken at maturity and soil samples after

harvest for chemical analyses.

(3) One plot of Series B clover was contaminated with soil from adjacent plots with high metal content and it has been treated as missing, it had treatment combination VEG COM, 50. An estimated value was used in the analyses. 84/W/RN/4 RED BEET

ROOTS FRESH WEIGHT TONNES/HECTARE

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

OM RESID	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25	23.2	23.7	25.8	20.4	23.3
50	28.0	19.4	21.8	25.7	23.7
MEAN	25 6	21 5	23 8	23 1	23 5

NONE 21.9

GRAND MEAN 23.2

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	OM RESID	OM RATE	OM RESID OM RATE
SED	2.24	1.59	3.17

SED FOR COMPARING NONE WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 2.75

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP 28 4.48 19.4

84/W/RN/4 RED BEET

TOPS FRESH WEIGHT TONNES/HECTARE

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

OM RESID	FYM	SEWAGE	SEW COM	VEG COM	MEAN
OM RATE					
25	12.7	11.1	11.6	11.1	11.6
50	12.5	10.2	9.2	12.4	11.1
MEAN	12.6	10.7	10.4	11.7	11 3

NONE 11.4

GRAND MEAN 11.4

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	OM RESID	OM RATE	OM RESID OM RATE
SED	0.77	0.54	1.09

SED FOR COMPARING NONE WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 0.94

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP 28 1.54 13.6

84/W/RN/4 CARROTS

ROOTS FRESH WEIGHT TONNES/HECTARE

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

OM RESID OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25 50	28.5 33.7	26.2	26.0 31.6	29.8 36.0	27.6 31.2
MEAN	31.1	24.8	28.8	32.9	29.4

NONE 34.2

GRAND MEAN 30.4

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	OM RESID	OM RATE	OM RESID OM RATE
SED	2.47	1.75	3.50

SED FOR COMPARING NONE WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 3.03

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 28
 4.95
 16.3

84/W/RN/4 CARROTS

TOPS FRESH WEIGHT TONNES/HECTARE

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

OM RESID OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25 50	11.6 12.1	10.6	10.8 11.8	11.6 12.9	11.2 11.3
MEAN	11.8	9.6	11.3	12.2	11.2

NONE 13.0

GRAND MEAN 11.6

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE OM RESID OM RATE OM RESID OM RATE

SED 1.05 0.74 1.49

SED FOR COMPARING NONE WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 1.29

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV% BLOCK.WP 28 2.10 18.1

84/W/RN/4 WHITE CLOVER

1ST CUT (24/7/84) DRY MATTER TONNES/HECTARE

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

OM RESID	FYM	SEWAGE	SEW COM	VEG COM	MEAN
OM RATE 25	0.69	0.43	0.35	0.88	0.59
50	1.19	0.21	0.38	0.71	0.62
MEAN	0.94	0.32	0.37	0.80	0.61

PEAT 0.50

GRAND MEAN 0.58

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

 TABLE
 OM RESID
 OM RATE
 OM RESID OM RATE

 SED
 0.113
 0.080
 0.160

SED FOR COMPARING PEAT WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 0.139

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 27
 0.227
 38.8

1ST CUT MEAN DM% 27.4

84/W/RN/4 WHITE CLOVER

2ND CUT (1/11/84) DRY MATTER TONNES/HECTARE

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

OM RESID OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25 50	1.60 1.52	1.28 1.36	1.29 1.42	1.46 1.56	1.41 1.47
MEAN	1.56	1.32	1 35	1 51	1 11

PEAT 1.44

GRAND MEAN 1.44

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	OM RESID	OM RATE	OM RESID OM RATE
SED	0.063	0.045	0.089

SED FOR COMPARING PEAT WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 0.077

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 27
 0.126
 8.8

2ND CUT MEAN DM% 13.0

84/W/RN/4 WHITE CLOVER

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

OM RESID OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25	2.28	1.71	1.64	2.34	2.00
50	2.71	1.58	1.80	2.28	2.09
MFAN	2 50	1 65	1 72	2 31	2 04

PEAT 1.94

GRAND MEAN 2.02

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	OM RESID	OM RATE	OM RESID OM RATE
SED	0.126	0.089	0.178

SED FOR COMPARING PEAT WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 0.155

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP 27 0.252 12.5

TOTAL OF 2 CUTS MEAN DM% 20.3

ARABLE REFERENCE PLOTS

Object: To study the long term effects of FYM and N, P and K fertilizers on the yield and mineral content of crops - Great Field IV.

Sponsor: F.V. Widdowson.

The 29th year of a rotation, s. barley, ley, potatoes, w. wheat, kale until 1980, w. barley, ley, potatoes, w. wheat, w. oats since 1981. The 24th year of a rotation on the additional plots (as the initial above rotation for 20 years; w. barley, ley, potatoes, w. wheat, w. oats since 1980). The 28th year of permanent grass.

For previous years see 58/Bc/1(t), 59/Bc/1(t), 60/B/3(t), 61-64/B/2, 65/B/2(t), 66/B/2(t), 67/B/2, 68/B/3(t) and 69-83/R/RN/5.

Design: 1 block of 12 plots for each crop on original plots. 1 block of 7 plots for each crop on additional plots.

Whole plot dimensions: 2.13 x 2.44.

Treatments: Fertilizers and farmyard manure:

MANURE

Original plots

0 N1

N1

N1P

K

N1K

PK

N1PK N2PK

NZF

N1PKD

N2PKD

N1,2 (kg N): 20, 40 (ley): 100, 200 (w. wheat, w. barley and w. oats): 125, 250 (potatoes, and permanent grass) as 'Nitro-Chalk'

P: 63 kg P₂0₅ as superphosphate

K: 250 kg K₂0 as muriate of potash

D: 38 tonnes FYM (permanent grass): 100 tonnes (to potatoes only - 50 tonnes to potatoes and kale until 1980): none to other crops

NOTES: (1) All w. wheat on these plots receives a standard dressing of 82 kg MgO as Epsom salts.

(2) Cereals receive 20 kg of N1 and 40 kg of N2 in March, remainder in April.

Additional plots

MANURE Fertilizers from 1980 to 1984 and in previous years:

1980-84 Until 1979 0 0 N2PK N2 PK N2PKMG N2 PK MG CA N2PKS N2 PK CA S **N2PKMGS** N2 PK MG S N1PKMGS N2 PK CA MG S N3PKMGS N2 PK CA MG S TE

N: In 1984: N1: 20 kg (ley), 120 kg (w. wheat, w. barley and w. oats), 160 kg (potatoes). N2: 30 kg (ley), 160 kg (w. wheat, w. barley and w. oats), 240 kg (potatoes). N3: 40 kg (ley), 200 kg (w. wheat, w. barley and w. oats), 320 kg (potatoes). Until 1979 N2 = larger rate on original plots in these years. As urea in all years. Cereals receive 40 kg N in March, remainder in April.

P: 126 kg P205 as potassium dihydrogen phosphate.

K: 251 kg K20 total. As potassium dihydrogen phosphate (83 kg K20) on all PK plots. In addition plots without S receive 168 kg K20 as potassium chloride, plots with S receive 92 kg K20 as potassium sulphate plus 76 kg K20 as potassium chloride. Since 1978 all PK plots receive, in addition to the standard total, 126 kg K20 for potatoes, applied in autumn as potassium chloride.

MG: 126 kg MgO as magnesium chloride.

CA: 126 kg CaO as calcium carbonate until 1979. In 1980 plots not previously given CA received calcium carbonate at 7.5 t, except 0 which was given 5 t.

S: 30 kg S supplied by the potassium sulphate.

TE: Trace element mixture which included Mn, Cu, Zn, B, Mo, Ca and Fe.

Standard applications:

Original and additional plots:

All cereals: Weedkillers: Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) with (except for oats) chlortoluron at 3.5 kg, applied with the permethrin in 220 l. Fungicides: Prochloraz at 0.40 kg with tridemorph at 0.52 kg in 220 l. Carbendazim at 0.15 kg, maneb at 1.6 kg and tridemorph at 0.37 kg with captafol at 1.1 kg applied with the pirimicarb in 220 l. Insecticides: Permethrin at 0.05 kg; pirimicarb at 0.14 kg.

W. wheat and w. oats: Fungicides: Propiconazole at 0.13 kg and captafol at 1.1 kg in 220 l. Growth regulator: Chlormequat at 1.9 kg in

W. barley: Carbendazim at 0.15 kg, maneb at 1.6 kg and tridemorph at 0.37 kg in 220 l. Growth regulator: Mepiquat chloride and ethephon (as 'Terpal' at 2.8 l) in 220 l.

Potatoes: Weedkillers: Linuron at 0.93 kg with paraquat at 0.28 kg ion in 220 l. Fungicide: Mancozeb at 1.3 kg in 220 l applied with the insecticide. Insecticide: Pirimicarb at 0.14 kg.

Seed: W. wheat: Norman, sown at 210 kg. W. barley: Panda, sown at 200 kg. W. oats: Peniarth, sown at 210 kg.

Potatoes: Desiree.

Grass-clover ley: RVP Italian ryegrass and Hungaropoly red clover.

Cultivations, etc.:-

W. wheat: Dug by hand: 19 Sept, 1983 (original plots), 20 Sept (additional plots). P, K and Mg applied to original plots; P, K, Mg and S applied to additional plots: 22 Sept. All plots lightly rotary cultivated, raked level, seed sown and raked in: 23 Sept. 'Brittox', chlortoluron and permethrin applied: 25 Oct. First N applied, prochloraz and tridemorph applied: 1 Mar, 1984. Second N applied: 9 Apr. Chlormequat applied: 25 Apr. Propiconazole and captafol applied: 24 May. Carbendazim, maneb, tridemorph, captafol and pirimicarb applied: 27 June. Harvested by hand: 7 Aug.
W. barley: Rotary cultivated, Mg applied to additional plots: 5 Sept,

W. barley: Rotary cultivated, Mg applied to additional plots: 5 Sept, 1983. P and K applied to original plots; P, K and S to additional plots: 7 Sept. Lightly rotary cultivated, raked level, seed sown, raked in: 20 Sept. 'Brittox', chlortoluron and permethrin applied: 25 Oct. First N applied, prochloraz and tridemorph applied: 1 Mar, 1984. Second N applied: 2 Apr. Growth regulator applied: 25 Apr. Carbendazim, maneb and tridemorph applied: 9 May. Carbendazim, maneb, tridemorph, captafol and pirimicarb applied: 27 June.

Harvested by hand: 23 July.

W. oats: Rotary cultivated, Mg applied to additional plots: 5 Sept, 1983. P and K applied to original plots; P, K and S to additional plots: 7 Sept. Lightly rotary cultivated, raked level, seed sown, raked in: 26 Sept. 'Brittox' and permethrin applied: 25 Oct. First N, prochloraz and tridemorph applied: 1 Mar, 1984. Second N applied: 9 Apr. Growth regulator applied: 25 Apr. Propiconazole and captafol applied: 24 May. Carbendazim, maneb, tridemorph, captafol and pirimicarb applied: 27 June. Harvested by hand: 6 Aug.

Potatoes: FYM applied to original plots: 7 Dec, 1983. Dug by hand: 9 Dec. P and K applied to original plots; P, K, Mg and S to additional plots: 19 Dec. N applied, deep rotary cultivated twice, potatoes planted and ridged by hand: 24 Apr, 1984. Weedkillers applied: 9 May. Fungicide and insecticide applied: 2 July. Plots given neither FYM nor K harvested by hand: 24 July. Remaining plots harvested by hand: 12 Sept.

Grass-clover ley: Lightly rotary cultivated, raked level, seed sown and raked in: 22 Aug, 1983. P and K applied to original plots; P, K, Mg and S applied to additional plots: 21 Nov. N applied: 1 Mar, 1984.

Cut: 30 May, 19 July, 2 Oct.

Permanent grass: P and K applied: 21 Nov, 1983. FYM and first N applied: 1 Mar, 1984. Second N applied: 24 May. Final N applied: 19 July. Cut: 30 May, 19 July, 2 Oct.

GREAT FIELD IV (R): ORIGINAL PLOTS

TONNES/HECTARE

**** TABLES OF MEANS ****

						LEY :	DRY M	ATTER	
	WINTER	WHEAT:	BAR	LEY:	1ST	2ND	3RD	TOTAL OF	
	GRAIN	STRAW	GRAIN	STRAW	CUT	CUT	CUT	3 CUTS	
MANURE					2.12	1.10	0.77	C 12	
0		5.50	2.35		3.18	1.18	0.77	5.13	
N1	6.49	5.59	2.88	2.78	3.94	1.62	0.81	6.37 4.37	
Р	4.98	4.85	3.34	2.44	2.80	1.22	0.35	5.82	
N1P	3.25		1.68	3.39	3.83 2.49	1.54	0.45	4.95	
K	5.44	7.32	3.27	2.88	3.39	1.77	0.92	6.05	
N1K		7.82		2.58	3.49	2.07	3.15	8.71	
	6.82	7.33	3.32	6.29	5.62	2.25	1.52	9.39	
	11.03	11.22	6.96	7.69	6.85	2.33	0.98	10.15	
	12.11	13.31	9.08	3.99	4.83		1.34		
	8.71			6.95	6.11		2.50		
	12.24			8.57	7.37	2.90	0.84	11.11	
NZPKU	10.83	13.95	9.47	0.3/	1.31	2.90	0.04	11.11	
MEAN DM%	76.6	59.0	85.8	66.2	27.0	31.7	21.4	26.7	
	0	ATS:	POTATO	ES:	PERMANE	NT GRASS	: DRY	MATTER	
			TOT	AL	1ST	2ND	3F	RD TOTAL OF	-
	GRAIN	STRAW	TUBE	RS	CUT	CUT	Cl	JT 3 CUTS	
MANURE									
0					0.61	0.68		18 1.46	
N1				.0	0.94	1.47		3.08	
P				. 4	0.53	0.89	0.		
N1P				.6	1.68	1.87	0.		
K				.1	1.06	1.02	0.		
N1K				.8	1.81	2.36		99 5.17	
PK				.5	0.63	0.83	0.		
N1PK				.8	2.34	2.76	0.		
N2PK				.6	3.85	3.56	1.		
D				.8	3.68	2.06		61 6.36 23 9.24	
N1PKD				.8	4.84 5.87	3.17 4.40		95 12.22	
N2PKD	9.03	13.34	60	.5	5.8/	4.40	1.	75 12.22	
MEAN DM%	83.0	43.7	24	.2	27.4	32.7	26	.6 28.9	

84/R/RN/5

GREAT FIELD IV (R): ADDITIONAL PLOTS

**** TABLES OF MEANS ****

						P	OTATOES:
	WINTER	WHEAT:	BA	RLEY:	OAT	S:	TOTAL
	GRAIN	STRAW	GRAIN	STRAW	GRAIN	STRAW	TUBERS
MANURES							
0	6.91	6.63	2.87	2.33	4.28	3.67	9.4
N2PK	11.06	13.90		7.62	9.02	10.66	48.8
N2PKMG	12.48	14.46		7.39		11.14	53.8
N2PKS	11.42	14.31	8.24	7.17			51.9
N2PKMGS	11.47	12.18		8.35			
N1PKMGS	11.80	12.67	7.40	6.25			50.0
N3PKMGS	11.33	15.65	9.26	7.69	8.90	12.33	55.4
MEAN DM%	77.1	58.4	85.2	65.5	83.4	49.8	24.4
			LEY : DR	Y MATTER			
	18		2ND	3RD	TOTAL OF		
	CL	IT	CUT	CUT	3 CUTS		
MANURES							
0	3.8	01	1.41	0.58	5.88		
N2PK	5.5		2.21	0.67	8.44		
N2PKMG	6.3		2.23	0.91	9.48		
N2PKS	6.2	-	2.19	1.30	9.74		
N2PKMGS	6.4		2.38	0.88	9.70		
N1PKMGS	5.7	-	2.15	1.09	9.04		
N3PKMGS	6.9	4	2.24	0.60	9.78		
MEAN DM%	26.	1	32.1	21.5	26.6		

CULTIVATION/WEEDKILLER

Object: To study the long-term effects of weedkillers and different methods of primary cultivation on a sequence of crops - Great Harpenden I.

Sponsors: R. Moffitt, J.A. Currie.

The 24th year, w. barley.

For previous years see 'Details' 1967 and 1973 and 74-83/R/RN/8.

Design: 2 randomised blocks of 12 plots split into 2.

Whole plot dimensions: 12.8 x 12.2.

Treatments: All combinations of:-

Whole plots

1. CULTIVTN Primary cultivations annually:

PLOUGH Ploughed: 13 Sept, 1983

ROTA DIG Cultivated by rotary digger: 14 Sept

DEEPTINE Deep-tine cultivated: 5 Sept

2. SUBSOIL(82) Subsoiling in September 1982:

NONE None

CNVNTIAL Conventional vertical tine

PARAPLOW 'Paraplow'

Sub plots

3. WEEDKLLR(75) Hormone weedkiller to cereals in the previous rotation,

last applied to s. barley 1975 (basal hormone weedkiller to s. wheat 1977, s. barley 1978 to 1980 and

w. barley 1981 to 1984):

NONE HORMONE

4. WEEDKLLR(80) Paraquat weedkiller to preceding cereal stubbles last

applied for w. barley in autumn 1980:

NONE **PARAQUAT**

NOTE: The combinations of 3 and 4 are tested on half plots: WEEDKLLR(75) NONE, WEEDKLLR(80) NONE and WEEDKLLR(75) HORMONE, WEEDKLLR(80) PARAQUAT on one block, remaining combinations on the other.

EXTRA (DD)

plus three extra whole plot treatments all with sub plot test 3 above; all given paraquat to preceding cereal stubble, direct drilled 1981, 1982, 1983 and 1984 but differing in subsoiling in September 1982:

NONE CNVNTIAL PARAPLOW None

Conventional vertical tine

'Paraplow'

NOTES: (1) The conventional vertical time sub soiler had times 76 cm apart and worked at a depth of about 50 cm.

(2) The 'Paraplow' had rigid times set at a 45° angle. The tip of each time was in line with the attachment of an adjacent time. The times were 51 cm apart and worked at a depth of about 38 cm.

Basal applications: Manures: (5:14:30) at 340 kg. 'Nitro-Chalk' at 630 kg. Weedkillers: Paraquat at 0.6 kg ion in 250 l. Methabenzthiazuron at 2.4 kg in 250 l. Mecoprop at 2.0 l and cyanazine at 0.30 l in 250 l applied with the fungicides. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg.

Seed: Igri, sown at 160 kg.

Cultivations, etc.:- Disced direct drilled plots: 15 Sept, 1983. NPK applied: 28 Sept. Paraquat applied: 29 Sept. Seed sown: 30 Sept. Methabenzthiazuron applied: 1 Oct. N applied: 22 Mar, 1984. Mecoprop and cyanazine applied with the fungicides: 12 Apr. Combine harvested: 25 July.

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

SÜBSOIL(82)	NONE	CNVNTIAL	PARAPLOW	MEAN
CULTIVTN				
PLOUGH	8.91	8.18	8.28	8.46
ROTA DIG	8.61	8.62	8.77	8.67
DEEPTINE	8.99	8.68	8.77	8.81
MEAN	8.84	8.49	8.61	8.64
WEEDKLLR(75)	NONE	HORMONE	MEAN	
CULTIVTN				
PLOUGH	8.50	8.41	8.46	
ROTA DIG	8.72	8.62	8.67	
DEEPTINE	8.88	8.74	8.81	
MEAN	8.70	8.59	8.64	
WEEDKLLR(75)	NONE	HORMONE	MEAN	
SUBSOIL(82)				
NONÉ	9.10	8.57	8.84	
CNVNTIAL	8.59	8.39	8.49	
PARAPLOW	8.41	8.81	8.61	
MEAN	8.70	8.59	8.64	

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

WEEDKLLR(80) CULTIVTN	NONE	PARAQUAT	MEAN
PLOUGH	8.50	8.42	8.46
ROTA DIG	8.54	8.80	8.67
DEEPTINE	8.75	8.88	8.81
MEAN	8.59	8.70	8.64
WEEDKLLR(80) SUBSOIL(82)	NONE	PARAQUAT	MEAN
NONÉ	8.52	9.15	8.84
CNVNTIAL	8.62	8.36	8.49
PARAPLOW	8.64	8.57	8.61
MEAN	8.59	8.70	8.64
WEEDKLLR(80) WEEDKLLR(75)	NONE	PARAQUAT	MEAN
NONE	8.67	8.73	8.70
HORMONE	8.52	8.66	8.59
MEAN	8.59	8.70	8.64

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	CULTIVTN	SUBSOIL(82)	WEEDKLLR(75)	WEEDKLLR(80)
SED	0.185	0.185	0.128	0.128
TABLE	CULTIVTN SUBSOIL(82)	CULTIVTN WEEDKLLR(75)	SUBSOIL(82) WEEDKLLR(75)	CULTIVTN WEEDKLLR(80)
SED EXCEPT WHEN	0.321 COMPARING MEANS	0.243 S WITH SAME LE	0.243 EVEL(S) OF:	0.243
CULTIVTN SUBSOIL(82		0.222	0.222	0.222

TABLE SUBSOIL(82) WEEDKLLR(80)

SED 0.243

EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: SUBSOIL(82) 0.222

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	8	0.321	3.7
BLOCK.WP.SP	8	0.385	4.5

GRAIN TONNES/HECTARE

EXTRA PLOTS

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

WEEDKLLR(75)	NONE	HORMONE	MEAN
EXTRA DD			
NONE	8.42	8.58	8.50
CNVNTIAL	9.23	8.50	8.86
PARAPLOW	8.95	8.35	8.65
MFAN	8.87	8.47	8.67

GRAIN MEAN DM% 85.3

ORGANIC MANURING

Object: To study, from crop yields and soil analyses, the effects of a range of types of organic matter - Woburn, Stackyard B.

Sponsor: A.E. Johnston.

The 20th year, sugar beet, w. oats, ley.

For previous years see 'Details' 1973 and 74-83/W/RN/12.

Design for sugar beet and w. oats: 2 blocks of 4 plots 3rd, 4th, 5th and 6th year leys: 2 blocks of 2 plots.

Whole plot dimensions: 8.53 x 30.5.

Treatments: From 1966 to 1971 the experiment had a preliminary period designed to build up organic matter, derived from different sources. An arable rotation was started on two blocks in 1972 and the remaining two blocks in 1973. After a period of testing the residues built up, a further period of accumulation was started; on two blocks (which included ley sown in 1979) in 1981 and on the other two (which included ley sown in 1980) in 1982. In addition to leys the first pair included w. oats in 1984 and the second pair sugar beet.

Sugar beet and w. oats tested:

MANURE

Organic manures and fertilizers in 1984, cumulative to 1983 and 1982 (both crops) and to 1981 (w. oats only) and to those applied in the preliminary period:

FYM

Farmyard manure at 50 tonnes

STRAW

Straw at 7.5 tonnes plus P_2O_5 at 140 kg, K_2O at

140 kg, MgO at 50 kg

2 3

FERT-FYM FERT-STR P_2O_5 at 280 kg, K_2O at 560 kg, MgO at 100 kg P_2O_5 at 140 kg, K_2O at 280 kg, MgO at 50 kg

All leys are clover/grass (LC) without N. 3rd and 4th year leys tested:

PREV LEY

Previous ley:

LC(LC) LC(LN) Clover/grass ley in preliminary period Grass ley with N in preliminary period

5th and 6th year leys tested:

PREV MAN

Previous manure:

LC(GM)

Green manures in preliminary period

LC(PT)

Peat in preliminary period

Standard applications:

W. oats: Manures: N at 90 kg as 'Nitro-Chalk'. Weedkiller: Methabenzthiazuron at 2.4 kg in 250 l.

Sugar beet: Manures: Ground chalk at 5.0 t, N at 150 kg as 'Nitro-Chalk'. Insecticide: Demeton-S-methyl at 0.24 kg in 250 l. Leys, 3rd, 4th, 5th and 6th years: Manures: P205 at 140 kg, K20 at 280 kg as (0:18:36), MgO at 50 kg as kieserite.

Seed: W. oats: Panema, sown at 200 kg. Sugar beet: Monoire, sown by precision drill.

Cultivations, etc.:-

W. oats: Half PK and Mg applied to FERT-FYM plots, treatment FYM and straw applied, sugar beet tops spread over arable plots, ploughed: 19 Oct, 1983. Half PK and Mg applied to FERT-FYM, all PK and Mg applied to FERT-STR and STRAW plots only, spring-tine cultivated with crumbler attached, seed sown: 20 Oct. Weedkiller applied: 21 Oct. N applied: 3 Apr, 1984. Combine harvested: 3 Aug.

Sugar beet: Ground chalk applied: 30 Sept, 1983. Half PK and Mg applied to FERT-FYM plots, treatment FYM and straw applied: 20 Oct. Ploughed: 21 Oct. PK applied to STRAW plots: 11 Nov. Half PK and Mg applied to FERT-FYM plots, all PK and Mg applied to FERT-STR plots and all Mg applied to STRAW plots: 15 Nov. Heavy spring-tine cultivated: 14 Dec. N applied and spring-tine cultivated: 3 Apr, 1984. Spring-tine cultivated with crumbler attached, seed sown: 4 Apr. Singled: 16-18 May. Tractor hoed: 31 May, 11 June. Hand hoed: 11-12 June, 29 June-4 July. Insecticide applied: 29 June. Lifted: 26 Oct.

3rd, 4th, 5th and 6th year leys: PK and Mg applied to 4th and 6th years: 20 Oct, 1983. 3rd and 5th years: 15 Nov. Cut: 12 June, 1984, 10 Sept.

SUGAR BEET

CLEAN BEET TONNES/HECTARE

**** TABLES OF MEANS ****

MANURE FYM STRAW FERT-FYM FERT-STR MEAN 51.8 48.0 37.6 45.5 45.7

SUGAR PERCENTAGE

**** TABLES OF MEANS ****

MANURE FYM STRAW FERT-FYM FERT-STR MEAN 18.2 18.3 17.9 18.2 18.2

TOTAL SUGAR TONNES/HECTARE

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

MANURE FYM STRAW FERT-FYM FERT-STR MEAN 9.44 8.77 6.83 8.32 8.34

TOPS TONNES/HECTARE

**** TABLES OF MEANS ****

MANURE FYM STRAW FERT-FYM FERT-STR MEAN 24.1 18.7 19.2 19.7 20.4

W.OATS

GRAIN TONNES/HECTARE

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

MANURE FYM STRAW FERT-FYM FERT-STR MEAN 5.10 5.14 4.94 4.44 4.90

GRAIN MEAN DM% 87.0

STRAW TONNES/HECTARE

**** TABLES OF MEANS ****

MANURE FYM STRAW FERT-FYM FERT-STR MEAN 5.19 4.90 4.06 3.70 4.46

STRAW MEAN DM% 84.3

PLOT AREA HARVESTED 0.00796

3RD YEAR LEY

DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

	1ST CUT (12/6/84)	2ND CUT (10/9/84)	TOTAL OF 2 CUTS
PREV LEY			
LC(LC)	3.54	0.41	3.95
LC(LN)	3.88	0.59	4.47
MEAN	3.71	0.50	4.21
MEAN DM%	24.4	31.9	28.2

4TH YEAR LEY

DRY MATTER TONNES/HECTARE

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

	1ST CUT	(12/6/84)	2ND CUT (10/9/84)	TOTAL OF 2	CUTS
PREV LEY					
LC(LC)		4.28	0.97		5.25
LC(LN)		4.46	0.76		5.22
MEAN		4.37	0.86		5.24
MEAN DM%		19.8	31.6		25.7

5TH YEAR LEY

DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

	1ST	CUT	(12/6/84)	2ND CUT	(10/9/84)	TOTAL O	F 2	CUTS
PREV MAN								
LC(GM)			2.59		0.69			3.28
LC(PT)			3.32		0.62			3.94
MEAN			2.96		0.65			3.61
MEAN DM%			21.6		32.5			27.1

6TH YEAR LEY

DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

	1ST CUT	(12/6/84)	2ND CUT (10/9/84)	TOTAL OF	2 CUTS
PREV MAN					
LC(GM)		4.52	0.77		5.30
LC(PT)		3.50	0.42		3.92
MEAN		4.01	0.60		4.61
MEAN DM%		20.2	35.9		28.1

INTENSIVE CEREALS

Object: To study the effects of intensive cereal cropping on yield, incidence of soil-borne pathogens and organic matter in the soil - Woburn Stackyard I.

Sponsors: A.E. Johnston, J. McEwen.

The 19th year, w. wheat, ley.

For previous years see 'Details' 1973 and 74-83/W/RN/13.

Treatments:-

Until 1977 the experiment tested all phases of the five-course rotation ley, potatoes, cereal, cereal and continuous cereal. From 1977 to 1980 all phases were cropped with cereal. The experiment was in two halves, one in which the cereal was w. wheat, sown on part of the site of the classical wheat experiment 1877-1954 and one in which the cereal was s. barley, sown on part of the site of the classical barley experiment 1877-1954. From 1981 the experiment is being used to establish leys of different durations for test on w. wheat in 1987. Plots not in ley are sown to w. wheat on both halves of the experiment.

The following crop sequences are being followed:

1981	82	83	84	85	86	87
W(5)	W	W	W	W	L	W
W(5)	W	W	W	L	L	W
W(6)	W	W	L	L	L	W
W(7)	W	L	L	L	L	W
W(8)	L	L	L	L	L	W
Ĺ	L	L	L	L	L	W

L = clover/grass ley W = w. wheat (5)etc = number of years continuous cereal

NOTE: Yields are not taken in the period 1981-86.

Standard applications:

W. wheat: Manures: (5:14:30) at 340 kg, N at 140 kg as 'Nitro-Chalk'.

Weedkiller: Chlortoluron at 3.5 kg in 250 l. Ley, 1st year: Manures: (5:14:30) at 340 kg, N at 50 kg as 'Nitro-Chalk'. Ley, 2nd, 3rd and 4th years: Manures: (0:18:36) at 380 kg.

Seed: W. wheat: Avalon, sown at 200 kg.

Ley: S 23 perennial ryegrass at 27 kg, Blanca white clover at 7 kg, mixture sown at 34 kg.

Cultivations, etc.:-

W. wheat: Ploughed: 13 Sept, 1983. NPK applied, rotary cultivated, seed sown: 28 Sept. Weedkiller applied: 29 Sept. N applied: 4 Apr, 1984. Combine harvested: 21 Aug.

1984. Combine harvested: 21 Aug.
Ley, 1st year: Ploughed: 13 Sept, 1983. NPK applied, rotary cultivated: 28 Sept. Seeds sown: 29 Sept. N applied: 27 Mar, 1984. Cut: 17 June, 11 Sept.

Ley, 2nd, 3rd and 4th years: PK applied: 31 Jan, 1984. Cut: 17 June, 11 Sept.

EFFECTS OF DEEP PK

Object: To study the residual effects of subsoiling and of incorporating a large dressing of PK in either the subsoil or topsoil, on yields and nutrient uptakes of s. barley - Woburn Butt Furlong.

Sponsors: J. McEwen, A.E. Johnston.

The tenth year, s. barley and s. oats.

For previous years see 74-83/W/RN/16.

Design: 4 series (for crops) each of 3 randomised blocks of 4 plots.

Whole plot dimensions: 4.27 x 2.59.

Treatments:

P	K	SUB	Extra PK and subsoil	treatment (applied autumn 1973):
			Extra PK	Subsoil (25-50 cm) treatment
-	-	-	None	None
-	-	2	None	Subsoiled
P	K	T	To topsoil (0-25 cm)	None
Р	K	S	To subsoil	Subsoiled

- NOTES: (1) The rates of P and K were 1930 kg P₂0₅, as superphosphate and 460 kg K₂0 as muriate of potash. These quantities, applied to subsoil, were chosen to equalize available P and K in top and subsoil.
 - (2) Subsoiling was done by spade, after removing the topsoil which was then replaced. PK to subsoil was worked in by forking.
 - (3) PK to topsoil was applied half before ploughing in autumn half soon after on the plough furrow.
 - (4) One series was fallow in 1984.

Basal applications:

All series: Weedkiller: Glyphosate at 1.4 kg in 250 l.

Series II and IV: S. barley: Manures: (20:10:10) at 750 kg.

Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 280 l. Fungicide: Tridemorph at 0.52 kg in 250 l.

Series III: S. oats: Manures: (20:10:10) at 750 kg. Weedkillers:

Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 280 l.

Seed: S. barley: Triumph, dressed with triadimenol and fuberidazole, sown at 160 kg.

S. oats: Trafalgar, sown at 200 kg.

Cultivations, etc.:-

Series I: Fallow: Glyphosate applied: 7 Sept, 1983. Ploughed: 20 Oct. Spring-tine cultivated: 14 Mar, 1984. Spring-tine cultivated with crumbler attached: 16 Mar, 16 May. Rotary cultivated: 25 July. Series II and IV: S. barley: Glyphosate applied: 7 Sept, 1983. Ploughed: 20 Oct. NPK applied: 14 Mar, 1984. Spring-tine cultivated, spring-tine cultivated with crumbler attached, seed

sown: 16 Mar. 'Brittox' applied: 16 May. Fungicide applied: 15 June. Harvested by hand: 13 Aug.
Series III: S. oats after s. barley: Glyphosate applied: 7 Sept, 1983. Ploughed: 20 Oct. NPK applied: 14 Mar, 1984. Spring-tine cultivated, spring-tine cultivated with crumbler attached, seed sown: 16 Mar. 'Brittox' applied: 16 May. Harvested by hand:

SERIES II BARLEY AFTER FALLOW

GRAIN TONNES/HECTARE

13 Aug.

**** TABLES OF MEANS ****

PK SUB --- -- S PK T PK S MEAN 4.32 4.47 4.35 4.62 4.44

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE PK SUB
SED 0.131

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP 6 0.161 3.6

GRAIN MEAN DM% 84.7

STRAW TONNES/HECTARE

**** TABLES OF MEANS ****

PK SUB --- -- S PKT PKS MEAN 3.45 3.61 3.48 3.46 3.50

STRAW MEAN DM% 86.4

SERIES IV BARLEY AFTER BARLEY

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

PK SUB --- -- S PKT PKS MEAN 4.60 4.48 4.37 4.62 4.52

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE PK SUB
SED 0.288

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 6
 0.353
 7.8

GRAIN MEAN DM% 84.1

STRAW TONNES/HECTARE

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

PK SUB --- -- S PKT PKS MEAN 4.16 4.05 4.01 4.09 4.08

STRAW MEAN DM% 85.1

SERIES III OATS

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

PK SUB --- -- S PK T PK S MEAN 3.22 3.08 3.44 3.24 3.25

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE PK SUB
SED 0.278

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 6
 0.340
 10.5

GRAIN MEAN DM% 83.4

STRAW TONNES/HECTARE

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

PK SUB --- -- S PK T PK S MEAN 2.96

STRAW MEAN DM% 79.2

RATES OF P AND K TO THE SUBSOIL

Object: To study the effects of a range of rates and frequencies of application of P and K to the subsoil, singly and together, on the yields and nutrient uptakes of a rotation of crops - Meadow.

Sponsors: J. McEwen, A.E. Johnston.

The fourth year, potatoes, s. barley, s. beans, w. wheat.

For previous years see 81-83/R/RN/17.

Design: 4 series (for crops) each of 40 plots.

Whole plot dimensions: 3.0×14.0 .

Treatments to each series:

TREATMNT

Extra P and K and primary cultivation tool in autumn 1980 only except on R plots, treatments repeated each autumn:

			P205(kg)	1	×2 ⁰	(kg)			Tool	
- P6	- K6	T	0 1000	0 500	to	topsoil	Plou	ıgh		(duplicated)
-	-	S SR	0	0	11	"	Wye	double-	digger "	(four plots) (duplicated)
P2	-	SR	63	0	to	subsoil	н	11	н .	(dapirodoca)
P3	-	S	125	0	11	н	11	11	11	
P4	-	S	250	0	11			11	11	
P5	-	S	500	0	11	п	н	"	11	(duplicated)
P6	-	S	1000	0	11	н	11	11	11	(aapiioaca)
-	K2	SR	0	31	11	11	11	11	н	
-	K3		0	63	н	н	н	11	11	
-	K4	S	0	125	11	11	11	н	11	
-	K5	S	0	250	88	11	н	11	11	(duplicated)
-	K6	S	0	350	11	11	н	11	п	(aupirouscu)
P1	K1	SR	31	16	н	ii .	н	11	н	
P1	K3	SR	31	63	11	п	н	11	п	
P2	K2	SR	63	31	14	11	II	11	H	
P3	K1	SR	125	16	11	II .	11	11	11	
P3	K3	SR	125	63	11		11	11	11	
P3	K4	S	125	125	п	n n	II	11	н	
	K3	S	250	63	16	II .	н	11	11	
P4	K4	S	250	125	11	11	11	н	11	
P4	K 5	S	250	250			н	н	11	(duplicated)
P4	K6	S	250	350	11	- 11	п	11	п	(dupi redeca)
P5	K4	S	500	125	61	#	11	н	н	(duplicated)
P5	K5	S	500	250	14	11	11	н	H	(dapirodoca)
P5	K6	S	500	350	и	п	11	п	н	
P6	K4	S	1000	125	11	n n	11	н	н	
	K5	S	1000	250	14	н	11	н	11	
P6		S	1000	350	11	н	11	**	H	

- NOTES: (1) Subsoiling was done with the Wye double-digger which turns a furrow with a conventional plough share, to a depth of 23 cm, and at the same time rotary cultivates the bottom of the adjacent furrow to a further depth of 15 cm. When applying P and K this was distributed ahead of the rotary cultivator.
 - (2) The topsoil PK dressing was equally divided before and after ploughing.
 - (3) All plots other than R were conventionally ploughed in autumn 1981, 1982 and 1983.
 - (4) The rate of 350 kg K₂0 applied was in error for 500 kg K₂0.

Standard applications:

Potatoes: Manures: (10:10:15 + 4.5 Mg) at 1960 kg. Weedkillers: Paraquat at 0.50 kg ion with linuron at 1.3 kg in 500 l. Glyphosate at 1.4 kg in 250 l. Fungicides: Fentin hydroxide at 0.28 kg in 200 l on seven occasions, with the insecticide on the first, third, fourth and sixth occasions. Insecticide: Pirimicarb at 0.14 kg on four occasions. Haulm desiccant: Diquat at 0.56 kg ion in 200 1.

S. barley: Manures: (20:10:10) at 630 kg. Weedkillers: 3, 6-dichloropicolinic acid at 0.07 kg and bromoxynil at 0.34 kg with mecoprop (as 'CMPP' at 4.2 1) applied with the fungicide in 250 1. Fungicide: Tridemorph at 0.52 kg.

S. beans: Weedkillers: Glyphosate at 1.4 kg in 250 l. Simazine at 1.2 l

in 250 l. Insecticide: Phorate at 5.6 kg. W. wheat: Manures: (0:18:36) at 350 kg. 'Nitro-Chalk' at 750 kg. Weedkillers: Mecoprop at 2.0 kg, ioxynil at 0.25 kg and bromoxynil at 0.25 kg in 200 l. Fungicide: Propiconazole at 0.25 kg in 500 l. Insecticide: Pirimicarb at 0.14 kg in 250 1.

Seed: Potatoes: Pentland Crown.

- S. barley: Triumph, dressed with triadimenol and fuberidazole, sown at 160 kg.
- S. beans: Minden, sown at 240 kg. W. wheat: Avalon, sown at 190 kg.

Cultivations, etc.:-

All crops: Treatments applied by double digger: 7-10 Nov, 1983. Ploughed: 11 Nov.

Potatoes: Glyphosate applied: 6 Oct, 1983. Heavy spring-tine cultivated twice: 16 Jan, 1984 and a third time: 14 Feb. NPK Mg applied: 3 Apr. Spiked rotary cultivated, potatoes planted: 4 Apr. Rotary ridged: 6 Apr. Linuron and paraquat applied: 3 May. Fentin hydroxide with the insecticide applied: 19 June, 17 July, 30 July, 28 Aug. Fentin hydroxide applied: 3 July, 13 Aug, 11 Sept. Haulm mechanically

destroyed: 3 Oct. Desiccant applied: 4 Oct. Lifted: 24 Oct.

S. barley: Spring-tine cultivated: 14 Nov, 1983. Heavy spring-tine cultivated: 14 Feb, 1984. NPK applied: 7 Mar. Spring-tine cultivated, rotary harrowed, seed sown: 8 Mar. Weedkillers and fungicide applied: 23 May. Combine harvested: 17 Aug.

S. beans: Glyphosate applied: 6 Oct, 1983. Heavy spring-tine cultivated twice: 16 Jan, 1984, and a third time: 14 Feb. Insecticide applied, heavy spring-tine cultivated, rotary harrowed, seed sown: 20 Mar. Simazine applied: 22 Mar. Combine harvested: 31 Aug.

W. wheat: Glyphosate applied: 6 Oct, 1983. Spring-tine cultivated, PK applied, spring-tine cultivated, rotary harrowed, seed sown: 14 Nov. N applied: 9 Apr, 1984. Weedkillers applied: 19 Apr. Fungicide applied: 14 June. Insecticide applied: 26 June. Combine harvested: 22 Aug.

```
84/R/RN/17
SERIES II POTATOES
TOTAL TUBERS TONNES/HECTARE
***** TABLES OF MEANS *****
     TREATMNT
                   57.7
        - - -
      P6 K6 T
                   66.1
       - - S
                   61.3
       - - SR
                   56.8
      P2 - SR
                  53.1
      P3 - S
                  52.3
       P4 - S
                  59.0
       P5 - S
                  63.0
      P6 - S
                  57.7
      - K2 SR
                  60.1
                  62.4
       - K3 S
       - K4 S
                  61.3
                   64.1
       - K5 S
       - K6 S
                   58.1
     P1 K1 SR
                   52.4
     P1 K3 SR
                  62.3
     P2 K2 SR
                   55.7
     P3 K1 SR
                   61.5
     P3 K3 SR
                   60.8
      P3 K4 S
                   58.3
                   58.9
      P4 K3 S
      P4 K4 S
                   59.3
      P4 K5 S
                   65.1
      P4 K6 S
                   61.8
      P5 K4 S
                   63.1
      P5 K5 S
                   65.6
      P5 K6 S
                   64.2
      P6 K4 S
                   62.0
      P6 K5 S
                   60.9
      P6 K6 S
                   65.6
                   60.8
        MEAN
**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****
TABLE
                  TREATMNT*
```

```
2.91 MIN REP
SED
                     2.30 MAX-MIN
```

* SED APPLIES ONLY TO - - -, P6 K6 T, - - S, - - SR, P5 - S, - K5 S, P4 K5 S AND P5 K4 S

TREATMNT MAX-MIN - - S V ANY OF REMAINDER MIN REP ANY OF THE REMAINDER

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF WP 10 2.06 3.4

SERIES II POTATOES

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

TREATMNT	
	98.0
P6 K6 T	98.4
S	98.0
SR	98.0
P2 - SR	98.1
P3 - S	98.3
P4 - S	98.8
P5 - S	97.6
P6 - S	98.2
- K2 SR	97.7
- K3 S	98.2
- K4 S	98.6
- K5 S	98.7
- K6 S	97.7
P1 K1 SR	99.2
P1 K3 SR	98.8
P2 K2 SR	98.9
P2 K2 SR P3 K1 SR	98.3
P3 K3 SR	98.8
P3 K4 S	99.1
P4 K3 S	98.7
P4 K4 S	98.0
P4 K5 S	98.0
P4 K6 S	98.1
P5 K4 S	98.2
P5 K5 S	98.4
P5 K6 S	98.5
P5 K4 S P5 K5 S P5 K6 S P6 K4 S	97.6
P6 K5 S	98.4
P6 K6 S	97.7
MEAN	98.2

```
84/R/RN/17
SERIES III SPRING BARLEY
GRAIN TONNES/HECTARE
***** TABLES OF MEANS *****
     TREATMNT
                   9.22
        - - -
      P6 K6 T
                   9.37
       - - S
                   9.17
       - - SR
                   9.13
      P2 - SR
                 9.22
       P3 - S
                  9.31
       P4 - S
                  9.47
       P5 - S
                 9.21
       P6 - S
                  9.71
      - K2 SR
                  9.01
       - K3 S
                  9.51
       - K4 S
                  9.01
       - K5 S
                  9.20
       - K6 S
                  8.72
     P1 K1 SR
                  9.06
     P1 K3 SR
                  9.37
     P2 K2 SR
                   9.17
     P3 K1 SR
                   9.33
     P3 K3 SR
                   9.37
      P3 K4 S
                   8.80
      P4 K3 S
                  9.19
      P4 K4 S
                  9.41
      P4 K5 S
                   9.41
      P4 K6 S
                  9.54
      P5 K4 S
                  9.15
      P5 K5 S
                  9.45
      P5 K6 S
                  9.37
      P6 K4 S
                  9.25
      P6 K5 S
                  9.40
      P6 K6 S
                  9.35
         MEAN
                  9.25
***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****
TABLE
                 TREATMNT*
SED
                    0.196 MIN REP
                    0.155 MAX-MIN
***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****
STRATUM
                          DF
                                        SE
                                                   CV%
WP
                          10
                                     0.139
                                                  1.5
GRAIN MEAN DM% 85.7
```

```
84/R/RN/17
SERIES IV SPRING BEANS
GRAIN TONNES/HECTARE
**** TABLES OF MEANS ****
     TREATMNT
                   4.50
        - - -
      P6 K6 T
                   4.06
       - - S
                   4.14
       - - SR
                   4.42
      P2 - SR
                   4.73
       P3 - S
                   4.89
       P4 - S
                   4.57
       P5 - S
                   4.61
       P6 - S
                   3.23
      - K2 SR
                   6.06
       - K3 S
                   4.15
       - K4 S
                   4.31
       - K5 S
                   4.25
       - K6 S
                   4.86
     P1 K1 SR
                   4.67
     P1 K3 SR
                   4.16
     P2 K2 SR
                   4.80
     P3 K1 SR
                   5.22
     P3 K3 SR
                   4.41
      P3 K4 S
                   5.00
      P4 K3 S
                   3.78
      P4 K4 S
                   3.62
      P4 K5 S
                   4.62
      P4 K6 S
                   4.41
      P5 K4 S
                   3.89
      P5 K5 S
                   3.74
      P5 K6 S
                   4.04
      P6 K4 S
                   4.04
      P6 K5 S
                    3.88
      P6 K6 S
                    3.95
         MEAN
                   4.34
**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****
TABLE
                  TREATMNT*
                      0.453 MIN REP
SED
                      0.358 MAX-MIN
***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****
STRATUM
                            DF
                                          SE
                                                     CV%
WP
                            10
                                     0.320
                                                     7.4
GRAIN MEAN DM% 88.0
```

```
84/R/RN/17
SERIES I WINTER WHEAT
GRAIN TONNES/HECTARE
***** TABLES OF MEANS *****
     TREATMNT
                   9.84
        - - -
      P6 K6 T
                  10.34
       - - S
                  9.73
       - - SR
                  10.56
      P2 - SR
                 11.19
       P3 - S
                 11.92
       P4 - S
                 10.66
       P5 - S
                 10.48
       P6 - S
                 10.94
      - K2 SR
                 11.02
       - K3 S
                 10.32
       - K4 S
                 10.13
       - K5 S
                  9.97
     - K6 S
P1 K1 SR
                  10.44
                  10.06
                 10.36
     P1 K3 SR
     P2 K2 SR
                  10.04
     P3 K1 SR
                  10.37
     P3 K3 SR
                 11.49
      P3 K4 S
                  9.75
      P4 K3 S
                  10.64
      P4 K4 S
                 10.36
      P4 K5 S
                 10.26
      P4 K6 S
                  10.24
      P5 K4 S
                 10.76
      P5 K5 S
                 10.04
                10.40
      P5 K6 S
                 10.03
      P6 K4 S
      P6 K5 S
                  9.08
     P6 K6 S
                  10.08
         MEAN
                  10.32
**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****
TABLE
                  TREATMNT
SED
                     0.449 MIN REP
                     0.355 MAX-MIN
***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****
STRATUM
                           DF
                                        SE
                                                    CV%
WP
                           10
                                    0.317
                                                    3.1
GRAIN MEAN DM% 86.7
```

84/R/CS/10 and 84/W/CS/10

LONG TERM LIMING

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

Sponsors: T.M. Addiscott, S.P. McGrath.

The 23rd year, fallow.

For previous years see 'Details' 1967, 1973 and 74-83/R&W/CS/10.

Design: 2 randomised blocks of 16 plots.

Whole plot dimensions: 6.40 x 18.3.

Cultivations, etc.:-

Sawyers I (R): Heavy spring-tine cultivated: 11 Nov, 1983 twice, 27 Apr, 1984, 9 May. Rotary cultivated: 27 Apr, 15 June, 12 July. Spring-tine cultivated: 13 July.

Stackyard C (W): Deep-tine cultivated: 16 Jan, 1984. Heavy spring-tine cultivated: 15 May. Cultivated with thistle bar: 10 July, 10 Aug. Rotary cultivated: 25 July.

84/R/CS/13

N LEVELS TO OLD GRASS

Object: To study the effects of a range of nitrogen rates on yield and botanical composition of very old permanent pasture. N fixed by legumes is estimated and the effect of treatments on nutrients available in the soil is also studied - Park Grass Old Plot 6.

Sponsor: A.E. Johnston.

The 20th year, old grass.

For previous years see 'Details' 1973 and 74-83/R/CS/13.

Design: 4 randomised blocks of 10 plots.

Whole plot dimensions: 1.83 x 10.1.

Treatments

TOTAL N Fertilizer nitrogen (kg N-total per annum applied in three equal dressings as (25:0:16)):

O(S)

O (sprayed with 2, 4-D ester to control legumes, duplicated)

O (duplicated)

112

168

225

281

338

NOTES: (1) 2, 4-D ester was applied at 1.0 kg in 220 l on 25 Apr, 1984.
(2) Rates of fertilizer nitrogen per cut were unchanged but as in 1983 only three cuts were taken instead of the usual four; accordingly total rates of nitrogen were three quarters of standard.

Basal applications: Manures: 34 kg P as superphosphate. 11 kg Mg as magnesium sulphate.

Cultivations, etc.:- Basal P and Mg applied: 22 Nov, 1983. Test NK applied: 16 Mar, 1984, 7 June, 27 July. Cut: 6 June, 26 July, 15 Nov.

84/R/CS/13

1ST CUT (6/6/84) DRY MATTER TONNES/HECTARE

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

TOTAL N O(S) 0 56 112 168 225 281 338 MEAN 0.31 1.94 1.88 2.19 3.51 4.82 5.05 5.72 2.77

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE TOTAL N

SED 0.2

0.246 MIN REP 0.213 MAX-MIN 0.174 MAX REP

TOTAL N

MAX REP O(S) V O

MAX-MIN O(S) OR O V ANY OF THE REMAINDER

MIN REP ANY OF THE REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP 29 0.348 12.6

1ST CUT MEAN DM% 22.9

2ND CUT (26/7/84) DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

TOTAL N O(S) 0 56 112 168 225 281 338 MEAN 0.46 2.31 1.92 2.16 2.57 2.48 2.97 2.95 2.06

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE TOTAL N

SED 0.255 MIN REP

0.221 MAX-MIN

0.180 MAX REP

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 29 0.361 17.5

2ND CUT MEAN DM% 27.2

84/R/CS/13

3RD CUT (15/11/84) DRY MATTER TONNES/HECTARE

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

TOTAL N O(S) 0 56 112 168 225 281 338 MEAN 0.23 0.64 0.82 1.07 1.30 1.78 1.90 2.08 1.07

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TOTAL N

SED 0.132 MIN REP 0.115 MAX-MIN

0.094 MAX REP

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK. WP 29 0.187 17.5

3RD CUT MEAN DM% 15.8

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

0 56 112 168 225 281 338 TOTAL N O(S) MEAN 0.99 4.89 4.62 5.43 7.39 9.08 9.92 10.75 5.89

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE TOTAL N

0.528 MIN REP 0.457 MAX-MIN 0.373 MAX REP SED

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 29 0.746 12.7

TOTAL OF 3 CUTS MEAN DM% 22.0

84/W/CS/34

NEMATICIDES IN CROP SEQUENCE

Object: To study the effects of a range of nematicides on incidence of Globodera rostochiensis and yield of potatoes. Residual effects of previous treatments are studied in wheat and barley - Woburn Great Hill II and III.

Sponsor: A.G. Whitehead.

The 16th year, potatoes, w. wheat, s. barley.

For previous years see 71/W/CS/34(t), 72/W/CS/34(t) and 73-83/W/CS/34.

Design: 4 series of 3 blocks of 10 plots.

Whole plot dimensions: 4.27 x 9.14.

Treatments: The experiment has four series with the following cropping:-

P = potatoes, SB = sugar beet, B = s. barley, W = w. wheat

* Treatments applied to potatoes, subsequent crops test residual effects.

Treatments to w. wheat (Series I): All combinations of:-

1. NEMACIDE(83) Residues of nematicides applied 1983:

FMC65201 FMC67825 OXAMYL

2. RATE Rates of nematicide (kg a.i.):

2.8 5.6 11.2

plus one untreated plot per block

RATE

0.0

```
84/W/CS/34
Treatments to potatoes (Series II): All combinations of:-
                    Nematicides applied 1984:

    NEMACIDE(84)

   ALDICARB
   DS 38697
   DS 46995
2. RATE
                    Rates of nematicide (kg a.i.):
                    Single (2.8 kg of aldicarb, 1.4 kg of DS materials) Double (5.6 kg of aldicarb, 2.8 kg of DS materials)
   SINGLE
   DOUBLE
   QUAD
                    Quadruple (11.2 kg of aldicarb, 5.6 kg of DS materials)
plus one untreated plot per block
   RATE
   NONE
Treatments to potatoes (Series III): All combinations of:-

    NEMACIDE(81)

                    Residues of nematicides applied 1981:
   ALDICARB
   H0E00668
   RH 9358
2. RATE
                    Rates of nematicide (kg a.i.):
   2.8
   5.6
   11.2
plus one untreated plot per block
RATE
0.0
Treatments to s. barley (Series IV): All combinations of:-

    NEMACIDE(82) Residues of nematicides applied 1982:

   DS 46995
   DS 47187
   OXAMYL
2. RATE
                    Rates of nematicide (kg a.i.):
   SINGLE
                    Single (1.5 kg of DS materials, 2.8 kg of oxamyl)
   DOUBLE
                    Double (3.0 kg of DS materials, 5.6 kg of oxamyl)
                    Quadruple (6.0 kg of DS materials, 11.2 kg of oxamyl)
   QUAD
```

plus one untreated plot per block

RATE

NONE

Standard applications:

W. wheat (Series I): Manures: Magnesian limestone at 5.0 t. (5:14:30) at 340 kg. N at 180 kg as 'Nitro-Chalk'. Weedkiller: Chlortoluron at 3.5 kg in 250 l.

Potatoes (Series II and III): Manures: (10:10:15+4.5 Mg) at 1990 kg. Weedkillers: Linuron at 0.75 l with paraquat at 0.20 kg ion in 250 l. Fungicides: Fentin acetate with maneb (as 'Brestan 60' at 0.5 kg) in 250 l with the insecticide. Fentin hydroxide at 0.28 kg in 250 l on six occasions, with the insecticide on the second and third occasions. Insecticide: Pirimicarb at 0.14 kg on three occasions.

S. barley (Series IV): Manures: (20:10:10) at 630 kg. Weedkillers: 3, 6-dichloropicolinic acid at 0.07 kg with the bromoxynil at 0.34 kg and mecoprop at 2.1 kg in 250 l. Fungicide: Tridemorph at 0.52 kg in 250 l.

Seed: W. wheat: Avalon, sown at 200 kg.

Potatoes: Pentland Crown.

S. barley: Triumph, dressed with triadimenol plus fuberidazole, sown at 160 kg.

Cultivations, etc.:-

W. wheat (Series I): Heavy spring-tine cultivated, NPK applied: 24 Oct, 1983. Magnesian limestone applied, spring-tine cultivated with crumbler attached, seed sown: 25 Oct. Weedkiller applied: 28 Oct. N applied: 11 Apr, 1984. Combine harvested: 20 Aug.

Potatoes (Series II and III): Heavy spring-tine cultivated (Series II): 24 Oct, 1983. Ploughed (Series III): 16 Nov. Deep-tine cultivated: 16 Jan, 1984. NPK with Mg applied: 2 Apr. Heavy spring-tine cultivated: 5 Apr. Rotary cultivated, potatoes planted (Series III): 13 Apr. Treatments applied, rotary cultivated, potatoes planted (Series II): 16 Apr. Weedkillers applied: 4 May. Fentin acetate with maneb and insecticide applied: 19 June. Fentin hydroxide applied: 3 July, 1 Aug, 28 Aug, 12 Sept. Fentin hydroxide with insecticide applied: 18 July, 20 July. Haulm mechanically destroyed: 28 Sept. Lifted (Series II): 9 Oct. (Series III): 10 Oct.

S. barley (Series IV): Ploughed: 16 Nov, 1983. NPK applied: 13 Mar, 1984. Spring-tine cultivated with crumbler attached, seed sown: 15 Mar. Weedkiller applied, fungicide applied: 30 May. Combine harvested: 14 Aug.

NOTES: Soil samples were taken before applying treatments and after harvest for counts of cysts, eggs and larvae of Globodera rostochiensis.

POTATOES SERIES II

TOTAL TUBERS TONNES/HECTARE

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

RATE	SINGLE	DOUBLE	QUAD	MEAN
NEMACIDE(84)				
ALDICARB	30.9	31.2	37.5	33.2
DS 38697	24.8	31.0	32.1	29.3
DS 46995	27.2	29.9	34.8	30.6
MEAN	27.6	30.7	34.8	31.0

RATE NONE 11.6

GRAND MEAN

29.1

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	NEMACIDE(84)	RATE NE	MACID	E(84)
				RATE
		8	RATE	NONE
SED	1.51	1.51		2.62

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV% BLOCK.WP 18 3.21 11.0

PERCENTAGE WARE 3.81CM (1.5 INCH RIDDLE)

**** TABLES OF MEANS ****

RATE	SINGLE	DOUBLE	QUAD	MEAN
NEMACIDE(84)	00.0			
ALDICARB	90.0	91.3	92.5	91.3
DS 38697	85.8	90.2	91.4	89.1
DS 46995	87.3	88.3	88.7	88.1
MEAN	87.7	89.9	90.8	89.5

RATE NONE

83.6

GRAND MEAN

88.9

POTATOES SERIES III

TOTAL TUBERS TONNES/HECTARE

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

RATE	2.8	5.6	11.2	MEAN
NEMACIDE(81)				
ALDICARB	16.2	16.5	26.4	19.7
H0E00668	16.3	15.4	21.5	17.7
RH 9358	15.8	21.4	24.9	20.7
MEAN	16.1	17.8	24.3	19.4

RATE 0.0 12.5

GRAND MEAN 18.7

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	NEMACIDE(81)	RATE NEMA	ACIDE(81)
			RATE
SED	1.52	1.52	2.64

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV% BLOCK. WP 3.23 18 17.3

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

RATE	2.8	5.6	11.2	MEAN
NEMACIDE(81)				
ALDICARB	83.9	79.6	86.8	83.4
H0E00668	82.6	80.8	85.2	82.9
RH 9358	80.9	84.4	88.5	84.6
MEAN	82.5	81.6	86.8	83.6

RATE 0.0

76.6

GRAND MEAN

82.9

GRAIN MEAN DM% 86.6

84/W/CS/34 WINTER WHEAT SERIES I GRAIN TONNES/HECTARE ***** TABLES OF MEANS ***** 2.8 5.6 RATE 11.2 MEAN NEMACIDE(83) 4.28 FMC65201 4.07 4.19 4.18 5.25 FMC67825 5.24 5.36 5.58 OXAMYL 5.25 5.44 4.26 4.99 MEAN 4.86 4.99 4.68 4.84 RATE 0.0 5.41 GRAND MEAN 4.90 **** STANDARD ERRORS OF DIFFERENCES OF MEANS **** TABLE NEMACIDE(83) RATE NEMACIDE(83) RATE & RATE 0.0 0.342 0.342 0.593 **** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION **** STRATUM DF SE CV% BLOCK. WP 18 0.726 14.8 GRAIN MEAN DM% 88.4

112

SPRING BARLEY SERIES IV

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

RATE	SINGLE	DOUBLE	QUAD	MEAN
NEMACIDE(82)		5 00	5 01	
DS 46995	6.50	5.33	6.21	6.01
DS 47187	5.53	6.58	5.75	5.95
OXAMYL	6.19	6.50	7.26	6.65
MEAN	6.07	6.13	6.40	6.20

RATE NONE 7.16

GRAND MEAN

6.30

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE

NEMACIDE(82) RATE NEMACIDE(82)

RATE

& RATE NONE

SED

0.432

0.432

0.749

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM

DF

SE

CV%

BLOCK.WP

18 0.917 14.6

GRAIN MEAN DM% 87.5

NEMATICIDES DOSAGE

Object: To study the effects of rates and methods of applying nematicides on Globodera rostochiensis and yield of potatoes; residual effects are also studied - Woburn Stackyard AII.

Sponsor: A.G. Whitehead.

The 17th year, potatoes, w. wheat.

For previous years see 72/W/CS/35(t) and 73-83/W/CS/35.

Design: 2 series each of 4 randomised blocks of 18 plots with S NEM YR on blocks

Whole plot dimensions: 4.27 x 6.10.

Treatments:-

The experiment has two series with the following cropping:-1968-72 73 74 75 76 77 78 79 80 81 82 83 84

Series I was damaged by soil erosion and has been excluded from the experiment since 1980.

P = Potatoes, SB = Sugar beet, B = S. barley, W = W. wheat

Treatments:

Series II, w. wheat 1984, tests the residual effects of treatments applied for potatoes in 1979 and 1983. All combinations of:-

Blocks

1. S NEM YR Years of applying spring nematicides:

1979 1979 only

1979+83 1979 repeated cumulatively in 1983

Whole plots

A NEM(79) Residual effects of nematicide applied autumn 1978:

NONE None

TELONE 'Telone' at 224 kg

S NEM Nematicides applied in spring 1979 and 1983:

ALDICARB OXAMYL

^{*}Treatments applied to potatoes, subsequent crops test residual effects.

```
84/W/CS/35
4. SNEMRATE
                  Rates of spring nematicides (kg):
    2.5
    5.0
    7.5
   10.0
plus two untreated plots per block
RATE
0.0
   Series III, potatoes 1984, tests the residual and fresh effects of sets
   of treatments applied for potatoes in 1980 and 1984, ignoring those
   applied in earlier years. All combinations (duplicated) of:-
Blocks
1. S NEM YR
                    Years of applying spring nematicides:
   1980
                    1980 only
   1980+84
                    1980 repeated cumulatively in 1984
Whole plots
2. S NEM
                    Spring nematicides:
   ALDICARB
   OXAMYL
3. SNEMRATE
                    Rates of spring nematicides (kg):
    2.5
    5.0
    7.5
   10.0
plus two untreated plots per block
RATE
0.0
Standard applications:
   W. wheat (Series II): Manures: (5:14:30) at 340 kg. N at 170 kg as
   'Nitro-Chalk'. Weedkiller: Chlortoluron at 3.5 kg in 250 l. Potatoes (Series III): Manures: Magnesian limestone at 5.0 t.
      (10:10:15+4.5 Mg) at 2510 kg. Weedkillers: Linuron at 1.2 1 with
      paraquat at 0.20 kg ion in 250 l. Fungicides: Fentin acetate with
      maneb (as 'Brestan 60' at 0.5 kg) in 250 1 on one occasion with the
      insecticide. Fentin hydroxide at 0.28 kg in 250 l on five occasions,
      with the insecticide on the second occasion. Insecticide: Pirimicarb
      at 0.14 kg on two occasions. Haulm desiccant: Diquat at 0.8 kg ion
      in 250 1.
Seed: W. wheat: Avalon, sown at 200 kg.
```

Potatoes: Pentland Crown.

Cultivations, etc.:-

W. wheat (Series II): Heavy spring-tine cultivated, NPK applied: 24 Oct, 1983. Spring-tine cultivated with crumbler attached, seed sown: 25 Oct. Weedkiller applied: 28 Oct. N applied: 3 Apr, 1984. Combine harvested: 21 Aug.

Potatoes (Series III): Magnesian limestone applied: 30 Sept, 1983.
Ploughed: 16 Nov. NPK with Mg applied: 3 Apr, 1984. Heavy springtine cultivated: 5 Apr. Treatments applied, rotary cultivated, potatoes planted: 11-12 Apr. Weedkillers applied: 4 May. Fentin acetate with maneb and insecticide applied: 19 June. Fentin hydroxide applied: 3 July, 1 Aug, 28 Aug, 12 Sept. Fentin hydroxide applied with insecticide: 18 July. Haulm desiccant applied: 27 Sept. Haulm mechanically destroyed: 28 Sept. Lifted: 8 Oct.

NOTE: Soil samples were taken before treatments were applied and afterharvest for cyst and egg counts of Globodera rostochiensis.

POTATOES SERIES III

TOTAL TUBERS TONNES/HECTARE

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

S NEM	ALDICARB	OXAMYL	MEAN		
S NEM YR 1980	33.3	31.6	32.5		
1980+84	49.1	49.4	49.2		
MEAN	41.2	40.5	40.9		
SNEMRATE S NEM YR	2.5	5.0	7.5	10.0	MEAN
1980	29.9	30.7	36.6	32.6	32.5
1980+84	49.5	47.1	49.0	51.4	49.2
MEAN	39.7	38.9	42.8	42.0	40.9
SNEMRATE S NEM	2.5	5.0	7.5	10.0	MEAN
ALDICARB	39.4	39.2	45.3	41.0	41.2
OXAMYL	40.0	38.5	40.3	43.0	40.5
MEAN	39.7	38.9	42.8	42.0	40.9
	SNEMRATE	2.5	5.0	7.5	10.0
S NEM YR	S NEM				
1980	ALDICARB OXAMYL		30.8 30.6	38.9 34.3	34.0 31.3
1980+84	ALDICARB OXAMYL		47.6 46.5	51.7 46.4	48.0 54.8
	UMARTIL	73.3	40.5	70.7	34.0

RATE 0.0 28.6

GRAND MEAN 39.5

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	S NEM	SNEMRATE	S NEM YR* S NEM	S NEM YR* SNEMRATE
SED	1.30	1.84	1.84	2.61
TABLE	S NEM SNEMRATE	S NEM YR* S NEM SNEMRATE & RATE 0.0		
SED	2.61	3.69		

^{*} WITHIN THE SAME LEVEL OF S NEM YR ONLY

POTATOES SERIES III

TOTAL TUBERS TONNES/HECTARE

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 52
 5.21
 13.2

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

S NEM	ALDICARB	OXAMYL	MEAN		
S NEM YR	01.7	00.7	01.0		
1980	91.7	90.7	91.2		
1980+84	95.8	95.1	95.5		
MEAN	93.8	92.9	93.3		
SNEMRATE S NEM YR	2.5	5.0	7.5	10.0	MEAN
1980	89.7	90.6	92.8	91.8	91.2
1980+84	95.0	95.5	95.6	95.8	95.5
MEAN	92.3	93.0	94.2	93.8	93.3
SNEMRATE S NEM	2.5	5.0	7.5	10.0	MEAN
ALDICARB	92.5	93.1	95.8	93.6	93.8
OXAMYL	92.1	93.0	92.5	94.0	92.9
MEAN	92.3	93.0	94.2	93.8	93.3
	SNEMRATE	2.5	5.0	7.5	10.0
S NEM YR	S NEM				
1980	ALDICARB	89.8	90.2	94.9	91.9
	OXAMYL	89.5	90.9	90.6	91.7
1980+84	ALDICARB	95.2	96.0	96.7	95.3
	O XAMY L	94.7	95.0	94.4	96.3

RATE 0.0 90.1

GRAND MEAN 93.0

WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

A NEM(79) S NEM YR	NONE	TELONE	MEAN		
1979	7.42	7.49	7.46		
1979+83	7.54	7.71	7.62		
MEAN	7.48	7.60	7.54		
S NEM S NEM YR	ALDICARB	OXAMYL	MEAN		
1979	7.49	7.42	7.46		
1979+83	7.59	7.65	7.62		
MEAN	7.54	7.54	7.54		
S NEM	ALDICARB	OXAMYL	MEAN		
A NEM(79)	ALDICAND	OWNITE	PILAN		
NONE	7.38	7.57	7.48		
TELONE					
TELUNE	7.71	7.50	7.60		
MEAN	7.54	7.54	7.54		
SNEMRATE	2.5	5.0	7.5	10.0	MEAN
	2.5	3.0	1.5	10.0	PILAN
S NEM YR					
1979	7.12	7.81	7.54	7.36	7.46
1979+83	7.84	8.01	7.14	7.51	7.62
MEAN	7.48	7.91	7.34	7.44	7.54
SNEMRATE A NEM(79)	2.5	5.0	7.5	10.0	MEAN
	7 55	7 61	7 25	7 40	7 40
NONE	7.55	7.61	7.35	7.40	7.48
TELONE	7.41	8.21	7.33	7.47	7.60
MEAN	7.48	7.91	7.34	7.44	7.54
SNEMRATE	2.5	5.0	7.5	10.0	МСАН
S NEM	2.5	5.0	/.5	10.0	MEAN
ALDICARB	7.58	8.03	7.09	7.47	7.54
OXAMYL	7.38	7.78	7.58	7.40	7.54
MEAN	7.48	7.91	7.34	7.44	7.54
A NEM(79)	NONE		TELONE		
	ALDICARB			OYAMVI	
S NEM YR	ALDICARD	UNAPITE AL	DICARD	UAAPIIL	
1979	7.18	7.66	7.81	7.18	
1979+83	7.58	7.49	7.60	7.82	

WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

		5.0	7.5	10.0	
1979 NON	E 7.04	7.65	7.65	7.33	
TELON	E 7.20	7.96	7.43	7.39	
1979+83 NON	E 8.05	7.56	7.05	7.48	
TELON	E 7.62	8.46	7.23	7.54	
SNEMRAT	F 2.5	5.0	7.5	10.0	
		0.0	,	10.0	
		7.86	7.17	7.33	
	L 8.14		7.26	7.41	
	SNEMRATE	2.5	5.0	7.5	10.0
A NFM(79)			•••	,	10.0
		7.14	7.91	6.99	7.48
TELONE					
					7.47
	SNEMRATE	2.5	5.0	7.5	10.0
S NEM YRA NEM(79			•••		
		7.00	7.82	6.99	6.91
2010					7.76
TELON					
1979+83 NON					8.05
TELON					7.17
		7.46	8.49		7.91
	S NEM YRA NEM(79 1979 NON TELON 1979+83 NON TELON SNEMRAT S NEM YR S NE 1979 ALDICAR OXAMY 1979+83 ALDICAR OXAMY A NEM(79) NONE TELONE S NEM YRA NEM(79 1979 NON TELON 1979+83 NON	S NEM YRA NEM(79)	S NEM YRA NEM(79) 1979 NONE 7.04 7.65 TELONE 7.20 7.96 1979+83 NONE 8.05 7.56 TELONE 7.62 8.46 SNEMRATE 2.5 5.0 S NEM YR S NEM 1979 ALDICARB 7.62 7.86 0 XAMYL 6.61 7.76 1979+83 ALDICARB 7.54 8.21 0 XAMYL 8.14 7.81 SNEMRATE 2.5 A NEM(79) S NEM NONE ALDICARB 7.14 0 XAMYL 7.95 TELONE ALDICARB 8.02 0 XAMYL 6.80 SNEMRATE 2.5 S NEM YRA NEM(79) S NEM 1979 NONE ALDICARB 7.00 0 XAMYL 6.80 SNEMRATE 2.5 S NEM YRA NEM(79) S NEM 1979 NONE ALDICARB 7.00 0 XAMYL 7.08 TELONE ALDICARB 7.29 0 XAMYL 6.15 1979+83 NONE ALDICARB 7.29 0 XAMYL 8.82	S NEM YRA NEM(79) 1979 NONE 7.04 7.65 7.65 TELONE 7.20 7.96 7.43 1979+83 NONE 8.05 7.56 7.05 TELONE 7.62 8.46 7.23 SNEMRATE 2.5 5.0 7.5 S NEM YR S NEM 1979 ALDICARB 7.62 7.86 7.17 0XAMYL 6.61 7.76 7.90 1979+83 ALDICARB 7.54 8.21 7.02 0XAMYL 8.14 7.81 7.26 SNEMRATE 2.5 5.0 A NEM(79) S NEM NONE ALDICARB 7.14 7.91 0XAMYL 7.95 7.30 TELONE ALDICARB 8.02 8.16 0XAMYL 7.95 7.30 TELONE ALDICARB 8.02 8.16 0XAMYL 6.80 8.26 SNEMRATE 2.5 5.0 SNEMRATE 2.5 5.0 SNEMRATE 2.5 5.0 SNEMRATE 2.5 5.0 OXAMYL 7.95 7.30 TELONE ALDICARB 7.14 7.91 0XAMYL 7.95 7.30 TELONE ALDICARB 8.02 8.16 0XAMYL 6.80 8.26	S NEM YRA NEM(79) 1979 NONE 7.04 7.65 7.65 7.33 TELONE 7.20 7.96 7.43 7.39 1979+83 NONE 8.05 7.56 7.05 7.48 TELONE 7.62 8.46 7.23 7.54 SNEMRATE 2.5 5.0 7.5 10.0 S NEM YR S NEM 1979 ALDICARB 7.62 7.86 7.17 7.33 OXAMYL 6.61 7.76 7.90 7.39 1979+83 ALDICARB 7.54 8.21 7.02 7.61 OXAMYL 8.14 7.81 7.26 7.41 SNEMRATE 2.5 5.0 7.5 A NEM(79) S NEM NONE ALDICARB 7.14 7.91 6.99 OXAMYL 7.95 7.30 7.70 TELONE ALDICARB 8.02 8.16 7.19 OXAMYL 6.80 8.26 7.46 SNEMRATE 2.5 5.0 7.5 S NEM YRA NEM(79) S NEM 1979 NONE ALDICARB 7.00 7.82 6.99 OXAMYL 7.08 7.48 8.31 TELONE ALDICARB 8.25 7.89 7.35 OXAMYL 7.08 7.48 8.31 TELONE ALDICARB 8.25 7.89 7.35 OXAMYL 6.15 8.03 7.50 1979+83 NONE ALDICARB 7.29 7.99 7.00 OXAMYL 6.15 8.03 7.50 1979+83 NONE ALDICARB 7.29 7.99 7.00 OXAMYL 8.82 7.13 7.10

RATE 0.0 6.40

GRAND MEAN 7.41

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	A NEM(79)	S NEM	SNEMRATE	
SED	0.217	0.217	0.306	
TABLE	S NEM YR* A NEM(79)	S NEM YR* S NEM	A NEM(79) S NEM	S NEM YR* SNEMRATE
SED	0.306	0.306	0.306	0.433

WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	A NEM(79) SNEMRATE	S NEM SNEMRATE	S NEM YR* A NEM(79) S NEM	S NEM YR* A NEM(79) SNEMRATE
SED	0.433	0.433	0.433	0.613
TABLE	S NEM YR* S NEM SNEMRATE	A NEM(79) S NEM SNEMRATE	S NEM YR* A NEM(79) S NEM SNEMRATE	
SED	0.613	0.613	0.866	

^{*} WITHIN THE SAME LEVEL OF S NEM YR ONLY SED FOR COMPARING RATE 0.0 WITH ANY ITEM IN S NEM YR.A NEM(79).S NEM.SNEMRATE TABLE IS 0.685

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 36 0.866 11.7

GRAIN MEAN DM% 89.3

DAZOMET AND NITROGEN

Object: To study the cumulative effects of dazomet and nitrogen on pathogens and yield of maize grown continuously - Woburn Butt Furlong.

Sponsors: A.J. Barnard, D. Hornby.

The 14th year, forage maize.

For previous years see 71/W/CS/66(t), 72/W/CS/66(t) and 73-83/W/CS/66.

Design: 2 blocks of 4 plots split into 4.

Whole plot dimensions: 2.13 x 16.5.

Treatments: All combinations of:-

Whole plots

Dazomet (kg per annum) cumulative 1971-79, none since: DAZOMET(79)

450

DAZOMET(84) Dazomet (kg) in 1982, 1983 and 1984:

450

Sub plots

N+FNGRES Nitrogen fertilizer as 'Nitro-Chalk' cumulative to 1982 and 1983 and fungicide residues from 1983:

NONE None

N78+N120 78 kg N on 5 Apr, 1984, 120 kg N to seedbed on 21 May

N120 120 kg N to seedbed on 21 May

120 kg N to seedbed + residues of 50 kg cyprofuram to N120(CY)

seedbed in 1983

NOTE: Sub plot treatments were superimposed on previous cumulative N treatments 1971-81.

Basal applications: Manures: (0:18:36) at 490 kg. Weedkiller: Atrazine at 1.1 kg in 280 1.

Seed: Beaupre, sown at 103,000 seeds per hectare.

Cultivations, etc.:- Ploughed: 15 Nov, 1983. PK applied: 28 Mar, 1984. Spring-tine cultivated with crumbler attached: 4 Apr. Dazomet and early N treatments applied, rotary cultivated: 5 Apr. Weedkiller applied, spring-tine cultivated, with crumbler attached, twice. Seed sown: 16 May. Seedbed N applied: 21 May. Hand harvested: 17 Oct.

NOTE: Soil samples were taken after harvest for counts of ectoparasitic nematodes.

FORAGE DRY MATTER TONNES/HECTARE

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

DAZOMET(84) DAZOMET(79)	0	450	MEAN		
0	13.61	14.19	13.90		
450	12.74	15.40	14.07		
MEAN	13.18	14.80	13.99		
N+FNGRES DAZOMET(79)	NONE	N78+N120	N120	N120(CY)	MEAN
Ó	7.94	16.94	15.09	15.63	13.90
450	8.71	16.41	14.81	16.35	14.07
MEAN	8.33	16.68	14.95	15.99	13.99
N+FNGRES DAZOMET(84)	NONE	N78+N120	N120	N120(CY)	MEAN
Ó	7.09	16.13	14.74	14.75	13.18
450	9.56	17.23	15.17	17.23	14.80
MEAN	8.33	16.68	14.95	15.99	13.99
	N+FNGRE		N78+N1	20 N120	N120(CY)
DAZOMET(79)	DAZOMET(84				
0		0 7.60	16.	92 14.48	15.45
	45				15.80
450		0 6.59			14.04
	45	10.83	17.	49 14.63	18.66

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	N+FNGRES	DAZOMET(79)* N+FNGRES		DAZOMET(79)* DAZOMET(84) N+FNGRES
SED	0.724	1.023	1.023	1.447

^{*} WITHIN SAME LEVEL OF DAZOMET(79) OR DAZOMET(84) OR BOTH

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	12	1.447	10.3

FORAGE MEAN DM% 33.7

EFFECTS OF BREAKS ON TAKE-ALL

Object: To study factors affecting the incidence of take-all (Gaeumannomyces graminis) and their effects on yields of s. cereals - Woburn, Butt Furlong.

Sponsor: D. Hornby.

The 13th year, s. barley, s. wheat.

For previous years see 72/W/CS/99(t) and 73-83/W/CS/99.

Design: 2 randomised blocks of 9 plots, 6 of which are split into 2.

Whole plot dimensions: 5.34 x 15.2.

Treatments: All combinations of:-

Whole plots

1. TREATMNT(1) Crop sequences; soil sterilant and inoculum in 1979:

		72	73	74	75	76	77	78	79	80	81-84
В	11(S)A	F	BE	В	В	В	В	В	B(S)	В	В
B	9 A	В	В	F	BE	В	В	В	В	В	В
В	8(SI)A	В	В	В	F	BE	В	В	B(SI)	В	В
В	7(I)A	В	В	В	В	F	BE	В	B(I)	В	В
	10	В	F	BE	В	В	В	В	В	В	W

All sequences were in s. barley 1968-71

Sub plots

2. INOC RES Residues of take-all inoculum:

O None I Inoculated (in 1980 and 1983 to s. barley, in 1981 and 1982 to s. wheat)

plus an extra combination of:

Whole plots

1. TREATMNT(2) Crop sequence:

B 17 S. barley 1968-84

Sub plots

2. AUT CROP Crop in autumn 1983 before sowing in spring 1984:

NONE None
BARLEY Barley sown 12 Oct, destroyed 15 Mar, resown 16 Mar.

plus three extra treatments testing crop sequences alone (all s. barley 1968-71):

EXTRA

		72	73	74	75	76	77	78	79	80	81	82-84
В	3	F	В	В	В	В	В	В	F	BE	0	B B
B	5	В	В	В	В	В	F	BE	0	В	В	В
B	4	В	В	В	В	В	В	F	BE	0	В	В

B = S. barley, W = S. wheat, BE = S. beans, O = S. oats, F = Fallow

(S) = Soil sterilant (1979), formalin.

- (I) & I = Inoculum of take-all applied on colonised autoclaved oats, in the ratio of three oats to one s. barley or s. wheat seed, broadcast at 310 kg on the surface and rotary harrowed in 1980, 1981 and 1983, combine drilled in 1979.
- A = Barley sown in autumn, destroyed and resown in spring.

Standard applications:

S. Wheat and s. barley: Manures: Magnesian limestone at 7.5 t. (20:10:10) at 420 kg, none to autumn-sown barley. Weedkillers: Glyphosate at 1.4 kg in 250 l. Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 250 l.

Seeds: S. barley: Triumph, dressed with ethirimol, sown at 170 kg in autumn and 160 kg in spring.
S. Wheat: Sicco, sown at 190 kg.

Cultivations, etc.:-

- S. barley: Glyphosate applied: 7 Sept, 1983. Magnesian limestone applied: 30 Sept. Ploughed: 10 Oct. Autumn-sown plots spring-tine cultivated with crumbler attached, seed sown: 12 Oct. NPK applied: 14 Mar, 1984. Spike rotary cultivated: 15 Mar. Spring-tine cultivated with crumbler attached, seed sown: 16 Mar. 'Brittox' applied: 15 May. Combine harvested: 14 Aug.
- S. wheat: Glyphosate applied: 7 Sept, 1983. Magnesian limestone applied: 30 Sept. Ploughed: 10 Oct. NPK applied, spike rotary cultivated: 14 Mar, 1984. Spring-tine cultivated with crumbler attached, seed sown: 16 Mar. 'Brittox' applied: 15 May. Combine harvested: 28 Aug.

NOTE: Plant samples were taken in July for incidence of take-all.

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

TREATMNT(1) INOC RES	B 11(S)A	B 9 A	B 8(SI)A	B 7(I)A	W 10	MEAN
0	5.26	5.43	4.81	5.19	3.75	4.89
I	5.16	5.77	5.33	5.61	4.09	5.19
MEAN	5.21	5.60	5.07	5.40	3.92	5.04

GRAIN TONNES/HECTARE

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

AUT CROP NONE BARLEY MEAN TREATMNT(2) 5.20 6.21 5.70 B 17 B 3 B 5 B 4 MEAN 5.95 6.38 6.30 6.21 EXTRA

GRAND MEAN 5.50

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE AUT CROP EXTRA INOC RES TREATMNT(1) INOC RES TREATMNT(1) SED 0.497 0.560 0.222 0.560

EXCEPT WHEN COMPARING MEANS WITHIN THE SAME LEVEL(S) OF: TREATMNT(1)

0.497

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV% BLOCK. WP 8 0.560 10.2 BLOCK. WP.SP 12 0.497 9.0

MEAN DM% 86.7

CONTROL OF PATHOGENS

Object: To study the effects of a range of chemicals on incidence of pathogens and yield of continuous maize - Long Hoos VI/VII 6.

Sponsors: A.J. Barnard, K.E. Fletcher, D.J. Hooper, D. Hornby, R.T. Plumb.

The 11th year, forage maize.

For previous years see 74-83/R/CS/133.

Design: 3 randomised blocks of 9 plots.

Whole plot dimensions: 2.13 x 18.3.

Treatments:-

CHEMICAL	Chemicals	applied	annually	except	as	stated:

NONE	None (2 plots per block)
ALDICARB	Aldicarb, 4.5 kg as granules to seedbed
BENOMYL	Benomyl, 11.2 kg as dust to seedbed
DAZOMET	Dazomet, 450 kg as granules in early spring (not applied

1975, 1979 and 1981) PERMETH

Permethrin, as foliar spray (0.15 kg in 1979, 0.05 kg in

PHORATE

Phorate, 1.68 kg as granules to seedbed Pirimicarb, 0.14 kg as foliar spray (1979 & 1984 only) **PIRIMICA** Benomyl + dazomet (not applied 1975, 1979 & 1981) BE+DA+PH + phorate, at above rates and times

NOTE: Permethrin and pirimicarb were applied in 340 l in 1979, 220 l in 1984.

Basal applications: Manures: 'Nitro-Chalk' at 660 kg. Weedkiller: Atrazine at 1.7 1 in 220 1.

Seed: Fronica, sown at 100,000 seeds per hectare.

Cultivations, etc.:- Ploughed: 3 Nov, 1983. Spring-tine cultivated dazomet plots only: 21 Mar, 1984. Dazomet applied and these plots only rotary cultivated: 22 Mar. Spring-tine cultivated: 10 May. Remaining seedbed treatments applied, power hardward, seed sown: 11 May. Weedkiller applied: 14 May. N applied: 18 May. Foliar treatments applied: 17 July. Harvested by hand: 30 Oct.

FORAGE MAIZE DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

CHEMICAL 11.62 NONE ALDICARB 11.53 BENOMYL 11.26 12.81 DAZOMET PERMETH 11.71 PHORATE 11.71 11.66 PIRIMICA BE+DA+PH 15.33 12.14 MEAN

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE CHEMICAL 0.959 MIN REP SED 0.831 MAX-MIN

CHEMICAL

MAX-MIN NONE V ANY OF REMAINDER MIN REP ANY OF REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV% BLOCK. WP 17 1.175 9.7

FORAGE MEAN DM% 33.6

CHEMICAL REFERENCE PLOTS

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

Sponsors: G.G. Briggs, R. MacDonald.

The 11th year, s. barley.

For previous years see 74-83/R/CS/140.

Design: Single replicate of 32 plots.

Whole plot dimensions: 4.06 x 4.57.

Treatments, applied cumulatively except as stated:

All combinations of:-

1. WEEDKLLR

Weedkiller in autumn:

NONE

None

GLYPHOS

Glyphosate at 1.5 kg to barley stubble each autumn

since 1979.

2. FUNGCIDE(1)

Fungicide in autumn:

NONE

None

TRIADIM

Triadimefon at 0.25 kg in autumn 1981 and 1982, 0.28 kg

in autumn 1983.

3. FUNGCIDE(2)

Fungicide in spring:

NONE

None

BENOMYL

Benomyl at 4 kg to the seedbed

4. INSCTCDE

Insecticide:

NONE

None

CHLORFEN

Chlorfenvinphos at 2 kg to the seedbed

5. NEMACIDE

Nematicide:

NONE

None

ALDICARB

Aldicarb at 6 kg to the seedbed as granules

NOTE: Glyphosate and triadimefon were applied in 340 l on 1 Nov, 1983. Other treatments were applied on 2 Apr, 1984.

Basal applications: Manures: 'Nitro-Chalk' at 560 kg. Weedkillers: Dicamba with mecoprop and MCPA (as 'Banlene Plus' at 4.9 1) in 220 l.

Seed: Triumph, seed not dressed, sown at 160 kg.

Cultivations, etc.:- Ploughed: 9 Dec, 1983. N applied: 22 Mar, 1984. Spring-tine cultivated, power harrowed, seed sown: 2 Apr. Weedkillers applied: 31 May. Combine harvested: 14 Aug.

NOTE: Mildew and aphids were assessed twice during the season.

GRAIN TONNES/HECTARE

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

FUNGCIDE(1) WEEDKLLR	NONE	TRIADIM	MEAN
	E 16	F 20	F 10
NONE	5.16	5.20	5.18
GLYPHOS	5.09	5.11	5.10
MEAN	5.12	5.16	5.14
PILAN	3.12	3.10	3.14
FUNGCIDE(2)	NONE	BENOMYL	MEAN
WEEDKLLR			
NONE	5.17	5.19	5.18
GLYPHOS	5.02	5.17	5.10
MEAN	5.09	5.18	5.14
FUNCCIOE (2)	NONE	DENOMY	MEAN
FUNGCIDE(2)	NONE	BENOMYL	MEAN
FUNGCIDE(1)			
NONE	5.10	5.14	5.12
TRIADIM	5.09	5.23	5.16
ININDIN	3.03	3.23	3.10
MEAN	5.09	5.18	5.14
INSCTCDE	NONE	CHLORFEN	MEAN
WEEDKLLR	HOHL	OHEOMI EN	FILAN
	F 06		
NONE	5.26	5.10	5.18
GLYPHOS	5.00	5.19	5.10
MEAN	5.13	5.15	5.14
1167111	3.13	3.13	3.14
THEOTOPE			
INSCTCDE	NONE	CHLORFEN	MEAN
FUNGCIDE(1)			
NONE	5.13	5.11	5.12
TRIADIM	5.13		
IKIADIM	5.13	5.18	5.16
MEAN	5.13	5.15	5.14
INSCTCDE	NONE	CHLORFEN	MEAN
	HONE	CHLUKFEN	MEAN
FUNGCIDE(2)			
NONE	5.07	5.12	5.09
BENOMYL	5.20	5.17	5.18
			0.10
MEAN	5.13	5.15	F 14
MEAN	5.15	5.15	5.14
NEMACIDE	NONE	ALDICARB	MEAN
WEEDKLLR			
NONE	5.02	5.33	E 10
			5.18
GLYPHOS	4.85	5.34	5.10
MEAN	4.94	5.34	5.14
(100 Vector) (100 Vector)		3.01	3.1

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

INDEED OF IT	LANS			
NEMACIDE FUNGCIDE(1)	NONE	ALDICARB	ME	AN
NÔNÉ	4.92	5.32	5.	12
TRIADIM	4.95	5.36		
MEAN	4.94	5.34	5.	14
NEMACIDE FUNGCIDE(2)	NONE	ALDICARB	ME	AN
NONE	4 03	5.26	5.	00
BENOMYL		5.42		
DENOMIE				
MEAN	4.94	5.34	5.	14
NEMACIDE INSCTCDE	NONE		ME	AN
NONE	4.95	5.31	5.	13
CHLORFEN	4.93		5.	15
MEAN	4.94	5.34	5.	14
FUNGCIDE(1) FUNGCIDE(2) WEEDKLLR	NONE NONE	BENOMYL	TRIADIM NONE	BENOMYL
	5.16	5.15	5.17	5.23
GLYPHOS	5.05	5.13	5.00	5.22
FUNGCIDE(1) INSCTCDE WEEDKLLR		CHLORFEN	TRIADIM NONE	
NONE	5.30	5.01	5.22	5.19
GLYPHOS	4.96	5.21	5.05	5.17
FUNGCIDE(2) INSCTCDE WEEDKLLR		CHLORFEN	BENOMYL NONE	CHLORFEN
NONE	5.19	5.14	5.33	5.05
GLYPHOS		5.10		5.28
FUNGCIDE(2)	NONE		BENOMYL	
INSCTCDE FUNGCIDE(1)	NONE	CHLORFEN	NONE	CHLORFEN
NONE	5.15		5.11	5.16
TRIADIM	4.98	5.19	5.28	5.17
FUNGCIDE(1)	NONE		TRIADIM	
NEMACIDE WEEDKLLR		ALDICARB		ALDICARB
NONE	4.97	5.34	5.08	5.33
GLYPHOS	4.88	5.30	4.83	5.39
		3.30	7.03	3.39

GRAIN TONNES/HECTARE

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

FUNGCIDE(2)				
NEMACIDE WEEDKLLR	NONE	ALDICARB	NONE	ALDICARB
NONE	5.11	5.22	4.94	5.44
GLYPHOS	4.75	5.30	4.96	5.39
FUNGCIDE(2)	NONE			
NEMACIDE FUNGCIDE(1)	NONE	ALDICARB	NONE	ALDICARB
NONE	4.95	5.26	4.90	5.38
TRIADIM	4.91	5.26	5.00	5.45
INSCTCDE	NONE		CHLORFEN	
NEMACIDE WEEDKLLR	NONE	ALDICARB	NONE	ALDICARB
NONE	5.11	5.41	4.94	5.25
GLYPHOS	4.80			5.48
INSCTCDE	NONE		CHLORFEN	
NEMACIDE FUNGCIDE(1)	NONE	ALDICARB	NONE	ALDICARB
NONE	4.97	5.30	4.88	5.34
TRIADIM	4.94	5.32	4.97	5.39
INSCTCDE	NONE		CHLORFEN	
NEMACIDE FUNGCIDE(2)	NONE	ALDICARB	NONE	ALDICARB
	4.89	5.24	4.97	
BENOMYL	5.01	5.38	4.88	5.45

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

MARGINS OF TWO FACTOR TABLES 0.077
TWO FACTOR TABLES 0.109
THREE FACTOR TABLES 0.155

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV% WP 6 0.219 4.3

GRAIN MEAN DM% 86.8

SEASONAL EFFECTS OF TAKE-ALL

Object: To study the incidence of take-all (Gaeumannomyces graminis) in continuous w. wheat and in first and second w. wheats after a break - Great Harpenden I.

Sponsor: D. Hornby.

The seventh year, s. beans, w. wheat.

For previous years see 78-83/R/CS/212.

Design: 3 randomised blocks of 4 plots.

Whole plot dimensions: 5.33 x 31.4.

Treatments:

PREVCROP	Previous	crops	before	w.	wheat	1984:	
	1978	1979	1980		1981	1982	1983
CONT W	W	W	W		W	W	W
FIRST W	BE	W	W		W	BE	W
BEANS	W	BE	W		W	W	BE

BE = s. beans, W = w. wheat

NOTE: An additional crop sequence was in s. beans 1984, yields not taken.

Standard applications:

Both crops: Weedkiller: Chlortoluron at 3.5 kg in 250 1.

W. wheat: Manures: (0:24:24) at 310 kg, combine drilled. 'Nitro-Chalk' at 350 kg. Weedkillers: Cyanazine at 0.3 l with mecoprop at 2.0 l in 250 l.

Seed: W. wheat: Avalon, sown at 190 kg. S. beans: Minden, sown at 200 kg.

Cultivations, etc.:-

Both crops: Ploughed: 16 Sept, 1983. Chlortoluron applied: 27 Sept. W. wheat: Spring-tine cultivated twice, seed sown: 23 Sept, 1983. N applied, cyanazine with mecoprop applied: 12 Apr, 1984. Combine harvested: 21 Aug.

S. beans: Deep spring-tine cultivated: 20 Mar, 1984. Rotary harrowed, seed sown: 21 Mar. Combine harvested: 31 Aug.

NOTE: Take-all was assessed in soil and in w. wheat plants.

GRAIN TONNES/HECTARE

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

PREVCROP

CONT W 5.79 FIRST W 5.59 BEANS 6.16

MEAN 5.85

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE PREVCROP
SED 0.161

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP 4 0.198 3.4

GRAIN MEAN DM% 86.8

84/R/CS/216 and 84/W/CS/216

EFFECTS OF SUBSOILING & DEEP PK

Object: To study the effects of subsoiling and of incorporating a large dressing of PK in the subsoil on yields and nutrient uptakes of a sequence of crops - Rothamsted (R) Delharding and Woburn (W) Road Piece.

Sponsors: J. McEwen, A.E. Johnston (R), M.K.V. Carr, R.J. Godwin (National College of Agricultural Engineering), I.B. Warboys, J.M. Wilkes (Wye College).

The seventh year, s. barley.

For previous years see 78-83/R&W/CS/216.

Design: 3 randomised blocks of 6 plots.

Whole plot dimensions: 4.27 x 13.7.

Treatments:

TREATMNT	Machines and incorporation of extra P and K into the subsoil:
000 00	Not subsoiled, no P or K
F00 F0	Farm standard, unwinged, subsoiler, no P or K, autumn 1977 & autumn 1979
N00 N0	N.C.A.E. winged subsoiler, no P or K, autumn 1977 & autumn 1979
NPK NO	N.C.A.E. winged subsoiler, P and K applied autumn 1977, subsoiled only autumn 1979
W00 00	Wye double digger, no P or K, autumn 1977 only
WPK 00	Wye double digger, P and K applied, autumn 1977 only
NOTES (1) The	e rates of P and K were 1930 kg P O as triple

- NOTES: (1) The rates of P and K were 1930 kg P_2O_5 , as triple superphosphate and 460 kg K_2O as muriate of potash.
 - (2) In autumn 1977 the Farm standard, unwinged, subsoiler was set to work at a depth of 38 cm at intervals of 50 cm Delharding (R) and at a depth of 50 cm at intervals of 70 cm Road Piece (W). In autumn 1979 it was set to work at a depth of 56 cm at intervals of 76 cm Delharding (R) and 142 cm Road Piece (W).
 - (3) In autumn 1977 the N.C.A.E. winged subsoiler had a single tine set to work at a depth of 40 cm at intervals of 60 cm on plots not given P and K and at alternate depths of 30 cm and 40 cm spaced 30 cm apart on plots given P and K; fertilizer was applied behind the subsoiling points. In autumn 1979 the winged subsoiler had three tines, the centre tine preceding the others, all set to work at a depth of 40 cm spaced 40 cm apart.
 - (4) The Wye double digger turned a furrow with a conventional plough to a depth of 23 cm and at the same time rotary cultivated the bottom of the furrow to a further depth of 15 cm. When applying P & K this was distributed ahead of the rotary cultivator.

84/R/CS/216 and 84/W/CS/216

Basal applications:Delharding (R): Manures: (20:10:10) at 560 kg. Weedkillers: Paraquat at 0.50 kg ion in 250 l. 3, 6-dichloropicolinic acid 0.07 kg with bromoxynil octanoate at 0.34 kg and mecoprop at 2.5 kg in 250 l applied with the fungicide. Fungicide: Tridemorph at 0.52 kg.

Road Piece (W): Manures: (20:10:10) at 760 kg. Weedkillers: Glyphosate at 1.4 kg in 250 l. Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 250 l applied with the fungicide. Fungicide: Ethirimol at 0.35 kg.

Seed: Both sites: Triumph, dressed with triadimenol plus fuberidazole, sown at 160 kg.

Cultivations, etc.:-

Delharding(R): Paraquat applied: 26 Aug, 1983. Ploughed: 10 Oct. NPK applied: 16 Mar, 1984. Spring-tine cultivated twice, seed sown: 19 Mar. 3, 6-dichloropicolinic acid, bromoxynil octanoate, mecoprop and fungicide applied: 23 May. Combine harvested: 17 Aug.

Road Piece (W): Glyphosate applied: 29 Sept, 1983. Ploughed: 15 Nov. NPK applied, spring-tine cultivated, spring-tine cultivated with crumbler attached, seed sown: 9 Mar, 1984. 'Brittox' and fungicide applied: 15 May. Combine harvested: 15 Aug.

GRAIN TONNES/HECTARE

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

TREATMNT 000 00 F00 F0 N00 N0 NPK N0 W00 00 WPK 00 MEAN 5.75 6.36 6.39 6.65 6.21 7.02 6.40

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE TREATMNT
SED 0.723

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 10 0.885 13.8

GRAIN MEAN DM% 83.8

PLOT AREA HARVESTED 0.00260

84/W/CS/216

GRAIN TONNES/HECTARE

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

TREATMNT 000 00 F00 F0 N00 N0 NPK N0 W00 00 WPK 00 MEAN 6.95 7.48 7.39 7.61 6.86 7.27 7.26

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE TREATMNT
SED 0.403

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 10 0.493 6.8

GRAIN MEAN DM% 86.3

MINIMUM CULTIVATION AND DEEP PK

Object: To study the effects of thorough subsoil disturbance and the incorporation of P and K into the subsoil on w. wheat and w. barley either sown conventionally or direct drilled - Woburn Warren Field I and II.

Sponsors: A.E. Johnston, J. McEwen, R.D. Prew, R.J. Gutteridge, P.H. Nicholls, C.J. Rawlinson.

The fifth year, w. wheat and w. barley.

For previous years see 80-83/W/CS/245.

Column plot dimensions: 4.27 x 57.6.

Design: 3 series each of 20 x 4 criss cross.

Treatments: All combinations of:-

Series:

 SER CROP Series, crops and p 	previous cropping:
--	--------------------

SER1 WB2 Series I, w. barley in rotation after w. oilseed rape, w. wheat

SER2 WW7 Series II, w. wheat, seventh cereal after a break crop SER3 WB7 Series III, w. barley, seventh cereal after a break crop

Column plots: All combinations (duplicated) of:

2. PK SUB Extra PK and subsoil treatments:

--- None, mouldboard ploughed --S None, subsoiled

PKS PK to subsoil

3. YEAR Years of applying PK SUB:

1980 In autumn 1979

1983 In autumn 1979 and in autumn 1982

4. DRILL Drills and associated cultivations:

CNVNTIAL Mouldboard ploughed, conventionally drilled
DIRECT Direct drilled (duplicated) (conventionally drilled in

years when factor 2 involves autumn ploughing)

Row plots:

5. N. PATH Nitrogen fertilizer in spring, and pathogen control:

75	ENHD	75	kg	N	enhanced	pathogen	control
150	ENHD	150	kg	N	enhanced	pathogen	control
225	ENHD	225	kg	N	enhanced	pathogen	control
150	STND	150	kg	N	standard	pathogen	control

plus two extra column plot treatments, in all combinations with row plots above:-

EXTRA

- TPK 80 D PK applied to topsoil and mouldboard ploughed in autumn 1979, direct drilled since
- TPK 80 C PK as above, mouldboard ploughed, conventionally drilled each year
- NOTES: (1) Rates of extra P and K were 500 kg ${\rm P_20_5}$, as superphosphate, 250 kg ${\rm K_20}$ as muriate of potash.
 - (2) Subsoiling was done with the Wye double-digger which turns a furrow with a conventional plough share, to a depth of 23 cm, and at the same time rotary cultivates the bottom of the adjacent furrow to a further depth of 15 cm. When applying P and K this was distributed ahead of the rotary cultivator.
 - (3) The topsoil PK dressing was equally divided before and after ploughing.
 - (4) Standard pathogen control was conventional seed dressings. Enhanced pathogen control had in addition prochloraz at 0.4 l in 250 l on 17 April, 1984 and propiconazole at 0.12 kg in 250 l on 14 May.

Standard applications:

- Series II, w. wheat, series I and III, w. barley: Manures: (5:14:30) at 340 kg combine drilled. Weedkillers: Paraquat at 0.50 kg ion in 250 l. Chlortoluron at 3.5 kg in 250 l. Dicamba with mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 250 l.
- Series II, w. wheat: Growth regulator: Chlormequat chloride at 1.1 kg in 250 l. Insecticide: Pirimicarb at 0.14 kg in 250 l.
- Series I and III, w. barley: Growth regulator: Mepiquat chloride with ethephon (as 'Terpal' at 2.0 1 with 'Citowett', a wetting agent, at 0.09 1) in 250 1.
- Seed: W. wheat: Avalon, sown at 200 kg. W. barley: Igri, sown at 170 kg.

Cultivations, etc.:-

- Series I and III: W. barley: Straw burnt: 18 Aug, 1983. Spring-tine cultivated: 19 Aug. Ploughed CNVNTIAL plots: 12 Sept. Rotary cultivated CNVNTIAL plots: 19 Sept. Paraquat applied to DIRECT plots, N applied: 20 Sept. Seed sown: 26 Sept. Chlortoluron applied: 29 Sept. Paraquat applied to all plots Series I only: 3 Oct. N treatments applied: 5 Apr, 1984. 'Herrisol' applied: 19 Apr. Growth regulator and wetting agent applied: 2 May. Combine harvested: 27 July.
- Series II: W. wheat: Straw burnt: 18 Aug, 1983. Spring-tine cultivated: 19 Aug. Ploughed CNVNTIAL plots: 13 Sept. Rotary cultivated CNVNTIAL plots: 19 Sept. Paraquat applied to DIRECT plots, N applied: 20 Sept. Seed sown: 27 Sept. Chlortoluron applied: 29 Sept. N treatments applied: 5 Apr, 1984. Growth regulator applied, 'Herrisol' applied: 17 Apr. Insecticide applied: 29 June. Combine harvested: 20 Aug.

84/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

A TABLES U	F MEANS ***	~ ~		
PK SUB		S	PKS	MEAN
N PATH				
75 ENHD	6.91	6.87	7.12	6.97
150 ENHD	8.02	7.68	8.15	7.95
225 ENHD	7.56	8.34	8.14	8.01
150 STND	8.03	7.83	8.12	7.99
MEAN	7.63	7.68	7.88	7.73
YEAR N PATH	1980	1983	MEAN	
	7 04	6 00	6 07	
75 ENHD	7.04	6.90	6.97	
150 ENHD	8.22	7.68	7.95	
225 ENHD	8.33	7.70	8.01	
150 STND	8.52	7.47	7.99	
MEAN	8.03	7.44	7.73	
VEAD	1980	1002	MEAN	
YEAR PK SUB	1900	1983	MEAN	
	7.87	7.39	7.63	
S	7.94		7.68	
PKS	8.27	7.50	7.88	
MEAN	8.03	7.44	7.73	
	CNVNTIAL	DIRECT	MEAN	
N PATH		7.05		
75 ENHD	6.41	7.25	6.97	
150 ENHD	7.52	8.16	7.95	
225 ENHD	7.20	8.42	8.01	
150 STND	7.69	8.15	7.99	
MEAN	7.21	7.99	7.73	
PK SUB	CNVNTIAL	DIRECT	MEAN	
	7.12	7.88	7.63	
S	6.81	8.12	7.68	
PKS	7.69	7.98	7.88	
			224 2242	
MEAN	7.21	7.99	7.73	
DRILL	CNVNTIAL	DIRECT	MEAN	
YEAR				
1980	7.22	8.43	8.03	
1983	7.19	7.56	7.44	
1303	/ •13	7.50	7.44	
MEAN	7.21	7.99	7.73	

84/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

	75 ENHD	150 ENHD	225 ENH	D 150 ST	ND M	EAN	
EXTRA	7 46	8.56	0 E	4 7.	71 8	.07	
TPK 80 D	7.46					.46	
TPK 80 C	7.08	7.68	/.0	3 /	+4 /	•40	
MEAN	7.27	8.12	8.0	8 7.5	58 7	.76	
PK SUB			S		PKS		
YEAR	1980	1983		1983	1980	1983	
N PATH	2500						
75 ENHD	6.99	6.83	6.89	6.86	7.23	7.01	
150 ENHD	8.23	7.81		7.54			
225 ENHD	7.73	7.38					
			8 30	7.36	8.73		
150 STND	0.34	7.55	0.30	7.50	0.75	7.00	
	PK SUB			 S		PKS	
	DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH							
75 ENHD		6.44	7.15	6.04	7.29	6.75	7.30
150 ENHD		7.76	8.15	6.98	8.03	7.82 8.01	8.31
225 ENHD		6.79	7.94	6.79	9.12	8.01	8.21
150 STND		7.50	8.30	7.40	8.05	8.17	8.10
130 31110		7.50	0.00				
	YEAR	1980		1983			
	DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT		
N PATH	DIVILLE	0					
75 ENHD		6.35	7.38	6.48	7.11		
150 ENHD				7.61			
			8.92				
225 ENHD		7.97					
150 STND		7.97	0.00	7.41	7.50		
	YEAR	1980		1983			
		CNVNTIAL		CNVNTIAL	DIRECT		
PK SUB	01122	•					
		7.29	8.17	6.96	7.60		
S		6.46			7.56		
PKS		7.92		7.45	7.52		
FKS		1.32	0.44	7.40	,,,,,		
		YEAR	1980		1983		
				DIRECT	CNVNTIAL	DIRECT	
N PATH	PK SUB						
75 ENHD			6.54	7.22	6.35	7.07	
75 EIIIID	S		5.77		6.31		
	PKS		6.73		6.78		
150 ENHD			7.85		7.68		
130 ENID	S		6.49		7.48		
	PKS		7.97		7.67		
005 54415					6.72		
225 ENHD			6.87				
	S		6.24		7.34		
	PKS		8.30				
150 STND			7.89				
	S		7.33				
	PKS		8.69	8.75	7.65	7.45	

84/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	PK SUB	YEAR	DRILL
SED	1.071	0.437	0.357	0.379
TABLE	N PATH* PK SUB	N PATH* YEAR	PK SUB YEAR	N PATH* DRILL
SED	0.526	0.430	0.618	0.456 MAX-MIN
TABLE	PK SUB DRILL	YEAR DRILL	N PATH* EXTRA	
SED	0.757 0.656 0.536	0.618 0.536 0.437	1.289	MIN REP 0.744 MAX-MIN MAX REP
TABLE	N PATH* PK SUB DRILL	N PATH* YEAR DRILL	PK SUB YEAR DRILL	N PATH* PK SUB YEAR DRILL
SED	0.911 0.789 0.644	0.744 0.644 0.526	1.071 0.928 0.757	1.289 MIN REP 1.116 MAX-MIN 0.911 MAX REP

^{*} WITHIN THE SAME LEVEL OF N PATH ONLY

DRILL MIN-REP CNVNTIAL
MAX-REP DIRECT
MAX-MIN DIRECT V CNVNTIAL

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%
WP1	6	0.757	9.8
WP1.WP2	18	0.585	7.6

GRAIN MEAN DM% 87.7

84/W/CS/245 WINTER BARLEY SERIES I

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

"" IABLES U	INEANS			
PK SUB		S	PKS	MEAN
N PATH				
75 ENHD	8.11	7.83	7.69	7.88
150 ENHD	XXA	8.00	8.90	8.81
225 ENHD	9.23	9.10	9.08	9.14
150 STND	8.66	8.44		8.49
MEAN	8.72	8.51	8.51	8.58
YEAR	1980	1983	MEAN	
N PATH				
75 ENHD	7.80	7.96	7.88	
150 ENHD	8.91	8.70	8.81	
225 ENHD	9.48	8.79	9.14	
150 STND	8.60	8.39	8.49	
MEAN	8.70	8.46	8.58	
YEAR	1980	1983	MEAN	
PK SUB				
		8.89		
S	8.80	8.21	8.51	
PKS	8.74	8.28	8.51	
MEAN	8.70	8.46	8.58	
	CNVNTIAL	DIRECT	MEAN	
N PATH				
75 ENHD	7.17	8.23	7.88	
150 ENHD	7.84	9.29	8.81	
225 ENHD		9.69		
150 STND	7.81	8.84	8.49	
MEAN	7.71	9.01	8.58	
DRILL PK SUB	CNVNTIAL	DIRECT	MEAN	
PK 30B	7.74	9.20	8.72	
S		8.95	8.51	
PKS		8.88	8.51	
MEAN	7.71	9.01	8.58	
DRILL	CNVNTIAL	DIRECT	MEAN	
YEAR	7 01	0.11	0.70	
1980	7.81	9.14	8.70	
1983	7.62	8.88	8.46	
MEAN	7.71	9.01	8.58	

84/W/CS/245 WINTER BARLEY SERIES I

GRAIN TONNES/HECTARE

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

N PATH EXTRA	75 ENHD	150 ENH	D 225 EN	HD 150 S	TND	MEAN	
TPK 80 D	7.48	7.9	3 8.	91 8	.93	8.31	
TPK 80 C	6.52	7.9		41 7		7.57	
MEAN	7.00	7.9	4 8.	66 8	.16	7.94	
PK SUB			S		PKS		
YEAR N PATH	1980	1983			1980	1983	
	7.89	8.33	7.74	7.92	7.75	7.63	
75 ENHD 150 ENHD	8.55	9.17	9.07	8.25	9.11	8 68	
225 ENHD	9.24	9.23	9 68	8 51	0.51	0.00	
150 STND	8.51	8.82	8.73	8.15	8.56	8.19	
	PK SUB			9		PKS	
	DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIREC
N PATH	-/12-6		DINEOI	JATAL	DINLOT	CHANTIAL	DIKEC
75 ENHD		7.29	8,52	7.26	8.11	6.98	8 0
150 ENHD		7.82	9.38	7.49	9 24	8.22	0.0
225 ENHD		7.92	9.80	7 00	9.60	8.29	0.4
150 STND		7.95	9.02	7.90	9.09	7.60	9.4
		7.55	3.02	7.07	0./3	7.00	8.7
	YEAR	1980		1983			
N DATH	DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT		
N PATH 75 ENHD		C 01	0.04	7 40			
		6.91	8.24	7.43	8.22		
150 ENHD		8.05	9.34	7.64	9.23		
225 ENHD		8.28	10.08	7.79	9.29		
150 STND		7.99	8.90	7.62	8.77		
	YEAR			1983			
PK SUB	DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT		
		7.71	8.97	7.78	9.44		
S		8.32	9.05	6.94	8.84		
PKS		7.40	9.41	8.14	8.35		
		YEAR	1980		1983		
				DIRECT	CNVNTIAL	DIRECT	
N PATH	PK SUB						
			6.87	8.41	7.70	8.64	
75 ENHD	The second second		7.22	8.00	7.30	8.23	
75 ENHD	S			8.30	7.30	7.80	
	PKS		6.66	0.30			
75 ENHD	PKS		6.66 7.71				
	PKS S		7.71	8.97	7.93	9.79	
	PKS		7.71 8.62	8.97 9.29	7.93 6.35	9.79 9.20	
	PKS S		7.71 8.62 7.81	8.97 9.29 9.77	7.93 6.35 8.63	9.79 9.20 8.70	
150 ENHD	PKS S PKS		7.71 8.62 7.81 8.04	8.97 9.29 9.77 9.83	7.93 6.35 8.63 7.80	9.79 9.20 8.70 9.94	
150 ENHD	PKS S PKS 		7.71 8.62 7.81 8.04 8.76	8.97 9.29 9.77 9.83 10.14	7.93 6.35 8.63 7.80 7.03	9.79 9.20 8.70 9.94 9.25	
150 ENHD	PKS S PKS S PKS		7.71 8.62 7.81 8.04 8.76 8.05	8.97 9.29 9.77 9.83 10.14 10.28	7.93 6.35 8.63 7.80 7.03 8.53	9.79 9.20 8.70 9.94 9.25 8.67	
150 ENHD 225 ENHD	PKS S PKS 		7.71 8.62 7.81 8.04 8.76	8.97 9.29 9.77 9.83 10.14	7.93 6.35 8.63 7.80 7.03	9.79 9.20 8.70 9.94 9.25	

84/W/CS/245 WINTER BARLEY SERIES I

GRAIN TONNES/HECTARE

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	EXTRA	PK SUB	YEAR	DRILL
SED	0.349	0.142	0.116	0.123
TABLE	N PATH* PK SUB	N PATH* YEAR	PK SUB YEAR	N PATH* DRILL
SED	0.193	0.157	0.201	0.167 MAX-MIN
TABLE	PK SUB DRILL	YEAR DRILL	N PATH* EXTRA	N PATH* PK SUB YEAR
SED		0.201 0.174 0.142	0.472	MIN REP 0.272 MAX-MIN MAX REP
TABLE	N PATH* PK SUB DRILL	N PATH* YEAR DRILL	PK SUB YEAR DRILL	N PATH* PK SUB YEAR DRILL
SED	0.333 0.289 0.236	0.272 0.236 0.193	0.349 0.302 0.246	0.472 MIN REP 0.408 MAX-MIN 0.333 MAX REP

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP1	6	0.246	2.9
WP1.WP2	18	0.259	3.0

GRAIN MEAN DM% 87.1

SUB PLOT AREA HARVESTED 0.00341

84/W/CS/245 WINTER BARLEY SERIES III

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

•	* IARLES O	F MEANS ***	**		
	PK SUB		S	PKS	MEAN
	N PATH			110	HEAN
	75 ENHD	6.49	6.12	6.42	6.34
	150 ENHD	7.10	7.45	7.28	7.27
	225 ENHD	7.34	8.01	7.79	7.71
	150 STND	7.40	7.59	7.31	7.43
	130 3110	7.40	7.59	7.31	7.43
	MEAN	7.08	7.29	7.20	7.19
	YEAR N PATH	1980	1983	MEAN	
	75 ENHD	6.68	6.01	6.34	
	150 ENHD	7.64		7.27	
	225 ENHD	8.09	7.34	7.71	
	150 STND	7.66	7.20	7.43	
	MEAN	7.52	6.87	7.19	
	YEAR	1980	1983	MEAN	
	PK SUB	1300	1905	HEAN	
		7.50	6.67	7.08	
	S	7.51	7.07	7.29	
	PKS		6.86	7.20	
	MEAN	7.50	6.07	7.10	
	MEAN	7.52	6.87	7.19	
	DRILL	CNVNTIAL	DIRECT	MEAN	
	N PATH				
	75 ENHD	5.84	6.60	6.34	
	150 ENHD	6.50	7.66	7.27	
	225 ENHD	6.82	8.16	7.71	
	150 STND	6.58	7.86	7.43	
	MEAN	6.43	7.57	7.19	
	PILAN	0.43	7.57	7.19	
		CNVNTIAL	DIRECT	MEAN	
	PK SUB				
		6.06	7.59	7.08	
	S	6.67	7.60	7.29	
	PKS	6.56	7.52	7.20	
	MEAN	6.43	7.57	7.19	
	DRILL	CNVNTIAL	DIDECT	MEAN	
	YEAR	CHVHITAL	DIRECT	MEAN	
		6.61	7 07	7 50	
	1980 1983	6.25	7.97	7.52	
	1903	0.25	7.17	6.87	
	MEAN	6.43	7.57	7.19	

84/W/CS/245 WINTER BARLEY SERIES III

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

INDEES OF	HEARIS						
N PATH EXTRA	75 ENHD	150 ENHD	225 EN	HD 150 ST	rnd i	MEAN	
TPK 80 D	7.60	8.33	9.3	21 7.	82	24	
TPK 80 C	6.16					6.85	
MEAN	6.88	7.56	8.2	22 7.	.52	7.54	
PK SUB			S		PKS		
YEAR		1983		1983		198	3
N PATH	6 60	6 20	6 61	E 62	6 72	6 1	1
75 ENHD	6.69	C A 7	0.01	5.62	7.66	6.1	1
150 ENHD	7.72 7.70	6.47	7.54	7.36 7.81	7.66	6.9	
225 ENHD	7.70	6.99	8.21	7.81	8.35	7.2	
150 STND	7.88	6.92	7.68	7.50	7.42	7.2	0
	PK SUB			S		PK	S
		CNVNTIAL		CNVNTIAL	DIRECT	CNVNTIA	L DIRECT
N PATH							
75 ENHD				5.52			
150 ENHD		6.14	7.57	6.75	7.80	6.6	0 7.62
225 ENHD				7.38			
150 STND		6.33	7.93	7.05	7.86	6.3	6 7.79
	YFAR	1980		1983			
		CNVNTIAL					
N PATH	DIVILLE	011111111111111111111111111111111111111	5111201	0	orneo.		
75 ENHD		5.78	7.12	5.89	6.07		
150 ENHD		6.80					
225 ENHD		7.06	8,60	6.19 6.58	7.72		
150 STND		6.80	8.09	6.35	7.63		
	YEAR	1980		1983			
		CNVNTIAL					
PK SUB	DRILL	CHVITTAL	DIRECT	CHVINTIAL	DIRECT		
		6 23	8 13	5.90	7.06		
S				6.53			
PKS		6.78		6.34			
1,73				0.54	7.12		
		YEAR	1980		1983		
		DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIREC	T
N PATH	PK SUB						
75 ENHD			5.66	7.21	5.87		1
	S		5.81	7.01	5.22	5.8	3
	PKS		5.88	7.14	6.58	5.8	8
150 ENHD			6.67	8.24	5.62	6.9	0
	S		6.63	7.99	6.88	7.6	0
	PKS		7.11	7.93	6.08		
225 ENHD			5.83		6.19		
	S		7.70	8.46	7.06	8.1	
	PKS		7.64		6.47	7.5	
150 STND			6.77		5.90		
200 31110	S		7.14		6.96		
	PKS		6.51	7.88	6.20		
	LVO		0.51	7.00	0.20	/ • /	U

84/W/CS/245 WINTER BARLEY SERIES III

GRAIN TONNES/HECTARE

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	EXTRA	PK SUB	YEAR	DRILL
SED	0.521	0.213	0.174	0.184
TABLE	N PATH* PK SUB	N PATH* YEAR	PK SUB YEAR	N PATH* DRILL
SED	0.325	0.226	0.301	0.282 MAX-MIN
TABLE	PK SUB DRILL	YEAR DRILL	N PATH* EXTRA	N PATH* PK SUB YEAR
SED	0.369 0.319 0.261	0.301 0.261 0.213	0.797	MIN REP 0.460 MAX-MIN MAX REP
TABLE	N PATH* PK SUB DRILL	N PATH* YEAR DRILL	PK SUB YEAR DRILL	N PATH* PK SUB YEAR DRILL
SED	0.563 0.488 0.398	0.460 0.398 0.325	0.521 0.452 0.369	0.797 MIN REP 0.690 MAX-MIN 0.563 MAX REP

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%
WP1	6	0.369	5.1
WP1.WP2	18	0.492	6.8

GRAIN MEAN DM% 86.9

SUB PLOT AREA HARVESTED 0.00341

EFFECTS OF SUBSOILING AND DEEP PK

Object: To study the effects of thorough subsoil disturbance and the incorporation of P and K into the subsoil on soil and crop parameters and on yield of s. barley - Gt. Field I.

Sponsors: J. McEwen, A.E. Johnston, D.P. Yeoman.

The fifth year, s. barley.

For previous years see 80-83/R/CS/246.

Whole plot dimensions: 4.27 x 17.7.

Design: 2 replicates of 28 plots, fully randomised.

Treatments: All combinations of:-

1. PK SUB Extra PK and subsoil treatment (applied autumn/winter 1979/80 only):

None, mouldboard ploughed (duplicated) - - -

Subsoiled - - S

P - S P to subsoil - K S K to subsoil

PK to subsoil

PKS PK to topsoil, mouldboard ploughed

Nitrogen fertilizer (kg N) 2. N (cumulative to previous years):

0

40

80 120

NOTES: (1) Rates of P and K were 1000 kg P205, as superphosphate, 500 kg K20, as muriate of potash.

(2) Subsoiling was done with the Wye double-digger which turns a furrow with a conventional plough share, to a depth of 23 cm, and at the same time rotary cultivates the bottom of the adjacent furrow to a further depth of 15 cm. When applying P and K this was distributed ahead of the rotary cultivator.

(3) The topsoil PK dressing was equally divided before and after ploughing.

(4) All treatments were mouldboard ploughed for 1981, 1982, 1983 and 1984.

Basal applications: Manures: (0:20:20) at 310 kg, combine drilled. Weedkillers: Glyphosate at 1.4 kg in 250 l. Mecoprop at 1.4 kg with ioxynil at 0.18 kg and bromoxynil at 0.18 kg in 250 l. Fungicide: Tridemorph at 0.52 kg in 250 1.

Seed: Triumph, seed dressed with triadimenol and fuberidazole, sown at 160 kg.

Cultivations, etc.:- Glyphosate applied: 26 Sept, 1983. Ploughed: 13 Dec. N treatments applied: 15 Mar, 1984. Spring-tine cultivated, seed sown: 19 Mar. Mecoprop with ioxynil and bromoxynil applied: 15 May. Fungicide applied: 6 June. Combine harvested: 17 Aug.

NOTE: Because of water logging four plots were lost, those with treatment combinations

PK SUB - K S P K T - - - P - S N 0 80 80 40

Estimated values were used in the analysis.

GRAIN TONNES/HECTARE

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

N	0	40	80	120	MEAN
PK SUB					
	3.83	5.18	6.90	7.77	5.92
S	4.13	6.57	7.34	7.70	6.43
P - S	5.23	5.25	7.59	7.26	6.33
- K S	5.14	5.89	7.48	7.70	6.55
PKS	4.86	6.50	8.56	8.38	7.07
PKT	5.03	6.34	7.81	7.56	6.68
MEAN	4.58	5.84	7.51	7.73	6.42

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	PK SUB	N	PK SUB	
			N	
SED	0.488	0.260		MIN REP
	0.422	0.369		MAX-MIN MAX REP

PK SUB

MAX REP - - -

MAX-MIN - - - V ANY OF REMAINDER

MIN REP ANY OF REMAINDER

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%
WP 28 0.976 15.2

GRAIN MEAN DM% 84.2

STRAW TONNES/HECTARE

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

N SUB	0	40	80	120	MEAN
PK SUB					
	1.33	2.02	3.13	4.09	2.64
S	1.37	2.36	3.89	4.37	2.99
P - S	1.93	2.20	3.32	4.24	2.92
- K S	1.73	2.51	3.48	4.35	3.02
PKS	1.73	2.61	3.81	4.99	3.28
PKT	1.88	2.70	4.51	4.63	3.43
MEAN	1.61	2.35	3.61	4.39	2.99

STRAW MEAN DM% 84.0

PLOT AREA HARVESTED 0.00217

ORGANIC MATTER AND EARTHWORM INOCULATION

Object: To study methods of inoculating earthworms into arable soil and the influence of organic materials on subsequent multiplication and spread - Hoosfield.

Sponsor: C.A. Edwards.

The fifth year, s. barley.

For previous years see 80-83/R/CS/247.

Design: 3 randomised blocks of 9 plots.

Whole plot dimensions: 7.85 x 7.62.

Treatments: All combinations of:-

WORMINOC(80) Earthworms and inoculation method for 1980 crop only:

NONE None

Earthworms (Lumbricus terrestris) applied at 16,700 per

hectare in November 1979:

EVEN

Evenly spaced throughout

CONC

Concentrated in metre squares, 100 earthworms per

square metre

2. ORG MATT

Forms of organic matter:

NONE

None

STR STR+FYM Straw at 6.50 t for 1980, 3.25 t for 1981 and 1982 Straw at 6.50 t for 1980, 3.25 t for 1981 and 1982 plus farmyard manure at 40 t for each year including 1984

Basal applications: Manures: (20:10:10) at 630 kg. Weedkillers: Paraquat at 0.4 kg ion in 250 l. 3, 6-dichloropicolinic acid at 0.05 kg and bromoxynil at 0.24 kg with mecoprop (as 'CMPP' at 3.0 l) in 250 l with the fungicide. Fungicide: Tridemorph at 0.52 kg.

Seed: Triumph, seed dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:- Paraquat applied: 21 Oct, 1983. Deep spring-tine cultivated twice: 11 Nov. FYM treatment applied: 24 Nov. NPK applied: 8 Mar, 1984. Spring-tine cultivated twice, seed sown: 10 Mar. 3, 6-dichloropicolinic acid, bromoxynil, mecoprop and tridemorph applied: 16 May. Combine harvested: 17 Aug.

NOTE: Soil fauna were estimated from soil cores taken monthly from April to August and from pitfall trapping in the same period. Earthworm samples were taken in the autumn.

GRAIN TONNES/HECTARE

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

ORG MATT	NONE	STR	STR+FYM	MEAN
WORMINOC(80)				
NONE	6.79	6.73	7.34	6.95
EVEN	6.77	6.39	6.55	6.57
CONC	6.52	6.83	6.65	6.67
MEAN	6.69	6.65	6.85	6.73

**** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	BLE WORMINOC(80)		WORMINOC(80) ORG MATT
SED	0.269	0.269	0.466

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP 16 0.571 8.5

GRAIN MEAN DM% 84.7

PLOT AREA HARVESTED 0.00244

INTENSIVE POTATOES

Object: To study the effects of a range of frequencies of cropping on the occurrence of pests and diseases and on the yield of potatoes - Woburn Lansome III.

Sponsors: A.G. Whitehead, T.M. Addiscott, P. Etheridge, D.A. Govier, I.F. Henderson, G.A. Hide, D.H. Lapwood, G.C. Scott.

The third year, s. barley, potatoes.

For previous years see 82-83/W/CS/273.

Design: In the third year: 2 randomised blocks of 5 plots split into 8

Whole plot dimensions: 9.00 x 24.7.

Treatments: All combinations of:-

Whole plots	Crop sequences and p	otato variet	ies:	
1. CROP SEQ	1982	1983	1984	1
PD B PP B B PD	Potatoes, Desiree S. barley	S. barley S. barley	Potatoes,	Maris Piper Desiree cated)
PD B PD	Potatoes, Desiree	S. barley	Potatoes,	
Sub plots				
2. SD TREAT	Seed treatment:			
NONE TOL+IMAZ	None Tolclofos methyl at of tubers	250 g and in	nazalil at	10 g per tonne
3. NEMACIDE	Nematicide:			
NONE OXAMYL	None Oxamyl at 5.0 kg wor	ked in to se	edbed	
4. MOLLCIDE	Molluscicide:			
NONE METHIOCA	None Methiocarb at 0.23 k 1984, 8 Aug, 22 A	g applied as ug, 5 Sept.	pellets o	on 26 July,

NOTES: (1) Additional plots were sown to s. barley for cropping sequences with differing frequencies of potatoes. Barley yields were not taken.

(2) Irrigation was applied to the potatoes as follows (mm water):

10-11 May 12.5 11-12 July 25 12.5 18 May 13 July 12.5 15 June 12.5 18 June 12.5 23-24 July 25 30 July-2 Aug 25 4-5 July 25 3 Aug 12.5

Total 175

Standard applications:

Potatoes: Manures: (0:18:36) at 410 kg, (10:10:15+4.5 Mg) at 3000 kg. Weedkillers: Glyphosate at 1.4 kg in 250 l. Linuron at 1.3 l in 250 l. Fungicides: Maneb at 0.36 kg with zineb at 0.04 kg in 250 l with the insecticide. Fentin hydroxide at 0.28 kg in 250 l on six occasions, with the insecticide on the second and third occasions. Insecticide: Pirimicarb at 0.14 kg on three occasions.

Insecticide: Pirimicarb at 0.14 kg on three occasions.

S. barley: Manures: (20:10:10) at 640 kg. Weedkillers: Glyphosate at 1.4 kg in 250 l. Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 2.5 l) in 250 l with the fungicide. Fungicide: Tridemorph at 0.3 kg.

Seed: S. barley: Triumph, dressed ethirimol, sown at 160 kg.

Cultivations, etc.:-

Potatoes: Glyphosate applied: 7 Sept, 1983. PK applied: 16 Nov. Ploughed: 13 Dec. NPK with Mg applied, spring-tine cultivated: 5 Apr, 1984. Oxamyl applied, rotary cultivated, potatoes planted: 13 Apr. Linuron applied: 3 May. Maneb, zineb with pirimicarb applied: 19 June. Fentin hydroxide with pirimicarb applied: 18 July, 20 July. Fentin hydroxide applied: 3 July, 1 Aug, 28 Aug, 12 Sept. Lifted: 1 Oct.

S. barley: Glyphosate applied to plots after barley: 7 Sept, 1983. Ploughed after barley: 13 Dec. Deep-tine cultivated after potatoes: 16 Jan, 1984. NPK applied: 15 Mar. Spring-tine cultivated: 16 Mar. Spring-tine cultivated with crumbler attached, seed sown: 19 Mar. 'Brittox' with fungicide applied: 15 May. Combine harvested: 18 Aug.

NOTES: (1) Plant samples were taken in August for tuber disease assessments.

- (2) Potato cyst nematode numbers were assessed before planting and after harvest.
- (3) Slug damage assessments were made on the lifted crop.

84/W/CS/273

TOTAL TUBERS TONNES/HECTARE

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

* 7	* IABLES OF	MEANS **	***		
	SD TREAT	NONE	TOL+IMAZ	MEAN	
	CRUP SEQ				
	PD B PP	36.5	37.7	37.1	
	B B PD	51.3			
	PD B PD	31.0		28.8	
	10010	31.0	20.5	20.0	
	MEAN	44.3	42.0	43.1	
	NEMACIDE	NONE	OXAMYL	MEAN	
	CROP SEQ				
	PD B PP	23.9	50.3	37.1	
	B B PD	43.1	56.8	49.9	
	PD B PD				
	MEAN	22.0	50.5		
	MEAN	33.8	52.5	43.1	
	NEMACIDE	NONE	OXAMYL	MEAN	
	SD TREAT				
	NONE	34.3	54.3	44.3	
	TOL+IMAZ	33.2	50.7	42.0	
	MEAN	33.8	52.5	43.1	
	MOLLCIDE	NONE	METHIOCA	MEAN	
	CROP SEQ				
	PD B PP		33.4		
	B B PD		48.3	49.9	
	PD B PD	31.4	26.1	28.8	
	MEAN	45.4	40.9	43.1	
	MOLLCIDE	NONE	METHIOCA	MEAN	
	SD TREAT				
	NONE	45.9			
	TOL+IMAZ	44.9	39.0	42.0	
	MEAN	45.4	40.9	43.1	
	1127111	10.1	40.5	43.1	
	MOLLCIDE	NONE	METHIOCA	MEAN	
	NEMACIDE				
	NONE	36.0	31.5	33.8	
	OXAMYL	54.7	50.2	52.5	
	MEAN	A.E. A	40.0	42.1	
	MEAN	45.4	40.9	43.1	
	SD TREAT	NONE		TOL+IMAZ	
	NEMACIDE	NONE	OXAMYL	NONE	OXAMYL
	CROP SEQ				
	PD B PP	22.8	50.2	25.1	50.4
	B B PD	44.1	58.6	42.1	54.9
	PD B PD	16.6	45.4	14.7	38.3
		20.0	70.7	17.7	30.3

TOTAL TUBERS TONNES/HECTARE

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

SD TREAT MOLLCIDE CROP SEQ	NONE NONE		TOL+IMAZ NONE	METHIOCA	
PD B PP B B PD	39.3 52.6		42.3 50.6		
PD B PD	32.2				
NEMACIDE			OXAMYL		
MOLLCIDE CROP SEQ	NONE	METHIOCA	NONE	METHIOCA	
PD B PP		20.0	53.7	46.8	
B B PD	44.5	41.7	58.7	54.9	
PD B PD	19.0	12.3	43.9	39.8	
NEMACIDE			OXAMYL		
MOLLCIDE SD TREAT	NONE	METHIOCA	NONE	METHIOCA	
	36.7	32.0	55.0	53.5	
TOL+IMAZ	35.4	31.1	54.5		
	NEMACIDE			OXAMYL	
CROP SEQ	MOLLCIDE SD TREAT	NONE	METHIOCA	NONE	METHIOCA
	NONE	30.0	15.6	48.6	51.7
	TOL+IMAZ		24.5		
B B PD	NONE		43.3		
	TOL+IMAZ			57.0	
PD B PD	NONE		14.2		
	TOL+IMAZ	18.9	10.5		

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	CROP SEQ	SD TREAT	NEMACIDE	MOLLCIDE	
SED	6.92 5.65	1.86	1.86	1.86	MIN REP MAX-MIN
TABLE	CROP SEQ SD TREAT	CROP SEQ NEMACIDE	SD TREAT NEMACIDE	CROP SEQ MOLLCIDE	
SED	7.53 6.14 4.34	7.53 6.14 4.34	2.64	7.53 6.14 4.34	MIN REP MAX-MIN MAX REP
CROP S	HEN COMPARING MEANS		EVEL(S) OF:	4.17 3.40 2.41	MIN REP MAX-MIN MAX REP

TOTAL TUBERS TONNES/HECTARE

**** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SD TREAT MOLLCIDE				
SED	2.64	2.64	8.60 7.02 4.97	8.60 7.02 4.97	
EXCEPT WHEN	COMPARING MEANS	WITH SAME LE	VEL(S) OF:		
CROP SEQ			5.89 4.81 3.40	5,89 4.81 3.40	MAX-MIN
TABLE	CROP SEQ NEMACIDE MOLLCIDE	NEMACIDE	SD TREAT		
SED	8.60 7.02 4.97	3.73	10.43 8.51	MIN REP MAX-MIN	
EXCEPT WHEN CROP SEQ	COMPARING MEANS 5.89 4.81 3.40	WITH SAME LE	6.02 EVEL(S) 0F: 8.34 6.81 4.81	MAX REP MIN REP MAX-MIN MAX REP	

CROP SEQ
MAX REP B B PD ONLY
MAX-MIN B B PD V ANY OF REMAINDER
MIN REP ANY OF REMAINDER

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%
BLOCK.WP	6	6.92	16.1
BLOCK.WP.SP	49	8.34	19.3

84/W/CS/273

PERCENTAGE WARE 4.44 CM (1.75 INCH) RIDDLE

**** TABLES OF MEANS ****

THEELO OF I				
SD TREAT CROP SEQ	NONE	TOL+IMAZ	MEAN	
PD B PP	60.6	64.5	67.6	
B B PD	70.1	73.1	71.6	
PD B PD			57.7	
FU D FU	33.0	01.7	37.7	
MEAN	64.9	69.1	67.0	
NEMACIDE CROP SEQ	NONE	OXAMYL	MEAN	
PD B PP	60.6	64 5	62.6	
B B PD	66.4	76.8 70.3	71.6	
	45.0	70.0	71.0	
PD B PD	45.2	70.3	57.7	
MEAN	61.0	73.0	67.0	
NEMACIDE	NONE	OXAMYL	MEAN	
SD TREAT				
	59.2	70.7	64.9	
TOL+IMAZ		75.3		
TOLITIME	02.5	73.3	. 03.1	
MEAN	61.0	73.0	67.0	
MOLLCIDE CROP SEQ	NONE	METHIOCA	MEAN	
PD B PP	61.0	64.2	62.6	
B B PD	73.1	70.1		
PD B PD	59.2	56.2		
PD D PD	33.2	30.2	37.7	
MEAN	67.9	66.1	67.0	
MOLLCIDE SD TREAT	NONE	METHIOCA	MEAN	
	65.0	64.8	64 9	
TOL+IMAZ		67.5		
TOLTTIAL	70.0	07.3	09.1	
MEAN	67.9	66.1	67.0	
MOLLCIDE NEMACIDE	NONE	METHIOCA	MEAN	
NONE	63.4	58.7	61.0	
OXAMYL	72.4		73.0	
OXAPITE	12.4	73.0	73.0	
MEAN	67.9	66.1	67.0	
SD TREAT	NONE		TOL+IMAZ	
NEMACIDE	NONE		NONE	OXAMYL
CROP SEQ				
PD B PP	58.5	62.7	62.8	66.3
B B PD	64.9			
				78.2
PD B PD	42.8	64.8	47.6	75.8

PERCENTAGE WARE 4.44 CM (1.75 INCH) RIDDLE

**** TABLES OF MEANS ****

SD TREAT MOLLCIDE CROP SEQ PD B PP B B PD PD B PD	NONE 57.1 71.2	METHIOCA 64.0 69.0 53.1	64.8 75.0	METHIOCA 64.3 71.2	
NEMACIDE MOLLCIDE CROP SEQ	NONE NONE	METHIOCA	O XAMYL NONE	METHIOCA	
PD B PP B B PD PD B PD	68.4	58.6 64.5 41.2	77.8	75.7	
NEMACIDE MOLLCIDE SD TREAT	NONE NONE	METHIOCA	OXAMYL NONE	METHIOCA	
		57.8 59.6			
CROP SEQ	NEMACIDE MOLLCIDE SD TREAT		METHIOCA		METHIOCA
PD B PP B B PD	TOL+IMAZ	60.9 64.4 65.4	56.0 61.2 64.4	65.2	67.4
PD B PD	TOL+IMAZ	71.3	64.6 39.7 42.7	78.6 63.0	77.8 66.5

SUB PLOT AREA HARVESTED 0.00075

NEMATICIDES AND STEM NEMATODE

Object: To study, on sites initially free from or infested by stem nematode (Ditylenchus dipsaci), the effects of nematicides on lucerne - Long Hoos V 5 (healthy) and Long Hoos IV 2 (infested).

Sponsor: A.G. Whitehead.

The third year, lucerne.

For previous years see 82-83/R/CS/279.

Design: On each site: 3 randomised blocks of 14 plots.

Whole plot dimensions: 1.2 x 3.7.

Treatments (applied to HEALTHY and INFESTED sites):

TREATMNT	Varieties, rates and methods of applying nematicides:
V 0 V A1 E 0	Vertus, untreated Vertus, aldicarb at 1.5 kg in seed furrows in 1982 Europe, untreated
E A1	Europe, aldicarb at 1.5 kg in seed furrows in 1982
E A2	Europe, aldicarb at 3.0 kg in seed furrows in 1982
E A1 A1	Europe, aldicarb at 1.5 kg in seed furrows in 1982, repeated
	after each cut in 1982 and in spring and after each cut
	thereafter
E A1 T1	Europe, aldicarb at 1.5 kg in seed furrows in 1982,
	thiabendazole at 1.5 kg over the rows in spring 1983 and 1984
E A2 T2	Europe, aldicarb at 3.0 kg in seed furrows in 1982.
	thiabendazole at 3.0 kg over the rows in spring 1983 and 1984
E C1	Europe, carbofuran at 1.5 kg in seed furrows in 1982
E C2	Europe, carbofuran at 3.0 kg in seed furrows in 1982
E C1 T1	Europe, carbofuran at 1.5 kg in seed furrows in 1982.
	thiabendazole at 1.5 kg over the rows in spring 1983 and 1984
E C2 T2	Europe, carbofuran at 3.0 kg in seed furrows in 1982.
	thiabendazole at 3.0 kg over the rows in spring 1983 and 1984
E T1 T1	Europe, thiabendazole at 1.5 kg over the rows at sowing in 1982
	and in spring 1983 and 1984
E T2 T2	Europe, thiabendazole at 3.0 kg over the rows at sowing in 1982
	and in spring 1983 and 1984

NOTE: Treatments in 1984 were applied in 7500 l by weeder bar.

Basal applications: Manures: (0:24:24) at 730 kg. Weedkiller: Propyzamide at 0.70 kg in 220 l.

Cultivations, etc .:-

Both sites: Weedkiller applied: 18 Jan, 1984. PK applied: 15 Mar. Healthy site: Cut: 12 June. Aldicarb and thiabendazole treatments applied: 21 June. Cut: 17 July. Aldicarb applied: 23 July. Cut: 3 Sept.

Infested site: Cut: 14 June. Aldicarb applied: 21 June. Thiabendazole
applied: 28 June. Cut: 6 Aug. Aldicarb applied: 10 Aug. Cut:
26 Sept.

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84/R/CS/279
```

NOTE: Assessments of stems infected with stem nematode were made on both sites.

LONG HOOS V 5 (HEALTHY SITE)

1ST CUT (12/6/84) DRY MATTER TONNES/HECTARE

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

TRE	ATN	INT	
	١	0 1	6.45
	٧	A1	6.63
	E	E 0	7.39
	E	A1	7.40
	E	A2	7.24
E	A1	A1	7.31
E	A1	T1	6.73
E	A2	T2	6.63
	E	C1	6.73
	E	C2	7.30
E	C1	T1	6.54
E	C2	T2	7.24
E	T1	T1	6.61
Ε	T2	T2	6.86
	M	EAN	6.93

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	TREATMNT
SED	0.575

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%
BLOCK.WP	26	0.705	10.2

1ST MEAN DM% 15.1

```
84/R/CS/279 LONG HOOS V 5 (HEALTHY SITE)
```

2ND CUT (17/7/84) DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

TREATM	NT	
V	0	4.27
V	A1	4.23
E	0	5.17
Ε	A1	5.05
E	A2	5.35
E A1	A1	4.73
E A1	T1	4.95
E A2	T2	4.75
Ε	C1	4.91
Ε	C2	4.84
E C1	T1	5.32
E C2	T2	4.79
E T1	T1	5.05
E T2	T2	4.52
ME	AN	4.85

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE TREATMNT
SED 0.247

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP 26 0.303 6.2

2ND MEAN DM% 17.9

```
84/R/CS/279 LONG HOOS V 5 (HEALTHY SITE)
```

3RD CUT (3/9/84) DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

TREATMNT	
V 0	3.86
V A1	3.72
E 0	4.48
E A1	4.36
E A2	4.34
E A1 A1	4.25
E A1 T1	4.58
E A2 T2	4.36
E C1	4.63
E C2	4.38
E C1 T1	4.92
E C2 T2	4.33
E T1 T1	4.71
E T2 T2	4.35
MEAN	4.38

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE TREATMNT
SED 0.264

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 26
 0.324
 7.4

3RD CUT MEAN DM% 22.8

```
84/R/CS/279 LONG HOOS V 5 (HEALTHY SITE)
```

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

TREATMNT	
V O	14.58
V A1	14.58
E 0	17.04
E A1	16.81
E A2	16.93
E A1 A1	16.29
E A1 T1	16.25
E A2 T2	15.73
E C1	16.27
E C2	16.52
E C1 T1	16.78
E C2 T2	16.35
E T1 T1	16.37
E T2 T2	15.73
MEAN	16.16

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	TREATMNT
SED	0.622

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP 26 0.762 4.7

TOTAL OF 2 CUTS MEAN DM% 18.6

PLOT AREA HARVESTED 0.00045

```
84/R/CS/279 LONG HOOS IV 2 (INFESTED SITE)
1ST CUT (14/6/84) DRY MATTER TONNES/HECTARE
```

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

TREATMNT	
V O	5.30
V A1	5.10
E 0	5.46
E A1	4.13
E A2	4.29
E A1 A1	5.02
E A1 T1	3.55
E A2 T2	4.04
E C1	4.91
E C2	5.51
E C1 T1	4.72
E C2 T2	4.40
E T1 T1	4.88
E T2 T2	4.74
MEAN	4.72

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE TREATMNT
SED 0.473

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 26
 0.580
 12.3

1ST MEAN DM% 15.8

84/R/CS/279 LONG HOOS IV 2 (INFESTED SITE)

2ND CUT (6/8/84) DRY MATTER TONNES/HECTARE

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

TREA	TN	TNN	
	١	0 1	7.39
	٧	A1	5.59
	E	0	6.41
	Ε	A1	4.64
	E	A2	5.95
E A	1	A1	5.97
EA	1	T1	5.50
EA	2	T2	5.27
	E	C1	6.33
	E	C2	6.29
E C	1	T1	5.16
E C	2	T2	5.91
E T	1	T1	5.64
ET	2	T2	5.24
	MI	EAN	5.81

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE TREATMNT
SED 0.678

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 26
 0.830
 14.3

2ND MEAN DM% 24.7

84/R/CS/279 LONG HOOS IV 2 (INFESTED SITE)

3RD CUT (26/9/84) DRY MATTER TONNES/HECTARE

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

TREATMNT V O 2.98 V A1 2.01 E 0 2.47 E A1 1.95 E A2 2.30 E A1 A1 2.08 E A1 T1 1.99 E A2 T2 2.00 E C1 E C2 2.46 2.34 E C1 T1 E C2 T2 2.48 1.91 E T1 T1 2.34 E T2 T2 2.03 MEAN 2.24

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE TREATMNT
SED 0.326

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 26 0.399 17.8

3RD CUT MEAN DM% 22.2

```
84/R/CS/279 LONG HOOS IV 2 (INFESTED SITE)
```

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

TREA	TMNT	
	V 0	15.68
	V A1	12.69
	E 0	14.34
	E A1	10.73
	E A2	12.54
E A	1 A1	13.06
EA	1 T1	11.04
EA	2 T2	11.31
	E C1	13.70
	E C2	14.14
E C	1 T1	12.36
E C	2 T2	12.22
ET	1 T1	12.86
ET	2 T2	12.01
	MEAN	12.76

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE TREATMNT
SED 1.294

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 26 1.585 12.4

TOTAL OF 2 CUTS MEAN DM% 20.9

PLOT AREA HARVESTED 0.00045

VARIETIES & PCN TOLERANCE

Object: To study the effects of a range of populations of potato cyst nematode (PCN) on varieties differing in susceptibility - Woburn Horsepool.

Sponsors: A.G. Whitehead, K. Evans.

The third year, potatoes.

For previous years see 82-83/W/CS/284.

Design: 2 randomised blocks of 32 plots.

Whole plot dimensions: 2.84 x 6.10.

Treatments: All combinations of:-

VARIETY(82) Potato varieties in 1982 (to establish different populations of PCN):

CARA Cara

CROWN Pentland Crown

CA CR Cara plants alternating with Pentland Crown plants

within the ridges

CA CA CR Two Cara plants alternating with one Pentland Crown

plant within the ridges

VARIETY(84) Potato varieties in 1984 (all fallow in 1983):

CROWN Pentland Crown
DELL Pentland Dell
DESIREE Desiree
PIPER Maris Piper

3. NEMACIDE(84) Nematicides applied to seedbed in 1984:

NONE None

OXAMYL Oxamyl at 5.6 kg

Basal applications: Manures: (10:10:15+4.5 Mg) at 2400 kg.
Weedkillers: Linuron at 1.2 l with paraquat at 0.2 kg ion in 250 l.
Fungicides: Fentin acetate with maneb (as 'Brestan 60' at 0.5 kg) in 250 l with the insecticide. Fentin hydroxide at 0.28 kg in 250 l on five occasions, with the insecticide on the second occasion.
Insecticide: Pirimicarb at 0.14 kg. Haulm desiccant: Diquat at 0.8 kg ion in 250 l.

Cultivations, etc.:-

Ploughed: 17 Nov, 1983. NPK with Mg applied: 2 Apr, 1984. Heavy spring-tine cultivated: 5 Apr. Nematicides applied, rotary cultivated, potatoes planted: 9-10 Apr. Weedkillers applied: 4 May. 'Brestan 60' with insecticide applied: 19 June. Fentin hydroxide applied: 3 July, 1 Aug, 28 Aug, 12 Sept. Fentin hydroxide with insecticide applied: 18 July. Haulm desiccant applied: 27 Sept. Haulm mechanically destroyed: 28 Sept. Lifted: 4-5 Oct.

NOTE: Soil samples were taken before planting and after harvest to assess numbers of cysts, eggs and larvae of Globodera rostochiensis.

TOTAL TUBERS TONNES/HECTARE

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

TABLES (OF PILANS				
VARIETY(84)	CROWN	DELL	DESIREE	PIPER	MEAN
VARIETY(82)					
ČARÁ	43.3	25.6	28.3	35.7	33.2
CROWN	33.7				
CA CR		17.7	20.1	33.2	27.3
CA CA CR			25.9	35.0	
CA CA CA	37.1	10.9	23.9	33.0	23.5
MEAN	37.7	20.4	23.9	34.0	29.0
NEMACIDE(84)	NONE	OXAMYL	MEAN		
VARIETY(82)					
CARA		40.5	33.2		
CROWN		36.3			
CA CR	17.4	37.2	27.3		
CA CA CR	22.0	36.5	29.3		
MEAN	20.4	37.6	29.0		
NEMACIDE(84)	NONE	LYMAXO	MEAN		
VARIETY(84)		07011112	1127111		
CROWN		50.9	37.7		
DELL		30.5	20.4		
DESIREE		32.6			
PIPER	31.6	36.3	34.0		
MEAN	20.4	37.6	29.0		
	NEMACIDE(84)		E OXAMYL		
VARIETY(82)	VARIETY(84)				
CARA	CROWN	31.	5 55.0		
	DELL	17.	6 33.5		
	DESIREE	21.	4 35.2		
	PIPER		3 38.1		
CROWN			7 49.6		
OROMA	DELL	5.	6 33.2		
	DESIREE				
	PIPER		7 33.1		
CA CD			7 53.1		
CA CR		20.	7 53.1		
	DELL	9.	8 25.6		
	DESTREE		5 31.4		
	PIPER				
CA CA CR	CROWN		4 45.8		
	DELL	8.	2 29.7		
	DESIREE	16.	9 34.9		

34.7

35.4

PIPER

84/W/CS/284 TOTAL TUBERS TONNES/HECTARE **** STANDARD ERRORS OF DIFFERENCES OF MEANS ***** VARIETY(82) VARIETY(84) NEMACIDE(84) VARIETY(82) VARIETY(84) SED 1.54 1.54 1.09 3.07 TABLE VARIETY(82) VARIETY(84) VARIETY(82) NEMACIDE(84) NEMACIDE(84) VARIETY(84) NEMACIDE(84) SED 2.17 2.17 4.35 ***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION **** STRATUM DF SE CV% BLOCK.WP 31 4.35 15.0 PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE ***** TABLES OF MEANS ***** VARIETY(84) CROWN DELL DESIREE PIPER MEAN VARIETY(82) CARA 94.2 82.5 86.8 84.1 86.9 75.7 95.5 CROWN 86.1 92.4 87.4 89.7 CA CR 94.4 85.6 83.3 88.2 CA CA CR 95.1 73.2 88.8 87.9 86.2 MEAN 94.8 79.2 86.3 88.5 87.2 NEMACIDE(84) NONE OXAMYL MEAN VARIETY(82) 90.0 CARA 83.8 86.9 87.4 CROWN 81.8 93.0 CA CR 85.1 91.4 88.2 89.9 CA CA CR 82.6 86.2 MEAN 83.3 91.1 87.2 NEMACIDE(84) NONE OXAMYL MEAN VARIETY(84) CROWN 93.4 96.2 94.8 DELL 67.1 91.4 79.2 DESIREE 81.3 91.3 86.3 PIPER 91.6 85.5 88.5

87.2

91.1

MEAN

83.3

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

	NEMACIDE(84)	NONE	OXAMYL
VARIETY(82)	VARIETY(84)		
CARA	CROWN	92.3	96.1
	DELL	73.0	92.0
	DESIREE	83.0	90.6
	PIPER	87.1	81.1
CROWN	CROWN	94.5	96.5
	DELL	58.1	93.3
	DESTREE	81.5	90.7
	PIPER	93.3	91.5
CA CR	CROWN	92.1	96.7
0/1 0/1	DELL	81.6	89.6
	DESIREE	72.5	94.2
	PIPER	94.1	85.3
CA CA CR	CROWN	94.8	95.4
CA CA CK			
	DELL	55.6	90.8
	DESIREE	87.9	89.6
	PIPER	91.9	83.9

PLOT AREA HARVESTED 0.00087

NITRIFICATION INHIBITORS

Object: To study the effects of nitrification inhibitors on the yield and nitrogen uptake of w. wheat - Woburn The Pightle.

Sponsors: G.A. Rodgers, A. Penny.

The third year, w. wheat.

For previous years see 82/W/WW/3 and 83/W/CS/293.

Design: 2 randomised blocks of 21 plots.

Whole plot dimensions: 4.0×12.0 .

Treatments, applied cumulatively to 1982 and 1983: All combinations of:-

 I FORM Nitrification inhibitors applied just before final seedbed cultivations:

DICYANDI Dicyandiamide ETRIDIAZ Etridiazole NITRAPYR Nitrapyrin

2. I RATE Rates of inhibitors:

SINGLE Single (1.0 kg for etridiazole and nitrapyrin; 10.0 kg for dicyandiamide)

DOUBLE Double (2.0 kg for etridiazole and nitrapyrin; 20.0 kg for

Double (2.0 kg for etridiazole and nitrapyrin; 20.0 kg for dicyandiamide)

3. N RATE Rates of nitrogen fertilizer in spring (kg N) as 'Nitro-Chalk':

0 35 70

plus 3 extra treatments given nitrogen fertilizer in spring only (kg N) as
 'Nitro-Chalk':

N RATE X 0 35 70

NOTE: Nitrification inhibitors were applied on 29 Sept, 1983.

Basal applications: Weedkillers: Paraquat at 0.5 kg ion in 250 l. Chlortoluron at 3.5 l in 250 l. Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 2.0 l) in 250 l with the growth regulator and the prochloraz with carbendazim. Fungicides: Prochloraz at 0.40 kg with carbendazim at 0.15 kg in 250 l. Carbendazim at 0.15 kg with tridemorph at 0.38 kg and maneb at 1.6 kg in 250 l. Growth regulator: Chlormequat (as 'Power 3c' at 4.2 l). Insecticide: Pirimicarb at 0.14 kg in 250 l.

Seed: Avalon, sown at 200 kg.

Cultivations, etc.:- Straw burnt: 30 Aug, 1983. Ploughed: 12 Sept. Paraquat applied: 26 Sept. Spring-tine cultivated, seed sown: 29 Sept. Chlortoluron applied: 4 Oct. N treatments applied: 16 Apr, 1984. 'Brittox', prochloraz with carbendazim and growth regulator applied: 17 Apr. Carbendazim with tridemorph and maneb applied: 21 June. Insecticide applied: 28 June. Combine harvested: 21 Aug.

NOTES: (1) Soil samples were taken in October, then at intervals until April and again before harvest for ammonia and nitrate analyses.

(2) Plant samples were taken in spring, July and at harvest for estimates of total N and dry matter.

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

I FORM N RATE	DICYANDI	ETRIDIAZ	NITRAPYR	ME	AN	
0	8.19	7.66	8.16	8.	00	
35	9.97	8.81	9.13			
70	9.08	8.95	9.20			
70	9.08	0.95	9.20	9.	07	
MEAN	9.08	8.47	8.83	8.	79	
I RATE N RATE	SINGLE	DOUBLE	MEAN			
0	8.20	7.81	8.00			
35	9.64	8.97				
70	9.27	8.88	9.07			
70	9.21	0.00	9.07			
MEAN	9.03	8.55	8.79			
I RATE I FORM	SINGLE	DOUBLE	MEAN			
DICYANDI	9.08	9.07	9.08			
			8.47			
ETRIDIAZ	8.87					
NITRAPYR	9.15	8.51	8.83			
MEAN	9.03	8.55	8.79			
I FORM	DICYANDI	E	TRIDIAZ		NITRAPYR	
I RATE		DOUBLE	SINGLE	DOUBLE	SINGLE	DOUBLE
N RATE		500522				
0		7.94	8.00	7.33	8.16	8.16
35			9.23			
70		9.49		8.53	9.76	
N RATE X	0	35	70	MEAN		
N KAIL A	8.09	8.86	8.29	8.41		
	3.00					
GRAND MEAN	8.74					

GRAIN TONNES/HECTARE

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	N RATE X	N RATE	I FORM	I RATE
SED	0.764	0.312	0.312	0.255
TABLE	N RATE I FORM	N RATE I RATE	I FORM I RATE	N RATE I FORM I RATE N RATE X
SED	0.540	0.441	0.441	0.764

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%
BLOCK.WP	20	0.764	8.7

GRAIN MEAN DM% 87.4

STRAW TONNES/HECTARE

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

I FORM N RATE	DICYANDI	ETRIDIAZ	NITRAPYR	MEAN
0	5.31	5.01	4.16	4.83
35	4.87	5.25		
			5.17	5.10
70	5.47	5.58	5.19	5.42
MEAN	5.22	5.28	4.84	5.11
I RATE	SINGLE	DOUBLE	MEAN	
N RATE			712/111	
0	5.06	4.59	4.83	
35	5.14	5.05	5.10	
70	5.54	5.29	5.42	
, •	0.01	3.23	3.42	
MEAN	5.25	4.98	5.11	
I RATE	SINGLE	DOUBLE	MEAN	
I FORM				
DICYANDI	5.08	5.35	5.22	
ETRIDIAZ	5.68	4.88	5.28	
NITRAPYR	4.98	4.70	4.84	
	4.30	4.70	4.04	
MEAN	5.25	4.98	5.11	

STRAW TONNES/HECTARE

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

I FOR	M DICYANDI		ETRIDIAZ		NITRAPYR	
I RAT	E SINGLE	DOUBLE	SINGLE	DOUBLE	SINGLE	DOUBLE
N RAT	E					
	5.79	4.82	4.82	5.20	4.58	3.74
3	4.28	5.45	6.04	4.47	5.10	5.23
7	5.17	5.78	6.19	4.97	5.27	5.12
N RATE X	0	35	70	MEAN		
	5.25	5.00	5.02	5.09		

GRAND MEAN 5.11

STRAW MEAN DM% 90.2

PLOT AREA HARVESTED 0.00244

NEMATICIDE SPRAYS AND STEM NEMATODE

Object: To study the effects of applying a range of chemicals to stubbles after each cut on the incidence of stem nematode (Ditylenchus dipsaci) in lucerne given carbofuran to the seed furrow - Long Hoos IV I.

Sponsor: A.G. Whitehead.

. The second year, lucerne.

For previous year see 83/R/CS/298.

Design: 2 randomised blocks of 16 plots.

Whole plot dimensions: 1.2×3.7 .

Treatments:

TREATMNT	Varieties and chemicals (all applied at 1.5 kg):
EV O EV C ER O ER C	Euver, untreated Euver, carbofuran to seed furrow Europe, untreated (duplicated) Europe, carbofuran to seed furrow
	To variety Europe, all given carbofuran to seed furrow
ER C AW ER C CE ER C CH ER C DE ER C DH ER C PE ER C PH ER C TCE ER C TCH ER C TBE ER C TBH	Aldicarb watered on Carbendazim, applied by electrostatic sprayer Carbendazim, applied by hydraulic sprayer Dimethoate, applied by electrostatic sprayer Dimethoate, applied by hydraulic sprayer Pirimiphos methyl, applied by electrostatic sprayer Pirimiphos methyl, applied by hydraulic sprayer Thiodicarb, applied by electrostatic sprayer Thiodicarb, applied by hydraulic sprayer Thiabendazole, applied by electrostatic sprayer Thiabendazole, applied by hydraulic sprayer

NOTE: Carbofuran was applied to seed furrow, in 1983 only. The other chemicals were applied after each cut in 1983 and after each cut except the last in 1984. Aldicarb was applied in 7500 l by weeder bar. Hydraulic sprays were applied in 310 l and electrostatic sprays in 5.7 l.

Basal applications: Manures: (0:24:24) at 730 kg. Weedkiller: Propyzamide at 0.70 kg in 220 l.

Cultivations, etc.:- Weedkiller applied: 18 Jan, 1984. PK applied: 15 Mar. Cut: 14 June. Aldicarb applied: 21 June. Other treatments applied: 28 June. Cut: 6 Aug. All treatments applied: 23 Aug. Cut: 26 Sept.

NOTE: The percentage of stems infected with stem nematode was assessed after the second cut.

1ST CUT (14/6/84) DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

TREATMNT	
EV 0	3.97
EV C	5.64
ER O	4.08
ER C	4.71
ER C AW	5.26
ER C CE	5.72
ER C CH	5.92
ER C DE	5.38
ER C DH	5.86
ER C PE	5.33
ER C PH	5.42
ER C TCE	6.80
ER C TCH	6.27
ER C TBE	6.40
ER C TBH	6.15
MEAN	5.44

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE TREATMNT
SED 0.647 MIN REP
0.560 MAX-MIN

TREATMNT
MAX-MIN ER O V ANY OF THE REMAINDER
MIN REP ANY OF THE REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV% BLOCK.WP 16 0.647 11.9

1ST CUT MEAN DM% 19.0

```
84/R/CS/298
2ND CUT (6/8/84) DRY MATTER TONNES/HECTARE
***** TABLES OF MEANS ****
     TREATMNT
         EV 0
                    3.84
         EV C
                    5.78
         ER 0
                    2.34
         ER C
                    3.43
      ER C AW
                    5.06
      ER C CE
ER C CH
                   4.70
                   5.22
      ER C DE
                   4.84
      ER C DH
                    6.86
      ER C PE
                    3.60
      ER C PH
                   4.68
     ER C TCE
                   5.76
     ER C TCH
                   5.20
     ER C TBE
                   4.90
     ER C TBH
                   5.65
         MEAN
                   4.64
**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****
TABLE
                  TREATMNT
SED
                     0.735 MIN REP
                     0.637 MAX-MIN
***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****
```

STRATUM DF SE CV% BLOCK. WP 16 0.735 15.8

2ND CUT MEAN DM% 26.4

```
84/R/CS/298
3RD CUT (26/9/84) DRY MATTER TONNES/HECTARE
**** TABLES OF MEANS ****
     TREATMNT
         EV 0
                   1.33
         EV C
                   1.90
         ER 0
                   1.02
         ER C
                   0.82
      ER C AW
                   1.21
      ER C CE
                   1.29
      ER C CH
                   2.02
      ER C DE
                   1.26
      ER C DH
                   1.45
      ER C PE
                   0.77
     ER C PH
                   1.06
     ER C TCE
                   1.28
     ER C TCH
                   1.68
    ER C TBE
ER C TBH
                  1.26
                   1.46
        MEAN
                   1.30
**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****
TABLE
                  TREATMNT
SED
                     0.371 MIN REP
                     0.322 MAX-MIN
**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****
```

DF

16

SE

0.371

CV%

28.5

3RD CUT MEAN DM% 22.8

STRATUM

BLOCK. WP

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

TREATMNT	
EV 0	9.14
EV C	13.33
ER O	7.43
ER C	8.95
ER C AW	11.52
ER C CE	11.71
ER C CH	13.16
ER C DE	11.47
ER C DH	14.17
ER C PE	9.70
ER C PH	11.17
ER C TCE	13.84
ER C TCH	13.15
ER C TBE	12.55
ER C TBH	13.26
MEAN	11.37

**** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT		
SED		MIN REP	
	1.131	MAX-MIN	

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%
BLOCK.WP 16 1.306 11.5

TOTAL OF 3 CUTS MEAN DM% 22.7

CROPS AND RHIZOCTONIA

Object: To study the effects of cropping and inoculation with Rhizoctonia isolates on subsequent infection and on yield of winter cereals - Meadow.

Sponsors: G.A. Hide, P.J. Read.

The second year, w. wheat, w. barley.

Design: 2 randomised blocks of 2 whole plots split into 4 sub plots split

into 4 sub sub plots.

Whole plot dimensions: 3.0 x 43.0.

Treatments: All combinations of:-

Whole plots

1. CROP(84) Crops in 1984:

W WHEAT W BARLEY

Sub plots

CROP(83) Crops in 1983:

FALLOW B Fallow, cultivations as for s. barley FALLOW P Fallow, cultivations as for potatoes POTATOES Potatoes

S BARLEY S. barley

Sub sub plots

3. INOC(83) Inoculum in 1983, applied during seedbed cultivations:

NONE None

RHIZ C W Rhizoctonia cerealis from wheat RHIZ S B Rhizoctonia solani from barley RHIZ S P Rhizoctonia solani from potatoes

Basal applications:

Wheat and barley: Manures: (5:14:30) at 340 kg. 'Nitro-Chalk' at 750 kg. Weedkillers: Chlortoluron at 3.5 kg in 250 l. 3, 6-dichloropicolinic acid at 0.07 kg with bromoxynil at 0.34 kg and mecoprop (as 'CMPP' at 4.2 l) in 200 l. Fungicides: Prochloraz at 0.40 kg with carbendazim at 0.15 kg in 500 l. Wheat only: Fungicide: Propiconazole at 0.25 kg in 500 l. Insecticide: Pirimicarb at 0.14 kg in 250 l.

Seed: W. wheat: Avalon, seed sown at 170 kg. W. barley: Igri, seed sown at 160 kg.

Cultivations, etc.:- Ploughed: 16 Sept, 1983. Heavy spring-tine cultivated: 20 Sept. NPK applied: 26 Sept. Rotary harrowed, wheat and barley sown: 27 Sept. Chlortoluron applied: 29 Sept. N applied: 6 Apr, 1984. 3, 6-dichloropicolinic acid, bromoxynil and mecoprop applied: 13 Apr. Prochloraz and carbendazim applied: 26 Apr. Propiconazole applied to wheat: 14 June. Pirimicarb applied to wheat: 26 June. Combine harvested barley: 26 July. Combine harvested wheat: 20 Aug. Previous crops: W. wheat 1981 and 1982.

NOTE: Barley plant samples were taken in late January and late May and wheat samples in early February and early June for inspection of root infections. Plant heights were measured on the last sampling occasion.

WINTER WHEAT

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

INOC(83)	NONE	RHIZ C W	RHIZ S B	RHIZ S P	MEAN
CROP(83)					
FALLOW B	11.75	11.53	11.78	11.42	11.62
FALLOW P	11.24	11.10	10.86	11.36	11.14
POTATOES	11.73	11.56	11.66	11.74	11.67
S BARLEY	9.59	9.74	9.14	10.33	9.70
MEAN	11.08	10.98	10.86	11.21	11.03

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	INOC(83)	CROP(83)* INOC(83)
SED	0.182	0.364

* WITHIN THE SAME LEVEL OF CROP(83) ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP.SP 12 0.364 3.3

GRAIN MEAN DM% 88.9

WINTER BARLEY

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

INOC(83)	NONE	RHIZ C W	RHIZ S B	RHIZ S P	MEAN
CROP(83) FALLOW B	9.81	9.96	9.56	9.72	9.76
FALLOW P	9.60	9.85	9.87	9.64	9.74
POTATOES	9.62	9.48	9.69	9.76	9.64
S BARLEY	9.12	9.13	8.13	8.87	8.82
MEAN	9.54	9.61	9.31	9.50	9.49

**** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	INOC(83)	CROP(83)* INOC(83)
SED	0.160	0.321

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP.SP 12 0.321 3.4

GRAIN MEAN DM% 83.0

84/W/CS/304

NITRIFICATION INHIBITORS

Object: To study the effects of adding nitrification inhibitors to liquid and solid urea on the yield and nitrogen uptake of a ley - Woburn Stackyard II.

Sponsors: G.A. Rodgers, F.V. Widdowson.

The first year, grass ley.

Design: 3 randomised blocks of 18 plots.

Whole plot dimensions: 12.2 x 2.4.

Treatments: All combinations of:-

INHIB I Inhibitor to injected aqueous urea (applied at 375 kg N):

0 AQU3 None

NIT AQU3 Nitrapyrin at 1.5 kg

C+P AQU3 Carbon disulphide at 10 kg plus potassium ethyl xanthate at

5 kg

2. APP TIME Times of applying aqueous urea:

WINTER 18 Jan, 1984 SPRING 12 Mar

plus all combinations of:-

INHIB B Inhibitor to broadcast prilled urea (applied at 375 kg N):

0 PU3 None

DIC PU3 Dicyandiamide at 56 kg

PHEN PU3 Phenylphosphorodiamidate at 8 kg

2. APP DIV Division of prilled urea:

DIVIDED Dressing equally divided between 13 Mar, 14 June, 17 Aug

SINGLE Single dressing on 13 Mar

plus six extra treatments:

EXTRA 'Nitro-Chalk' dressings (kg N):

0 None

Dressings equally divided between 13 Mar, 14 June, 17 Aug:

NC1 D 125 NC2 D 250 NC3 D 375 NC4 D 500

Single dressing on 13 Mar:

NC3 S 375

84/W/CS/304

Basal applications: Manures: Magnesian limestone at 7.5 t. (0:18:36) at 470 kg. Weedkillers: MCPA with MCPB (as 'Trifolex-tra' at 7.0 1) in 250 l.

Cultivations, etc.:- Weedkillers applied: 22 Sept, 1983. Magnesian limestone applied: 30 Sept. PK applied: 15 Nov. Cut: 8 June, 1984, 9 Aug, 20 Nov.

NOTES: (1) Estimates of ammonia losses were made in the fortnight after applying treatments. Soil samples were taken at intervals for ammonium and nitrate analyses.

(2) Plant samples were taken at each cut for estimates of total N and dry matter.

1ST CUT (8/6/84) DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

APP TIME	WINTER	SPRING	MEAN				
INHIB I							
0 AQU3	5.86	6.61	6.23				
NIT AQU3	6.93	6.03	6.48				
C+P AQU3	6.54	5.50	6.02				
MEAN	6.44	6.05	6.24				
APP DIV	DIVIDED	SINGLE	MEAN				
INHIB B	DIVIDED		PILAN				
0 PU3	5.53	6.44	5.98				
DIC PU3	5.17	5.95	5.56				
PHEN PU3	5.43	6.59	6.01				
MEAN	5.38	6.32	5.85				
EXTRA	0	NC1 D	NC2 D	NC3 D	NC4 D	NC3 S	MEAN
	2.39	4.62	5.28	6.38	6.39	6.48	5.26

GRAND MEAN 5.78

TABLE	EXTRA	APP TIME	APP DIV	INHIB I
SED	0.386	0.223	0.223	0.273
TABLE	INHIB B	APP TIME INHIB I	APP DIV	
SED	0.273	0.386	0.386	

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 34
 0.473
 8.2

1ST CUT MEAN DM% 19.9

84/W/CS/304								
2ND CUT (9/8/	84) DRY MATT	TER TONNE	S/HECTA	RE				
**** TABLES	OF MEANS ***	**						
APP TIME INHIB I		SPRING	М	EAN				
O AQU3 NIT AQU3 C+P AQU3	2.03	2.22 1.97 2.16	2	.03 .00 .04				
MEAN	1.93	2.12	2	.02				
APP DIV INHIB B		SINGLE	М	EAN				
O PU3 DIC PU3 PHEN PU3		1.31 1.16 1.99	1	.52 .51 .10				
MEAN	1.93	1.49	1	•71				
EXTRA	0 0.31	NC1 D 1.54	NC2 D 2.52	NC:	3 D	NC4 D 2.55	NC3 S 1.99	MEAN 1.89
GRAND MEAN 1.	.87							
TABLE	EXTR	A APP	TIME	APP [VIC	INHIB I		
SED	0.25	4 0	.147	0.1	47	0.180		
TABLE	INHIB	B APP INH	TIME IB I	APP D				
SED	0.18	0 0	.254	0.2	54			
***** STRATUM	STANDARD ER	RORS AND	COEFFIC	IENTS O	F VAR	IATION ****	*	
STRATUM		DF		SE	CV	1%		

STRATUM DF SE CV% BLOCK.WP 34 0.311 16.6

2ND CUT MEAN DM% 33.6

NC3 D

1.45

NC4 D

1.41

NC3 S

0.59

MEAN

0.84

84/W/CS/304

3RD CUT (20/11/84) DRY MATTER TONNES/HECTARE

**** TABLES OF MEANS ****

APP TIME	WINTER	SPRING	MEAN	
INHIB I				
0 AQU3	0.55	0.52	0.53	
NIT AQU3	0.42	0.66	0.54	
C+P AQU3	0.49	0.62	0.55	
MEAN	0.49	0.60	0.54	
APP DIV	DIVIDED	SINGLE	MEAN	
INHIB B				
0 PU3	1.25	0.20	0.73	
DIC PU3	0.99	0.17	0.58	
PHEN PU3	0.94	0.40	0.67	
MEAN	1.06	0.26	0.66	
EXTRA	0	NC1 D	NC2 D	
	0.09	0.54	0.94	

GRAND MEAN 0.68

TABLE	EXTRA	APP TIME	APP DIV	INHIB I
SED	0.154	0.089	0.089	0.109
TABLE	INHIB B	APP TIME INHIB I	APP DIV	
SED	0.109	0.154	0.154	

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP 34 0.189 27.8

3RD CUT MEAN DM% 15.0

84/W/CS/304

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

APP TIME INHIB I	WINTER	SPRING	MEAN				
O AQU3	8.26	9.34	8.80				
NIT AQU3	9.39	8.67	9.03				
C+P AQU3	8.94	8.29	8.61				
			_				
MEAN	8.86	8.76	8.81				
			0.01				
APP DIV	DIVIDED	SINGLE	MEAN				
	DIVIDED	JINGLL	FILAN				
INHIB B							
0 PU3	8.50	7.96	8.23				
DIC PU3	8.03	7.27	7.65				
PHEN PU3	8.58	8.97	8.77				
THEN 105	0.30	0.37	0.77				
MEAN	0 07	0.07					
MEAN	8.37	8.07	8.22				
EXTRA	0	NC1 D	NC2 D	NC3 D	NC4 D	NC3 S	MEAN
LAINA							MEAN
	2.79	6.70	8.74	10.22	10.35	9.06	7.98

GRAND MEAN 8.34

TABLE	EXTRA	APP TIME	APP DIV	INHIB I
SED	0.533	0.308	0.308	0.377
TABLE	INHIB B	APP TIME INHIB I	APP DIV	
SED	0.377	0.533	0.533	

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%
BLOCK.WP 34 0.653 7.8

TOTAL OF 3 CUTS MEAN DM% 22.8

84/S/CS/1

FACTORS AFFECTING YIELD

Object: To study the effects of a range of factors on the yield of w. wheat - Saxmundham.

Sponsors: F.V. Widdowson, A. Penny.

The 19th year, w. wheat.

For previous years see 66/C/30(t), 67/C/23(t), 68/C/39, 69-83/S/CS/1.

Design: The experiment was on two sites, one after beans and one after wheat. On each site the design was a single replicate of 8 whole plots split into 5 sub-plots.

Whole plot dimensions: Wheat after beans: 8.53 x 18.3.

Wheat after wheat: 6.30 x 30.0.

Treatments: On each site, combinations of:-

Whole plots

VARIETY Varieties:

GALAHAD MOULIN

2. WINTER N Nitrogen fertilizer (kg N) as urea on 14 Feb, 1984 in addition to a basal application of 50 kg N as urea to the seedbed:

60

3. PATHCONT Pest and pathogen control:

NONE None

FULL Prochloraz at 0.40 kg in 220 l on 10 Apr, 1984.

Propiconazole at 0.13 kg with captafol at 1.1 kg in 220 l

on 23 May.

Carbendazim at 0.15 kg, maneb at 1.6 kg and tridemorph at 0.37 kg plus captafol at 1.1 kg and pirimicarb at 0.14 kg in 220 l on 27 June.

Sub plots

4 N RATE Total nitrogen fertilizer applied in spring (kg N) as 'Nitro-Chalk':

84/S/CS/1

Basal applications: Manures: (0:20:20) at 630 kg (after wheat) and 310 kg (after beans). Weedkillers: Isoproturon at 2.5 kg with mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) applied with the insecticide in 220 l. Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 2.1 l) in 220 l. Insecticide: Permethrin at 0.06 kg.

Seed: Varieties sown at 400 seeds per m2.

Cultivations, etc.:- PK applied: 18 Aug, 1983 (after wheat), 30 Aug (after beans). Ploughed: 9 Sept. Power harrowed, seed sown: 27 Sept. Isoproturon, 'Brittox' and permethrin applied: 19 Oct. Spring N applied: 10 Apr, 1984. 'Brittox' applied: 17 Apr. Combine harvested: 21 Aug.

NOTE: Mineral N content of soil to 90 cm depth and the nitrate content of the crop were assessed in autumn and spring. N content of grain was measured.

WHEAT AFTER BEANS

GRAIN TONNES/HECTARE

VARIETY GALAHAD 11.77 12.30 12.03 MOULIN 10.90 11.08 10.99 MEAN 11.33 11.69 11.51 PATHCONT NONE FULL MEAN VARIETY GALAHAD 11.73 12.33 12.03 MOULIN 10.67 11.30 10.99 MEAN 11.20 11.82 11.51	
MOULIN 10.90 11.08 10.99 MEAN 11.33 11.69 11.51 PATHCONT NONE FULL MEAN VARIETY GALAHAD 11.73 12.33 12.03 MOULIN 10.67 11.30 10.99	
MEAN 11.33 11.69 11.51 PATHCONT NONE FULL MEAN VARIETY GALAHAD 11.73 12.33 12.03 MOULIN 10.67 11.30 10.99	
PATHCONT NONE FULL MEAN VARIETY GALAHAD 11.73 12.33 12.03 MOULIN 10.67 11.30 10.99	
VARIETY GALAHAD 11.73 12.33 12.03 MOULIN 10.67 11.30 10.99	
GALAHAD 11.73 12.33 12.03 MOULIN 10.67 11.30 10.99	
MOULIN 10.67 11.30 10.99	
MOULIN 10.67 11.30 10.99	
MEAN 11 00	
MEAN 11.20 11.82 11.51	
PATHCONT NONE FULL MEAN WINTER N	
0 10.95 11.71 11.33	
60 11.45 11.92 11.69	
11.43 11.92 11.09	
MEAN 11.20 11.82 11.51	
N RATE 0 120 150 180 210	MEAN
VARIETY	ILAII
GALAHAD 9.29 12.50 12.76 12.82 12.80 1	2.03
MOULTH 0.00	
MUULIN 8.32 11.72 12.00 11.48 11.41 1	0.99
MEAN 8.81 12.11 12.38 12.15 12.10 1	
MEAN 8.81 12.11 12.38 12.15 12.10 1	1.51

84/S/CS/1 WHEAT AFTER BEANS

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

MEAN
11.33
11.69
11.51
MEAN
11.20
11.82
11.51

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	N RATE	N RATE* VARIETY	N RATE* WINTER N	N RATE* PATHCONT
SED	0.285	0.404	0.404	0.404

^{*} WITHIN THE SAME LEVEL OF VARIETY, WINTER N OR PATHCONT ONLY

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%
WP.SP	16	0.571	5.0

GRAIN MEAN DM% 85.5

84/S/CS/1 WHEAT AFTER WHEAT

GRAIN TONNES/HECTARE

1710220 01	11271110					
WINTER N VARIETY	0	60	MEAN			
GALAHAD	8.49	10.08	9.29			
MOULIN	6.95	9.70	8.33			
MOULIN	0.93	9.70	0.33			
MEAN	7.72	9.89	8.81			
PATHCONT	NONE	FULL	MEAN			
GALAHAD	8.85	9.72	9.29			
MOULIN	7.44	9.21	8.33			
HOOLIN	,	,,,,	0.00			
MEAN	8.15	9.47	8.81			
PATHCONT WINTER N	NONE	FULL	MEAN			
0	7.01	8.43	7.72			
60	9.28	10.50	9.89			
MEAN	8.15	9.47	8.81			
N RATE VARIETY	0	150	180	210	240	MEAN
GALAHAD	5.29	9.78	10.13	10.55	10.68	9.29
MOULIN	4.16	8.74	9.20	9.50	10.02	8.33
		•••	3.20			
MEAN	4.72	9.26	9.67	10.02	10.35	8.81
	•	150	100	010	040	MEAN
N RATE	0	150	180	210	240	MEAN
WINTER N	0.00	0.00	0.70	0.00	0.50	7 70
0	2.93	8.26	8.70	9.20	9.52	7.72
60	6.52	10.27	10.63	10.85	11.18	9.89
MEAN	4.72	9.26	9.67	10.02	10.35	8.81
N RATE	0	150	180	210	240	MEAN
PATHCONT						
NONE	4.50	8.48	8.92	9.27	9.56	8.15
FULL	4.95	10.05	10.42	10.78	11.14	9.47
	*					
MEAN	4.72	9.26	9.67	10.02	10.35	8.81
	-					

84/S/CS/1 WHEAT AFTER WHEAT

GRAIN TONNES/HECTARE

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	N RATE	N RATE* VARIETY	N RATE* WINTER N	N RATE* PATHCONT
SED	0.201	0.284	0.284	0.284

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV% WP.SP 16 0.401 4.6

GRAIN MEAN DM% 86.1

84/R/WW/1 and 84/W/WW/1

WINTER WHEAT

VARIETIES

Object: To study a selection of the newer varieties of w. wheat and the effects of growth regulator on them on land in rotation (pathogen free) and after wheat (pathogen infected) - Rothamsted Fosters West (pathogen free RH) and Little Hoos (pathogen infected RD), Woburn Far Field I (pathogen free WH).

Sponsors: R. Moffitt, R.J. Gutteridge.

Design: 2 randomised blocks of 2 whole plots split into (RH) 13 (RD,WH) 11.

Sub plot dimensions: (RH) 3.0×12.0 , (RD) 3.0×10.0 , (WH) 4.0×12.0 .

Treatments: All combinations of:-

Whole plots

GROWREG Growth regulator:

NONE None

CHLORMEQ Chlormequat at 1.7 l in 250 l.

Sub plots

2. VARIETY Varieties:

AVALON Avalon (duplicated on RH only) BRMSTONE Brimstone FENMAN Fenman GALAHAD Galahad LONGBOW Longbow MISSION Mission MOULIN Moulin NORMAN Norman (duplicated on RH only) RAPIER Rapier STETSON Stetson

TR GRACE Triticale, Grace

Basal applications:

Fosters West (RH): Manures: N at 200 kg as 'Nitro-Chalk'.

Weedkillers: Mecoprop at 2.2 kg with isoproturon at 2.4 kg in 250 l.

Cyanazine at 0.24 l with mecoprop at 1.6 l in 250 l. Fungicides:

Carbendazim at 0.15 kg with tridemorph at 0.38 kg and maneb at 1.6 kg in 250 l.

Insecticide: Pirimicarb at 0.14 kg in 250 l.

Little Hoos (RD): Manures: N at 50 kg and 160 kg as 'Nitro- Chalk'. Weedkillers: Paraquat at 0.6 kg ion in 250 l. Mecoprop at 2.2 kg with isoproturon at 2.4 kg in 250 l. Cyanazine at 0.24 l with mecoprop at 1.6 l applied with the prochloraz and carbendazim in 250 l. Fungicides: Prochloraz at 0.4 kg with carbendazim at 0.15 kg. Carbendazim at 0.15 kg with tridemorph at 0.38 kg and maneb at 1.6 kg in 250 l. Insecticide: Pirimicarb at 0.14 kg in 250 l.

84/R/WW/1 and 84/W/WW/1

Far Field I (WH): Manures: N at 50 kg and 140 kg as 'Nitro-Chalk'. Fungicides: Prochloraz at 0.4 kg with carbendazim at 0.15 kg in 250 l. Propiconazole at 0.25 kg in 250 l. Insecticide: Pirimicarb at 0.14 kg in 250 l.

Seed: Fosters West (RH), Little Hoos (RD): Varieties sown at 180 kg. Far Field I (WH): Varieties sown at 190 kg.

Cultivations, etc.:-

Fosters West (RH): Ploughed: 15 Sept, 1983. Spring-tine cultivated: 12 Oct. Rotary harrowed, seed sown: 13 Oct. Mecoprop with isoproturon applied: 9 Nov. N applied: 9 Apr, 1984. Cyanazine with mecoprop applied: 17 Apr. Chlormequat applied: 25 Apr. Fungicides applied: 13 June. Insecticide applied: 27 June. Combine harvested: 22 Aug. Previous crops: W. wheat 1982, w. beans 1983.

Little Hoos (RD): Heavy spring-tine cultivated twice: 23 Aug, 1983, 13 Oct. Paraquat applied: 26 Sept. Rotary harrowed, seed sown: 17 Oct. Mecoprop with isoproturon applied: 10 Nov. N applied: 10 Mar, 1984, 10 Apr. Cyanazine with mecoprop and prochloraz with carbendazim applied 17 Apr. Chlormequat applied: 25 Apr. Carbendazim with tridemorph and maneb applied: 13 June. Insecticide applied: 27 June. Combine harvested: 22 Aug. Previous crops: W. oats 1982, w. wheat 1983.

Far Field I (WH): Heavy spring-tine cultivated, spring-tine cultivated with crumbler attached, seed sown: 4 Nov, 1983. N applied: 22 Mar, 1984, 30 Apr. Chlormequat applied, prochloraz with carbendazim applied: 14 May. Propiconazole applied: 16 June. Insecticide applied: 29 June. Combine harvested: 22 Aug. Previous crops: S. barley 1982, potatoes 1983.

HEALTHY SITE

GRAIN TONNES/HECTARE

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

GROWREG	NONE	CHLORMEQ	MEAN
VARIETY			
AVALON	11.94	11.65	11.79
BRMSTONE	12.75	12.45	12.60
FENMAN	11.66	11.46	11.56
GALAHAD	12.45	12.08	12.27
LONGBOW	12.28	12.03	12.15
MISSION	11.82	11.87	11.85
MOULIN	12.31	12.16	12.23
NORMAN	12.23	11.65	11.94
RAPIER	13.07	12.39	12.73
STETSON	12.06	11.64	11.85
TR GRACE	7.74	8.21	7.98
MEAN	11.85	11.60	11.72

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	VARIETY	GROWREG* VARIETY
SED	0.220	0.311 MIN REP
	0.191	0.270 MAX-MIN
	0.156	0.220 MAX REP

* WITHIN THE SAME LEVEL OF GROWREG ON

VARIETY

MAX REP AVALON V NORMAN
MAX-MIN AVALON OR NORMAN V ANY OF THE REMAINDER
MIN REP ANY OF THE REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV% BLOCK.WP.SP 28 0.311 2.7

GRAIN MEAN DM% 87.2

DISEASED SITE

GRAIN TONNES/HECTARE

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

GROWREG	NONE	CHLORMEQ	MEAN
VARIETY		•	
AVALON	10.76	11.44	11.10
BRMSTONE	12.76	12.05	12.40
FENMAN	10.77	11.16	10.96
GALAHAD	11.82	12.05	11.93
LONGBOW	11.73	12.01	11.87
MISSION	10.16	11.13	10.64
MOULIN	11.01	11.19	11.10
NORMAN	12.00	11.91	11.95
RAPIER	11.74	12.62	12.18
STETSON	10.91	10.89	10.90
TR GRACE	7.16	7.71	7.44
MEAN	10.98	11.29	11.13

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	VARIETY	GROWRE G*
		VARIETY
SED	0.312	0.441

^{*} WITHIN THE SAME LEVEL OF GROWREG ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	20	0.441	4.0

GRAIN MEAN DM% 87.8

84/W/WW/1

GRAIN TONNES/HECTARE

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

GROWREG	NONE	CHLORMEQ	MEAN
VARIETY			
AVALON	10.63	10.03	10.33
BRMSTONE	9.69	9.82	9.76
FENMAN	10.96	10.31	10.64
GALAHAD	9.64	8.72	9.18
LONGBOW	10.11	9.21	9.66
MISSION	10.64	11.74	11.19
MOULIN	11.36	9.24	10.30
NORMAN	9.17	9.98	9.57
RAPIER	9.24	10.39	9.81
STETSON	10.52	9.70	10.11
TR GRACE	6.79	6.40	6.60
MEAN	9.89	9.59	9.74

TABLE	VARIETY	GROWREG* VARIETY
SED	0.865	1.223

^{*} WITHIN THE SAME LEVEL OF GROWREG ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	20	1.223	12.6

GRAIN MEAN DM% 86.9

WINTER WHEAT

FACTORS LIMITING YIELD

Object: To study the effects of a range of factors on the incidence of pests and diseases and on the growth and yield of w. wheat - Pastures.

Sponsors: R.D. Prew, N. Carter, B.M. Church, J. Lacey, A. Penny, R.T. Plumb, G.N. Thorne, A.D. Todd, R. M. Webb.

Associate sponsors: D.S. Jenkinson, A.H. Weir, P.J. Welbank, F.V. Widdowson.

Design: Half replicate of 2⁸ + 54 extra plots, arranged in 4 blocks with PREVCROP on blocks.

Whole plot dimensions: 3.0 x 15.2.

Treatments: Combinations of:-

Blocks

PREVCROP Previous cropping:

BARLEY Potatoes 1981, w. wheat 1982, s. barley 1983 OATS Potatoes 1981, w. wheat 1982, s. oats 1983

Whole plots

SOWDATE Dates of sowing:

20 SEP 20 September, 1983 18 OCT 18 October

3. TOTAL N Total amount of N fertilizer (kg N) as 'Nitro-Chalk':

160 230

4. N TIME Timing of nitrogen fertilizer applications:

EARLY 3 Feb, 1984, 7 Mar, 2 May LATE 7 Mar, 4 Apr, 14 May

5. GROWREG Growth regulator:

NONE None

CHLORMEQ Chlormequat chloride + choline chloride (as 'New 5 C Cycocel' at 1.75 l) at Zadoks GS 30 on 3 Apr for SOWDATE 20 SEPT and 27 April for SOWDATE 18 OCT

6. SPR FUNG Spring fungicide:

NONE None

BENOMYL Benomyl at 0.28 kg in 220 l on 10 April

7. SUM FUNG Summer fungicide:

NONE None

PR+CA+MA Propiconazole at 0.12 kg, alone in 220 l on 30 May, with

carbendazim at 0.25 kg and maneb at 1.6 kg in 220 1 on

26 June

8. PESTCIDE Autumn and summer pesticides:

NONE None

AL+OM+PI Aldicarb at 7.0 kg worked into seedbed + omethoate at

0.63 1 in 220 1 on 10 Feb + pirimicarb at 0.14 kg in

220 1 on 21 June

Plus all combinations of the following (all given chlormequat chloride + choline chloride, benomyl, propiconazole, carbendazim, maneb, aldicarb, omethoate, pirimicarb; the plots sown 15 Sept were given N timed early and plots sown 26 Oct given N timed late):

Blocks

PRECROPX Previous cropping:

BARLEY Potatoes 1981, w. wheat 1982, s. barley 1983 OATS Potatoes 1981, w. wheat 1982, s. oats 1983

Whole plots

SOWDATEX Dates of sowing:

20 SEPT 20 September, 1983 18 OCT 18 October

10 UCI 10 UCLUBER

3. TOTAL NX Total amount of N fertilizer (kg N) as 'Nitro-Chalk':

0 125

195

265

Plus a half replicate of the following combinations (all trickle irrigated to lessen a deficit of 37.5 mm to 12.5 mm, and given chlormequat chloride + choline chloride, benomyl, propiconazole, carbendazim, maneb, aldicarb, omethoate and pirimicarb):

Blocks

PRECROPI Previous cropping:

BARLEY Potatoes 1981, w. wheat 1982, s. barley 1983 OATS Potatoes 1981, w. wheat 1982, s. oats 1983

Whole plots

SOWDATEI Dates of sowing:

20 SEPT 20 September, 1983 18 OCT 18 October

202

3. TOTAL NI Total amount of N fertilizer (kg N) as 'Nitro-Chalk':

160 230

4. N TIMEI Timing of fertilizer application:

EARLY 3 February, 1984, 7 March, 2 May LATE 7 March, 4 April, 14 May

5. AUT NI Autumn applied N fertilizer:

NONE None

AUT N 40 kg N applied to seedbed in addition to spring N

plus a half replicate of the following combinations (all grown after oats and given 160 kg N, propiconazole, carbendazim, maneb, aldicarb and pirimicarb but not given omethoate).

SOWDATEP Date of sowing:

20 SEPT 20 September, 1983 18 OCT 18 October

2. N TIMEP Timing of nitrogen fertilizer application:

EARLY 3 Feb, 1984, 7 Mar, 2 May LATE 7 Mar, 4 Apr, 14 May

3. GROWREGP Growth regulator:

NONE None

CHLORMEQ Chlormequat + choline chloride (as 'New 5 C Cycocel' at 1.75 l) at Zadoks GS 30 on 3 April for SOWDATE 20 SEPT and 27 April for SOWDATE 18 OCT

4. SPR FUNP Spring fungicide:

NONE None

BENOMYL Benomy1 at 0.28 kg in 220 l on 10 Apr

Plus six extra treatments (all, except NONE plots, given chlormequat chloride + choline chloride, tridemorph, propiconazole, carbendazim, maneb, aldicarb, omethoate, pirimicarb):

EXTRA

SE GREGX Sown 20 Sept, after oats given additional chlormequat chloride + choline chloride (as 'New 5 C Cycocel' at 1.0 1) at Zadoks GS 13/21 on 10 Nov, 1983, and 230 kg N at N TIME EARLY (duplicated) Sown 18 Oct, after oats given additional chlormequat SL GREGX chloride + choline chloride (as 'New 5 C Cycocel' at 1.0 1) at Zadoks GS 13/21 on 9 Feb, 1984 and 230 kg N at N TIME LATE (duplicated) SE FAL Sown 20 Sept after fallow and given 230 kg N at N TIME EARLY (duplicated) SL FAL Sown 18 Oct after fallow and given 230 kg N at N TIME LATE (duplicated) Sown 20 Sept after fallow SE NONE F SL NONE F Sown 18 Oct after fallow

NOTE: TOTAL N fertilizer was given in three applications, 40 kg N on the first and third dates for each N TIME the remainder on the second.

Basal applications: Manures: (0:18:36) at 420 kg. Weedkillers: Paraquat at 0.42 kg ion in 250 l. Chlortoluron at 3.5 kg in 250 l.

Seed: Avalon, sown at 170 kg.

Cultivations, etc.:- Heavy spring-tine cultivated: 22 Aug, 1983. PK applied: 5 Sept. Heavy spring-tine cultivated: 7 Sept. Paraquat applied: 19 Sept. Aldicarb applied for SOWDATE 20 SEPT, rotary harrowed, seed sown: 20 Sept. Aldicarb applied for SOWDATE 18 OCT, rotary harrowed, seed sown: 18 Oct. Chlortoluron applied: 20 Oct. Combine harvested: 21 Aug, 1984.

NOTE: Soil was sampled for nematodes, shoot borers, water and mineral N contents. Plants were assessed for foot and root rots throughout the season. The above-ground crop was examined for barley yellow dwarf virus, aphids, foliar diseases and microflora. Light interception, dry weight, leaf area, shoot numbers and N and K content of the above-ground crop and stem nitrate were measured on several occasions.

GRAIN TONNES/HECTARE

	. 2.0000 1.0000		
SOWDATE	20 SEPT	18 OCT	MEAN
PREVCROP			
BARLEY	7.52	8.88	8.20
OATS	10.43	10.43	10.43
			10.40
MEAN	8.98	9.65	9.32
TOTAL N	160	230	MEAN
PREVCROP			
BARLEY	7.80	8.61	8.20
OATS	10.08	10.78	10.43
0.110	10.00	10.70	10.43
MEAN	8.94	9.69	9.32
TOTAL N	160	230	MEAN
SOWDATE			
20 SEPT	8.62	9.34	8.98
18 OCT	9.26	10.05	9.65
20 00.	3.20	10.03	3.03
MEAN	8.94	9.69	9.32
N TIME	EARLY	LATE	MEAN
PREVCROP		2,,,,	7127111
BARLEY	8.12	8.28	8.20
OATS	10.36	10.49	
UNIS	10.30	10.49	10.43
MEAN	9.24	9.39	9.32
N TIME	EARLY	LATE	MEAN
SOWDATE			
20 SEPT	8.84	9.11	8.98
18 OCT	9.65	9.66	9.65
10 001	3.03	9.00	9.00
MEAN	9.24	9.39	9.32
N TIME	EARLY	LATE	MEAN
TOTAL N		Little	112/111
160	9.00	8.88	8.94
230	9.49	9.90	9.69
MEAN	9.24	9.39	9.32
GROWREG	NONE	CHLORMEQ	MEAN
PREVCROP			
BARLEY	8.04	8.36	9 20
OATS	10.34	10.52	8.20
UAIS	10.34	10.52	10.43
MEAN	9.19	9.44	9.32

GRAIN TONNES/HECTARE

INDLES OF	TEARS		
GROWREG	NONE	CHLORMEQ	MEAN
SOWDATE			
20 SEPT	8.79	9.17	8.98
18 OCT	9.59	9.72	9.65
10 001	3.33	3.72	
MEAN	9.19	9.44	9.32
GROWREG	NONE	CHLORMEQ	MEAN
TOTAL N			
160	8.71	9.17	8.94
230	9.67	9.71	9.69
MEAN	9.19	9.44	9.32
GROWREG	NONE	CHLORMEQ	MEAN
N TIME	HONL	CHLORHLY	PILAN
	0.16	0 22	0.04
EARLY	9.16	9.33	9.24
LATE	9.22	9.56	9.39
MEAN	9.19	9.44	9.32
SPR FUNG	NONE	BENOMYL	MEAN
PREVCROP			
BARLEY	7.90	8.50	8.20
OATS	10.33		10.43
UNIS	10.55	10.55	10.43
MEAN	9.12	9.51	9.32
SPR FUNG	NONE	BENOMYL	MEAN
SOWDATE			
20 SEPT	8.72	9.24	8.98
18 OCT	9.52		9.65
10 001	J.JL	3.13	3.03
MEAN	9.12	9.51	9.32
SPR FUNG	NONE	BENOMYL	MEAN
TOTAL N			
160	8.69	9.19	8.94
230	9.54	9.84	9.69
MEAN	9.12	9.51	9.32
SPR FUNG	NONE	BENOMYL	MEAN
N TIME		J = 1,0111 E	,,,,,,,,
EARLY	9.03	9.46	9.24
LATE	9.21	9.57	
LATE	9.21	9.5/	9.39
MEAN	9.12	9.51	9.32

GRAIN TONNES/HECTARE

** IABLES OF	MEANS **	***	
SPR FUNG	NONE	BENOMYL	MEAN
GROWREG			
NONE	8.98	9.40	9.19
CHLORMEQ	9.26	9.63	9.44
CHEOKIALQ	3.20	3.03	3.44
MEAN	9.12	9.51	9.32
SUM FUNG	NONE	PR+CA+MA	MEAN
PREVCROP	0.00	0.01	0.00
BARLEY	8.20	8.21	8.20
OATS	10.39	10.47	10.43
MEAN	9.29	9.34	9.32
SUM FUNG	NONE	PR+CA+MA	MEAN
SOWDATE			
20 SEPT	8.98	8.98	8.98
18 OCT	9.61	9.70	9.65
MEAN	9.29	9.34	9.32
SUM FUNG	NONE	PR+CA+MA	MEAN
TOTAL N			
160	8.94	8.94	8.94
230	9.65	9.73	9.69
230	9.00	9./3	3.03
MEAN	9.29	9.34	9.32
SUM FUNG	NONE	PR+CA+MA	MEAN
N TIME			
EARLY	9.26	9.23	9.24
LATE	9.33	9.45	9.39
MEAN	9.29	9.34	9.32
SUM FUNG	NONE	PR+CA+MA	MEAN
GROWREG			
NONE	9.18	9.20	9.19
CHLORMEQ	9.41	9.47	9.44
MEAN	9.29	9.34	9.32
SUM FUNG	NONE	PR+CA+MA	MEAN
SPR FUNG			
NONE	9.06	9.18	9.12
BENOMYL	9.53	9.50	9.51
DENUMIL	9.53	9.50	9.31
MEAN	9.29	9.34	9.32

84/R/WW/3

GRAIN TONNES/HECTARE

PESTCIDE PREVCROP	NONE	AL+OM+PI	MEAN
	0.00		
BARLEY	8.29	8.11	8.20
OATS	10.12	10.74	10.43
MEAN	9.21	9.43	9.32
PESTCIDE	NONE	AL+OM+PI	MEAN
20 SEPT	8.87	9.08	8.98
18 OCT	9.54	9.77	9.65
10 001	3.34	9.//	9.00
MEAN	9.21	9.43	9.32
PESTCIDE	NONE	AL+OM+PI	MEAN
TOTAL N			
160	8.88	9.00	8.94
230	9.53	9.85	9.69
200	3.00	3.03	9.09
MEAN	9.21	9.43	9.32
PESTCIDE	NONE	AL+OM+PI	MEAN
N TIME			
EARLY	9.17	9.32	9.24
LATE	9.24	9.53	9.39
MEAN	9.21	9.43	9.32
PESTCIDE	NONE	AL+OM+PI	MEAN
GROWREG			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
NONE	9.10	9.28	9.19
CHLORMEQ	9.32	9.57	9.44
onconneq	3.32	9.37	9.44
MEAN	9.21	9.43	9.32
PESTCIDE	NONE	AL+OM+PI	MEAN
SPR FUNG			
NONE	8.92	9.31	9.12
BENOMYL	9.49	9.54	9.51
BEHOME	3.43	9.54	9.51
MEAN	9.21	9.43	9.32
PESTCIDE	NONE	AL+OM+PI	MEAN
SUM FUNG			
NONE	9.21	9.38	9.29
PR+CA+MA	9.20	9.47	9.34
VIIII	3.20	9.47	9.34
MEAN	9.21	9.43	9.32

GRAIN TONNES/HECTARE

INDEES OF	HEARIS			
SOWDATE TOTAL N	20 SEPT 160	230	18 OCT 160	230
PREVCROP BARLEY OATS	7.09 10.15	7.96 10.72		
SOWDATE	20 SEPT		18 OCT	
N TIME PREVCROP	EARLY	LATE	EARLY	LATE
BARLEY OATS	7.40 10.28			
TOTAL N N TIME PREVCROP	160 EARLY	LATE	230 EARLY	LATE
BARLEY OATS	7.90 10.10	7.70 10.06		8.86 10.93
TOTAL N N TIME	160 EARLY	LATE	230 EARLY	LATE
SOWDATE 20 SEPT 18 OCT	8.62 9.39	8.62 9.14		
SOWDATE	20 SEPT	7.14	18 OCT	10.19
GROWREG PREVCROP	NONE	CHLORMEQ		CHLORMEQ
BARLEY OATS	7.29 10.29			
TOTAL N GROWREG PREVCROP	160 NONE	CHLORMEQ	230 NONE	CHLORMEQ
BARLEY OATS	7.44 9.97			
TOTAL N GROWREG SOWDATE	160 NONE	CHLORMEQ	230 NONE	CHLORMEQ
20 SEPT 18 OCT	8.37 9.04	8.86 9.49	9.21 10.14	9.47 9.95
N TIME GROWREG PREVCROP	EARLY NONE	CHLORMEQ	LATE NONE	CHLORMEQ
BARLEY	8.05 10.27			
N TIME GROWREG SOWDATE	EARLY NONE	CHLORMEQ	LATE NONE	CHLORMEQ
20 SEPT 18 OCT	8.83 9.49		8.75 9.69	

GRAIN TONNES/HECTARE

N TIME GROWREG TOTAL N	EARLY NONE	CHLORMEQ	LATE NONE	CHLORMEQ
160 230	8.83 9.49	9.17 9.48		
SOWDATE SPR FUNG PREVCROP	20 SEPT NONE	BENOMYL	18 OCT NONE	BENOMYL
BARLEY OATS	7.16 10.27			
TOTAL N SPR FUNG PREVCROP	160 NONE	BENOMYL	230 NONE	
BARLEY OATS	7.40 9.99	8.20 10.17		8.80 10.88
TOTAL N SPR FUNG SOWDATE	160 NONE	BENOMYL	230 NONE	BENOMYL
20 SEPT 18 OCT	8.32 9.06	8.92 9.46		
N TIME SPR FUNG PREVCROP	EARLY NONE	BENOMYL	LATE NONE	BENOMYL
BARLEY OATS	7.80 10.26	8.45 10.47		8.55 10.59
N TIME SPR FUNG SOWDATE	EARLY NONE	BENOMYL	LATE NONE	BENOMYL
20 SEPT 18 OCT	8.59 9.47	9.10 9.82	8.85 9.57	9.38 9.76
N TIME SPR FUNG TOTAL N	EARLY NONE	BENOMYL	NONE.	BENOMYL
160 230	8.74 9.32	9.27 9.65	8.65 9.77	9.11 10.03
GROWREG SPR FUNG PREVCROP	NONE	BENOMYL	CHLORMEQ NONE	BENOMYL
BARLEY OATS	7.75 10.21	8.34 10.46	8.06 10.45	8.67 10.59
GROWREG SPR FUNG SOWDATE	NONE NONE	BENOMYL	CHLORMEQ NONE	BENOMYL
20 SEPT 18 OCT	8.48 9.48	9.09 9.71	8.95 9.56	9.38 9.88

GRAIN TONNES/HECTARE

GROWREG SPR FUNG	NONE NONE		CHLORMEQ NONE	BENOMYL
TOTAL N	0.46	0.05	0.00	0.42
160			8.92	
230	9.50	9.85	9.59	9.83
GROWREG	NONE		CHLORMEQ	
SPR FUNG		BENOMYL	NONE	BENOMYL
N TIME	HONL	BEHOME	HOHL	DENOMIL
EARLY	8.93	9.39	9.12	9.53
LATE	9.03	9.41		
LAIL	3.03	7.71	3.03	3.70
SOWDATE	20 SEPT		18 OCT	
SUM FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
PREVCROP				
BARLEY	7.49	7.56	8.91	8.85
OATS		10.40	10.31	10.54
TOTAL N	160		230	
SUM FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
PREVCROP				
BARLEY	7.81	7.79	8.60	8.62
OATS	10.07	10.09	10.71	10.85
TOTAL N	160		230	
SUM FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
SOWDATE				
20 SEPT	8.67	8.56		9.39
18 OCT	9.20	9.32	10.02	10.07
N TIME	EARLY		LATE	
SUM FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
PREVCROP				
BARLEY			8.24	
OATS	10.35	10.37	10.42	10.57
N TIME	EARLY		LATE	
SUM FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
SOWDATE				
20 SEPT	8.91			
18 OCT	9.61	9.69	9.61	9.71
N TIME	EARLY		LATE	
SUM FUNG		PR+CA+MA		PR+CA+MA
TOTAL N	HUNL	FRICAINA	HOHL	TIC TON TIM
160	9.07	8.94	8.81	8.95
230	9.45			
230	3.40	3.32	3.03	3.34
GROWREG	NONE		CHLORMEQ	
SUM FUNG		PR+CA+MA		PR+CA+MA
PREVCROP	HOILE			
BARLEY	8.09	8.00	8.31	8.41
OATS	10.27			
The same of the sa				

GRAIN TONNES/HECTARE

	WREG	NONE	PR+CA+MA	CHLORMEQ	DD+CV+WV
SOM	DATE				
	SEPT	8.81	8.77	9.15	9.18
18	OCT	9.55	8.77 9.63	9.67	9.77
	WREG	NONE		CHLORMEQ	
	FUNG AL N	NONE	PR+CA+MA	NONE	PR+CA+MA
101	160	8.82	8.59	9 05	0 20
	230	9.54	9.81	9.76	9 65
000					
	WREG	NONE	DD - 0.1 - WA	CHLORMEQ	
	FUNG TIME	NUNE	PR+CA+MA	NONE	PR+CA+MA
E	ARLY	9.16	9.16	9.35	9.30
	LATE	9.19	9.24	9.47	9.65
SPR	FUNG	NONE		BENOMYL	
	FUNG		PR+CA+MA	NONE	PR+CA+MA
	CROP				
	RLEY	7.87	7.94	8.53	8.47
	OATS	10.24	10.42	10.54	10.52
SPR	FUNG	NONE		BENOMYL	
	FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
	DATE				
	SEPT	8.59	8.84 9.52	9.36	9.11
18	OCT	9.52	9.52	9.70	9.88
SPR	FUNG	NONE		BENOMYL	
	FUNG	NONE	PR+CA+MA		PR+CA+MA
101	AL N 160	0 55	0.00	0.00	0.05
	230	9.56	8.83	9.32	9.05
	230	9.30	9.00	9./4	9.94
SPR	FUNG	NONE		BENOMYL	
	FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
	TIME				
	ARLY	8.98	9.07	9.53	9.39
	LATE	9.13	9.29	9.53	9.60
	FUNG	NONE	PR+CA+MA	BENOMYL	
	FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
	WREG				
	NONE	8.86	9.09	9.49	9.31
CHLU	RMEQ	9.25	9.26	9.57	9.69
		20 SEPT		18 OCT	
PEST		NONE	AL+OM+PI	NONE	AL+OM+PI
	CROP	7 60			
		7.69		8.89	
(DATS	10.06	10.81	10.18	10.67

GRAIN TONNES/HECTARE

TOTAL N PESTCIDE	160 NONE	AL+OM+PI	230 NONE	AL+OM+PI
PREVCROP BARLEY	8.00	7.60	8.59	8.63
OATS		10.40		
TOTAL N PESTCIDE SOWDATE	160 NONE	AL+OM+PI	230 NONE	AL+OM+PI
20 SEPT 18 OCT	8.61 9.15	8.62 9.37		9.54 10.17
N TIME PESTCIDE PREVCROP	EARLY NONE	AL+OM+PI	LATE NONE	AL+OM+PI
BARLEY	8.23 10.11	8.02 10.62		8.21 10.86
N TIME PESTCIDE SOWDATE	EARLY NONE	AL+OM+PI	LATE NONE	AL+OM+PI
20 SEPT 18 OCT	8.80 9.54	8.88 9.75		
N TIME PESTCIDE TOTAL N	EARLY NONE	AL+OM+PI	LATE NONE	AL+OM+PI
160 230	8.93 9.41			8.93 10.14
GROWREG PESTCIDE PREVCROP		AL+OM+PI	CHLORMEQ NONE	AL+OM+PI
BARLEY	8.18 10.01	7.90 10.66	8.41 10.23	
GROWREG PESTCIDE SOWDATE	NONE NONE	AL+OM+PI	CHLORMEQ NONE	AL+OM+PI
20 SEPT 18 OCT	8.67 9.52	8.91 9.66		
GROWREG PESTCIDE TOTAL N	NONE	AL+OM+PI	CHLORMEQ NONE	AL+OM+PI
160 230	8.70 9.49			
GROWREG PESTCIDE N TIME	NONE NONE	AL+OM+PI	CHLORMEQ NONE	AL+OM+PI
EARLY	9.13 9.06			

GRAIN TONNES/HECTARE

F	SPR FUNG PESTCIDE	NONE NONE	AL+OM+PI	BENOMYL NONE	AL+OM+PI
1	PREVCROP	7.86	7.95	8.73	8.28
	OATS	9.99	10.67	10.25	10.81
	SPR FUNG	NONE		BENOMYL	
F	SOWDATE	NONE	AL+OM+PI	NONE	AL+OM+PI
	20 SEPT	8.45	8.98 9.64	9.30	9.18
	18 OCT	9.39	9.64	9.68	9.90
	SPR FUNG	NONE		BENOMYL	
F	PESTCIDE TOTAL N	NONE	AL+OM+PI	NONE	AL+OM+PI
	160	8.67	8.72	9.09	9.28
	230	9.18	9.91	9.88	9.80
	SPR FUNG	NONE		BENOMYL	
P	PESTCIDE N TIME	NONE	AL+OM+PI	NONE	AL+OM+PI
	EARLY	8.84	9.21	9.50	9.42
	LATE		9.41		
	SPR FUNG	NONE		BENOMYL	
F	GROWREG	NONE	AL+OM+PI	NONE	AL+OM+PI
	NONE		9.16		
C	HLORMEQ		9.47		
	SUM FUNG	NONE		PR+CA+MA	
	PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
	BARLEY	8.40	8.00	8.19	8.22
	OATS	10.02	10.76	10.22	10.72
	UM FUNG	NONE		PR+CA+MA	
P	SOWDATE	NONE	AL+OM+PI	NONE	AL+OM+PI
	20 SEPT	8.96	9.00	8.79	9.16
	18 OCT	9.46	9.76	9.62	9.78
	SUM FUNG	NONE		PR+CA+MA	
	ESTCIDE TOTAL N	NONE	AL+OM+PI	NONE	AL+OM+PI
	160	8.90	8.98	8.87	9.02
	230	9.52	9.78	9.54	9.92
	UM FUNG	NONE		PR+CA+MA	
Р	ESTCIDE N TIME	NONE	AL+OM+PI	NONE	AL+OM+PI
	EARLY		9.34	9.16	
	LATE	9.23	9.42	9.25	9.65

84/R/WW/3

GRAIN TONNES/HECTARE

SUM FUNG			PR+CA+MA		
PESTCIDE GROWREG	à	AL+OM+PI		AL+01	
NONE CHLORME			9.03 9.38		9.37 9.57
SUM FUNG	NONE.		PR+CA+MA	1	
PESTCIDE SPR FUNG	NONE	AL+OM+PI		AL+01	M+PI
NONE	8.86				9.37
BENOMYL	9.55	9.51	9.42		9.57
SOWDATEX PRECROPX	20 SEPT	18 OCT	MEAN		
BARLEY	6.13	7.71	6.92		
OATS	8.76	9.20	8.98		
MEAN	7.45	8.46	7.95		
TOTAL NX PRECROPX	0	125	195	265	MEAN
BARLEY	2.63	7 73	7.61	0 73	6.92
OATS	4.33			1.59	8.98
MEAN	3.48	8.49	9.19 1	0.66	7.95
TOTAL NX SOWDATEX	0	125	195	265	MEAN
20 SEPT	3.32	7.58	8.85	0.04	7.45
18 OCT	3.64	9.39		1.27	8.46
MEAN	3.48	8.49	9.19 1	0.66	7.95
SOWDATE I PRECROPI	20 SEPT	18 OC	Г МЕ	AN	
BARLEY	8.11	9.6	2 8.	87	
OATS	10.62				
MEAN	9.37	10.4	1 9.	.89	
TOTAL NI PRECROPI	160	230	MEA	IN	
BARLEY	8.28	9.4	. 0	.87	
OATS	10.84				
MEAN	9.56	10.2	2 9.	.89	
TOTAL NI SOWDATEI	160	230	MEA	IN	
20 SEPT	8.93	9.8	0 0	.37	
18 OCT	10.18				
MEAN	9.56	10.2	2 9.	.89	

GRAIN TONNES/HECTARE

INDLES OF	MEANS		
N TIMEI PRECROPI	EARLY	LATE	MEAN
	9.04	0 60	0.07
BARLEY		8.69	8.87
OATS	10.89	10.93	10.91
MEAN	9.97	9.81	9.89
N TIMEI SOWDATEI	EARLY	LATE	MEAN
20 SEPT	9.64	9.10	9.37
18 OCT	10.29	10.53	10.41
MEAN	9.97	9.81	9.89
N TIMEI	EARLY	LATE	MEAN
TOTAL NI	LAKLI	LAIL	MEAN
160	9.73	9.38	9.56
230	10.20	10.24	10.22
MEAN	9.97	9.81	9.89
AUT NI	NONE	AUT N	MEAN
PRECROPI			
BARLEY	8.39	9.34	8.87
OATS	10.97	10.85	10.91
MEAN	9.68	10.10	9.89
AUT NI SOWDATEI	NONE	AUT N	MEAN
20 SEPT	9.42	9.31	9.37
18 OCT	9.94	10.89	10.41
10 001	3.34	10.09	10.41
MEAN	9.68	10.10	9.89
AUT NI TOTAL NI	NONE	AUT N	MEAN
	0.53	0.50	0.56
160	9.53	9.58	9.56
230	9.83	10.61	10.22
MEAN	9.68	10.10	9.89
AUT NI	NONE	AUT N	MEAN
N TIMEI			
EARLY	9.64	10.29	9.97
LATE	9.72	9.90	9.81
MEAN	9.68	10.10	9.89

GRAIN TONNES/HECTARE

	200000000000000000000000000000000000000		
N TIMEP	EARLY	LATE	MEAN
SOWDATEP			
20 SEPT	10.16	10.34	10.25
18 OCT	10.51	10.50	10.51
MEAN	10.33	10.42	10.38
GROWREGP	NONE	CHLORMEQ	MEAN
SOWDATEP		7 - 10 to 4 1 to 10 to 1	
20 SEPT	10.12	10.38	10.25
18 OCT	10.88	10.13	10.51
MEAN	10.50	10.25	10.38
GROWREGP	NONE	CHLORMEQ	MEAN
N TIMEP			
EARLY	10.55	10.12	10.33
LATE	10.45	10.39	10.42
MEAN	10.50	10.25	10.38
SPR FUNP	NONE	BENOMYL	MEAN
SOWDATEP			
20 SEPT	10.45	10.04	10.24
18 OCT	10.71	10.30	10.51
MEAN	10.58	10.17	10.38
SPR FUNP	NONE	BENOMYL	MEAN
N TIMEP			
EARLY	10.54	10.13	10.33
LATE	10.62	10.21	10.42
MCAA	10.50	10 17	10.00
MEAN	10.58	10.17	10.38
COD FUND	NONE	OFNOW	MEAN
SPR FUNP	NONE	BENOMYL	MEAN
GROWREGP	10 70	10.00	10.50
NONE	10.70	10.29	10.50
CHLORMEQ	10.46	10.05	10.25
MEAN	10.58	10 17	10 20
MEAN	10.50	10.17	10.38
EXTRA			
SE GREGX	10.89		
SL GREGX	11.51		
SE FAL	10.70		
SL FAL	11.51		
SE NONE F	7.27		
SL NONE F	8.55		
VEVIIE 1	0.00		
MEAN	10.50		

GRAIN TONNES/HECTARE

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

SED APPLY TO MAIN FACTORIAL PLOTS ONLY

MARGINS OF TWO FACTOR TABLES 0.093*
TWO FACTOR TABLES 0.143**
THREE FACTOR TABLES 0.203**

* NOT INCLUDING PREVCROP

** WITHIN THE SAME LEVEL OF PREVCROP ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM

DF

SE

CV%

BLOCK.WP

33

0.574

6.2

GRAIN MEAN DM% 87.1

WINTER WHEAT

SOIL COMPACTION AND YIELD

Object: To study the effects of disrupting a compact layer in a sandy soil on the physiology, growth and yield of winter wheat - Woburn, Butt Close III.

Sponsors: P.J. Welbank, F.V. Widdowson.

Associate sponsors: K.J. Parkinson, J.E. Leach, A.H. Weir, P.B. Barraclough.

Design: A single replicate of $2^5 + 12$ extra plots.

Whole plot dimensions: 2.75 x 14.8.

Treatments: All combinations of:-

Whole plots

1. CULTIVTN Cultivations:

WYE DIG Deep cultivation with Wye double-digger PLOUGH Normal cultivation with mouldboard plough

Sub plots

2. IRRIGATN Irrigation:

NONE None

FULL Full (175 mm) to lessen a deficit of 25 mm to 12.5 mm

3. WINTER N Amounts of nitrogen fertilizer applied on 30 Nov, 1983 and 31 Jan, 1984 (kg N) as urea:

0 35+35

4. SPRING N Amounts of nitrogen fertilizer applied in spring (kg N) as 'Nitro-Chalk':

115 185

5. N TIME Times of applying spring fertilizer:

EARLY All except 40 kg N on 8 Mar; remainder on 2 May LATE All except 40 kg N on 3 Apr; remainder on 15 May

plus all combinations of the following all given irrigation, winter nitrogen, and spring nitrogen timed early:-

Whole plots

1 CULTIVNX Cultivations:

WYE DIG Deep cultivations with Wye double-digger PLOUGH Normal cultivations with mouldboard plough

Sub plots

2. SPRNG NX Amounts of nitrogen fertilizer applied in spring (kg N) as 'Nitro-Chalk':

80 150 220

Plus 2 nil nitrogen plots (given irrigation) and 4 root sampling plots (given winter nitrogen and 185 kg N applied late)

EXTRA

WY NO I	Deep cultivation, irrigated
PL NO I	Normal cultivation, irrigated
RWY N5 I	Deep cultivation, irrigated
RWY N5 0	Deep cultivation
RPL N5 I	Normal cultivation, irrigated
RPL N5 0	Normal cultivation

NOTES: (1) Deep cultivation was done with the Wye double-digger which turned a furrow with a conventional plough share to a depth of 25 cm and at the same time rotary cultivated the bottom of the adjacent furrow, in this case to a further depth of 23 cm.

(2) Normal cultivation was by mouldboard plough to a depth of 20 cm.

Irrigation treatment was applied as follows (mm water):

4	May	12.5	10 July	12.5
8	May	25	11 July	12.5
10-11	May	25	20 July	25
17	May	12.5	31 July	12.5
21	June	12.5	1 Aug	12.5
22	June	12.5	3	
			Total	175

Basal applications: Manures: (0:18:36) at 310 kg. Weedkiller: Chlortoluron at 3.5 kg in 280 l. Fungicides: Triadimefon at 0.06 kg with carbendazim at 0.13 kg in 280 l on two occasions, with the pirimicarb on the second. Insecticide: Pirimicarb at 0.14 kg. Nematicide: Aldicarb at 5.4 kg.

Seed: Avalon, sown at 170 kg.

Cultivations, etc.:-

Cultivation treatments applied: 8-9 Sept, 1983. PK and nematicide applied, spring-tine cultivated: 19 Sept. Rotary cultivated, seed sown: 20 Sept. Weedkiller applied: 6 Oct. Fungicides applied: 4 May, 1984. Fungicides with insecticide applied: 27 June. Harvested by hand: 10 Aug. Previous crops: Oats 1982, potatoes 1983.

- NOTES: (1) Measurements were made of plant and shoot numbers, dry weight of tops and ears, leaf area and N contents during growth, photosynthetic rates, stomatal resistance and plant water potential.
 - (2) Measurements of soil water, soil water potential and soil temperature were made.
 - (3) Soil samples were taken at intervals for determinations of N content.
 - (4) Straw for yield was cut at ground level.

GRAIN TONNES/HECTARE

IRRIGATN CULTIVTN	NONE	FULL	MEAN
WYE DIG	9.63	9.51	9.57
PLOUGH	8.68	9.48	9.08
rLoodii	0.00	9.40	9.00
MEAN	9.15	9.49	9.32
WINTER N	0	35+35	MEAN
CULTIVTN			
WYE DIG	9.64	9.50	9.57
PLOUGH	8.97	9.19	9.08
MEAN	9.31	9.34	9.32
WINTER N	0	35+35	MEAN
IRRIGATN			
NONE	9.20	9.11	9.15
FULL	9.41	9.57	9.49
MEAN	9.31	9.34	9.32
SPRING N	115	185	MEAN
CULTIVTN			
WYE DIG	9.34	9.80	9.57
PLOUGH	8.62	9.54	9.08
MEAN	8.98	9.67	9.32
SPRING N	115	185	MEAN
IRRIGATN			
NONE	8.74	9.56	9.15
FULL	9.21	9.77	9.49
MEAN	8.98	9.67	9.32

84/W/WW/3

GRAIN TONNES/HECTARE

* TABLES OF	MEANS ***	**		
SPRING N	115	185	MEAN	
WINTER N			0.01	
0	8.84	9.77	9.31	
35+35	9.12	9.56	9.34	
MEAN	8.98	9.67	9.32	
N TIME	EARLY	LATE	MEAN	
CULTIVTN				
WYE DIG	9.42	9.72	9.57	
PLOUGH	8.57	9.59	9.08	
MEAN	8.99	9.65	9.32	
N TIME	EARLY	LATE	MEAN	
IRRIGATN	LINE	LATE	112/114	
	0.64	0 67	0.15	
NONE	8.64	9.67	9.15	
FULL	9.35	. 9.64	9.49	
MEAN	8.99	9.65	9.32	
N TIME WINTER N	EARLY	LATE	MEAN	
0	8.94	9.67	9.31	
35+35	9.04	9.64	9.34	
35+35	9.04	9.04	9.34	
MEAN	8.99	9.65	9.32	
N TIME SPRING N	EARLY	LATE	MEAN	
115	8.76	9.20	8.98	
185	9.23	10.11	9.67	
103	9.23	10.11	3.07	
MEAN	8.99	9.65	9.32	
IRRIGATN	NONE		FULL	
WINTER N	0	35+35	0	35+35
	U	33133	U	33133
CULTIVTN	0.00	0.66	0.00	0 00
WYE DIG	9.60	9.66	9.69	9.33
PLOUGH	8.79	8.56	9.14	9.81
IRRIGATN	NONE		FULL	
SPRING N	115	185	115	185
CULTIVTN				
WYE DIG	9.13	10.13	9.55	9.47
PLOUGH	8.36	9.00	8.88	10.07
	0.30	3.00		10.07
WINTER N	0		35+35	
SPRING N	115	185	115	185
CULTIVTN			7.5	
WYE DIG	9.20	10.09	9.48	9.51
PLOUGH	8.48	9.46	8.76	9.61
FLUUUN	0.40	7.40	0./0	9.01

GRAIN TONNES/HECTARE

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

WINTER N	0		35+35	
SPRING N	115	185	115	185
IRRIGATN				
NONE	8.69	9.70	8.80	9.42
FULL	8.99	9.84	9.44	9.71
IRRIGATN	NONE		FULL	
N TIME	EARLY	LATE	EARLY	LATE
CULTIVTN				
WYE DIG	9.50	9.76	9.34	9.68
PLOUGH	7.77	9.58	9.36	9.59
WINTER N	0		35+35	
N TIME	EARLY	LATE	EARLY	LATE
CULTIVTN				
WYE DIG	9.55	9.74	9.29	9.70
PLOUGH	8.34	9.60	8.80	9.58
WINTER N	0		35+35	
N TIME	EARLY	LATE	EARLY	LATE
IRRIGATN				
NONE	8.55	9.84	8.72	9.50
FULL	9.34	9.49	9.37	9.78
SPRING N	115		185	
N TIME	EARLY	LATE	EARLY	LATE
CULTIVTN				
WYE DIG	9.47	9.21	9.37	10.23
PLOUGH	8.05	9.18	9.08	9.99
SPRING N	115		185	
N TIME	EARLY	LATE	EARLY	LATE
IRRIGATN				
NONE	8.48	9.01	8.79	10.33
FULL	9.04	9.39	9.66	9.89
SPRING N	115		185	
N TIME	EARLY	LATE	EARLY	LATE
WINTER N				
0	8.63	9.04	9.25	10.29
35+35	8.89	9.35	9.20	9.93
SPRNG NX	80	150	220	MEAN
CULTIVNX				
WYE DIG	8.74	9.20	10.31	9.41
PLOUGH	9.55	10.73	10.14	10.14
MEAN	9.14	9.96	10.22	9.78

223

RWY N5 I 10.54

RWY N5 0 RPL N5 I RPL N5 0 MEAN

12.11

PL NO I 7.69

EXTRA

WY NO I

2.99

8.33

GRAIN TONNES/HECTARE

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

SED APPLY TO MAIN FACTORIAL PLOTS ONLY

MARGINS OF TWO FACTOR TABLES 0.236
TWO FACTOR TABLES 0.334
THREE FACTOR TABLES 0.472

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV% WP 6 0.668 7.2

GRAIN MEAN DM% 83.3

84/W/WW/3

1110220 01	TIET III O		
IRRIGATN CULTIVTN	NONE	FULL	MEAN
WYE DIG	11.95	12.66	12.30
PLOUGH	9.63	10.44	10.03
1 200011	3.00	2001.	2000
MEAN	10.79	11.55	11.17
WINTER N	0	35+35	MEAN
CULTIVTN			
WYE DIG	11.68	12.92	12.30
PLOUGH	9.49	10.58	10.03
MEAN	10.59	11.75	11.17
MEAN	10.59	11./5	11.1/
WINTER N	0	35+35	MEAN
IRRIGATN	Ü	55.55	112/11
NONE	10.50	11.09	10.79
FULL	10.68	12.42	11.55
1022	10.00	12.72	11.00
MEAN	10.59	11.75	11.17
SPRING N	115	185	MEAN
CULTIVTN			
WYE DIG	11.59	13.02	12.30
PLOUGH	9.79	10.28	10.03
	10.50	11 65	11 17
MEAN	10.69	11.65	11.17
SPRING N	115	185	MEAN
IRRIGATN	113	103	HEAR
NONE	10.63	10.95	10.79
FULL	10.74	12.35	11.55
1022	10.74	12.00	11.00
MEAN	10.69	11.65	11.17
SPRING N	115	185	MEAN
WINTER N		100 (100 (100 (100 (100 (100 (100 (100	
0	10.20	10.98	10.59
35+35	11.18	12.33	11.75
MEAN	10.00	11 65	11 17
MEAN	10.69	11.65	11.17
N TIME	EARLY	LATE	MEAN
	EAKLI	LAIL	MEAN
CULTIVTN WYE DIG	12.73	11.87	12.30
	9.81	10.26	10.03
PLOUGH	9.01	10.20	10.03
MEAN	11.27	11.07	11.17
PILAN	11061	11.07	2101/

STRAW TONNES/HECTARE

TABLES OF	HEARS			
N TIME IRRIGATN	EARLY	LATE	MEAN	
NONE	10.17	11.41	10.70	
FULL	12.37		10.79	
TOLL	12.37	10.72	11.55	
MEAN	11.27	11.07	11.17	
N TIME WINTER N	EARLY	LATE	MEAN	
0	10.65	10.53	10.59	
35+35	11.89	11.61	11.75	
		11.01	11./5	
MEAN	11.27	11.07	11.17	
N TIME SPRING N	EARLY	LATE	MEAN	
115	10.82	10.55	10.69	
185	11.72	11.58	11.65	
MEAN	11.27	11.07	11.17	
IRRIGATN	NONE		CIII I	
WINTER N	0	35+35	FULL	25.25
CULTIVTN	Ü	33733	0	35+35
WYE DIG	11.64	12.26	11.73	13.58
PLOUGH	9.35	9.92	9.62	11.25
IRRIGATN	NONE		CIII I	
SPRING N	115	185	FULL	105
CULTIVTN	113	100	115	185
WYE DIG	11.60	12.29	11.57	10 74
PLOUGH	9.66	9.61	9.91	13.74
	*****	3.01	3.31	10.96
WINTER N	0		35+35	
SPRING N	115	185	115	185
CULTIVTN				-00
WYE DIG	11.29	12.08	11.89	13.95
PLOUGH	9.10	9.87	10.47	10.70
WINTER N	0		35+35	
SPRING N	115	185	115	185
IRRIGATN		100	113	100
NONE	10.14	10.85	11.12	11.05
FULL	10.25	11.10	11.23	13.60
IRRIGATN	NONE		FULL	
N TIME	EARLY	LATE	EARLY	LATE
CULTIVTN				LAIL
WYE DIG	11.84	12.05	13.62	11.70
PLOUGH	8.49	10.78	11.13	9.74
				J 0 / T

84/W/WW/3

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

WINTER N	0		35+35	
N TIME	EARLY	LATE	EARLY	LATE
CULTIVTN	10.00			
WYE DIG	12.03	11.34	13.44	12.40
PLOUGH	9.27	9.71	10.35	10.81
WINTER N	0		35+35	
N TIME	EARLY	LATE	EARLY	LATE
IRRIGATN				
NONE	9.71	11.28	10.62	11.55
FULL	11.58	9.77	13.17	11.66
SPRING N	115		185	
N TIME	EARLY	LATE	EARLY	LATE
CULTIVTN				
WYE DIG	12.20	10.97	13.26	12.78
PLOUGH	9.43	10.14	10.18	10.38
SPRING N	115		185	
N TIME	EARLY	LATE	EARLY	LATE
IRRIGATN				
NONE	10.65	10.62	9.69	12.21
FULL	10.99	10.49	13.76	10.95
SPRING N	115		185	
N TIME	EARLY	LATE	EARLY	LATE
WINTER N				
0	10.50	9.89	10.79	11.16
35+35	11.13	11.22	12.66	12.00
SPRNG NX	80	150	220	MEAN
CULTIVNX				
WYE DIG	11.15	10.82	12.20	11.39
PLOUGH	12.87	13.34	12.11	12.77
MEAN	12.01	12.08	12.16	12.08

EXTRA WY NO I PL NO I RWY N5 I RWY N5 0 RPL N5 I RPL N5 0 MEAN 4.10 8.25 12.63 * 12.63 * 9.40

STRAW MEAN DM% 57.4

PLOT AREA HARVESTED 0.00392 (MEAN)

WINTER WHEAT

WEEDKILLER RATES

Object: To study the effects of weedkillers applied at different rates by electrostatic or hydraulic sprayers - Stackyard.

Sponsors: G.R. Cayley, D.C. Griffiths, B.J. Pye, P. Etheridge, G.C. Scott, F.T. Phillips.

Design: 4 randomised blocks of 8 plots.

Whole plot dimensions: 3.0×30.0 .

Treatments: All combinations of:-

1. SPRAYERS Spraying machine:

HYDRAUL Conventional hydraulic sprayer

ELECTRO Electrostatic sprayer

RATES Rates of isoproturon + mecroprop:

STANDARD Standard rate mecoprop at 2.0 1, isoproturon at 2.43 1 on

15 Nov, 1983

HALF Half above rate QUARTER Quarter above rate

plus one extra treatment:

EXTRA

NONE No weedkiller

NOTES: (1) The conventional hydraulic sprayer was tractor mounted and applied the weedkillers in 200 l.

(2) The electrostatic sprayer was also tractor mounted and had spinning cones charged at 30 kv and applied the weedkillers in 10 l.

Basal applications: Manures: 'Nitro-Chalk' at 750 kg. Fungicides:
Prochloraz at 0.40 kg and carbendazim at 0.15 kg in 250 l. Maneb at
1.6 kg, carbendazim at 0.15 kg and tridemorph at 0.38 kg with captafol
at 1.2 kg in 250 l. Insecticide: Pirimicarb at 0.14 kg in 200 l.

Seed: Avalon, sown at 170 kg.

Cultivations, etc.:- Ploughed: 31 Aug, 1983. Spring-tine cultivated twice, rotary harrowed, seed sown: 20 Sept. N applied: 9 Apr, 1984. Prochloraz and carbendazim applied: 25 Apr. Maneb, carbendazim, tridemorph and captafol applied: 12 June. Insecticide applied: 26 June. Combine harvested: 21 Aug. Previous crops: W. wheat 1982, w. beans 1983.

NOTE: Samples of volunteer beans, winter wheat crop, and weeds were taken immediately after spraying for analysis of weedkiller deposits. Weed counts were made in November 1983, and January, February and May 1984.

GRAIN TONNES/HECTARE

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

RATES	STANDARD	HALF	QUARTER	MEAN
SPRAYERS				
HYDRAUL	12.19	11.45	11.18	11.61
ELECTRO	11.77	11.14	10.80	11.24
MEAN	11.98	11.30	10.99	11 42

NONE

9.48

GRAND MEAN

11.15

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE

SPRAYERS RATES SPRAYERS

RATES & NONE

0.185 0.227

0.321

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM

DF

SE

CV%

BLOCK. WP

18 0.453 4.1

GRAIN MEAN DM% 87.5

WINTER WHEAT

CONTROL OF SLUGS

Object: To test seed treatments for the control of slugs in winter wheat - Pastures.

Sponsor: G.C. Scott.

Design: 4 randomised blocks of 9 plots.

Whole plot dimensions: 6.0×8.0 .

TREATMNT	Treatments to control slugs:
NONE	None
MET 2 SD	Methiocarb seed treatment, 0.2% ai/wt of seed
CAR 1 SD	Cartap seed treatment, 0.1% ai/wt of seed
CAR 2 SD	Cartap seed treatment, 0.2% ai/wt of seed
CAR2+MP	Cartap seed treatment, 0.2% ai/wt of seed + methiocarb pellets drilled with seed
JAP 1 SD	'JAP 1' seed treatment
JAP 2 SD	'JAP 2' seed treatment
MET PDR	Methiocarb pellets drilled with seed
MET PBC	Methiocarb pellets broadcast on 7 Oct, 1983, pre-drilling

Basal applications: Manures: 'Nitro-Chalk' at 750 kg. Weedkillers: Glyphosate at 1.4 kg in 250 l. Chlortoluron at 3.5 kg in 250 l. Mecoprop (as 'CMPP' at 4.2 l) in 250 l. Fungicides: Maneb at 1.6 kg and zineb at 0.17 kg in 250 l with prochloraz at 0.4 kg. Insecticide: Pirimicarb at 0.14 kg in 500 l.

Seed: Norman, sown at 200 kg.

Cultivations, etc.:- Glyphosate applied: 1 Sept, 1983. Heavy spring-tine cultivated twice: 27 Sept. Disced twice: 30 Sept. Rotary harrowed, seed sown: 19 Oct. Chlortoluron applied: 21 Oct. N applied: 9 Apr, 1984. Mecoprop applied: 18 Apr. Fungicides applied: 19 June. Insecticide applied: 28 June. Combine harvested: 22 Aug. Previous crops: Grass/clover ley 1982 and 1983.

NOTE: Slug counts were made before and after drilling. Samples were taken in November for assessment of slug damage to seeds.

GRAIN TONNES/HECTARE

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

TREATMNT		
NONE	12.50	
MET 2 SD	13.62	
CAR 1 SD	12.24	
CAR 2 SD	12.53	
CAR2+MP	12.62	
JAP 1 SD	12.76	
JAP 2 SD	12.61	
MET PDR	12.26	
MET PBC	12.75	
MEAN	12.65	

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE TREATMNT
SED 0.624

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 24
 0.883
 7.0

GRAIN MEAN DM% 86.4

WINTER WHEAT

SEED DRESSINGS AND TAKE-ALL

Object: To study the effects of seed treatments on the incidence of takeall and on the yield of early-sown winter wheat - Gt. Knott I.

Sponsor: G.L. Bateman.

Design: 4 randomised blocks of 6 plots.

Whole plot dimensions: 3.0×12.0 .

Treatments: All combinations of:-

SOWDATE

Dates of sowing:

8 SEPT

8 September, 1983

7 OCT

7 October

2. SEED DR

Seed dressings:

NONE

None

TRIADIME

Triadimenol at 0.5 g/kg of seed plus fuberidazole at

0.06 g/kg of seed

UKO 82F

'UKO 82 f' at 2.75 ml/kg of seed

Basal applications: Manures: Muriate of potash at 420 kg. 'Nitro-Chalk' on three occasions, at 130 kg on the first, at 150 kg on the second and at 460 kg on the third. Weedkillers: Isoproturon at 2.5 kg with bromoxynil and ioxynil (as 'Deloxil' at 2.0 l) in 250 l. Dicamba with mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 250 l applied with the prochloraz and carbendazim. Fungicides: Prochloraz at 0.4 kg with carbendazim at 0.15 kg. Maneb at 1.6 kg with tridemorph at 0.38 kg and carbendazim at 0.15 kg in 250 l. Insecticide: Pirimicarb at 0.14 kg in 250 l.

Seed: Aquila, sown at 170 kg.

Cultivations, etc.:- Heavy spring-tine cultivated: 3 Sept, 1983. Muriate of potash and first N applied: 7 Sept. All plots heavy spring-tine cultivated twice, early-sown plots rotary harrowed and seed sown: 8 Sept. Late-sown plots rotary harrowed and seed sown: 7 Oct. Isoproturon with 'Deloxil' applied: 1 Dec. Second N applied: 16 Feb, 1984. Third N applied: 11 Apr. 'Herrisol' with prochloraz and carbendazim applied: 17 Apr. Maneb, carbendazim and tridemorph applied: 13 June. Insecticide applied: 27 June. Combine harvested: 22 Aug. Previous crops: W. wheat 1982 and 1983.

NOTE: Take-all and mildew assessments were made twice during the autumn. Take-all and foot rots were assessed in March, May and June.

GRAIN TONNES/HECTARE

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

SEED DR SOWDATE	NONE	TRIADIME	UKO 82F	MEAN
8 SEPT	5.72	8.44	6.93	7.03
7 OCT	7.43	7.75	7.89	7.69
MEAN	6.57	8.09	7.41	7.36

**** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SOWDATE	SEED DR	SOWDATE SEED DR
SED	0.378	0.463	0.655

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%
BLOCK.WP 15 0.926 12.6

GRAIN MEAN DM% 86.2

WINTER WHEAT

APHID CONTROL BY ERYNIA

Object: To study the effect on caged and uncaged aphid populations of applying two amounts of the aphid pathogenic fungus Erynia neoaphidis on the incidence of aphids and on the yield of w. wheat - Long Hoos V 4.

Sponsor: N. Wilding.

Design: 3 randomised blocks of 6 plots.

Whole plot dimensions: 2.14 x 2.0.

Treatments: All combinations of:-

1. COVER Covering on plots:

NONE None

CAGED Mesh-sided cages covering plots from 18 May, 1984 to

29 June.

2. INOCULUM Rate of inoculum:

NONE None

E NEO 1 E. neoaphidis applied as a powder of mummified aphids at

0.5 kg on 17 June and 4 July

E NEO 2 E. neoaphidis applied as a powder of mummified aphids at

5.0 kg on 17 June and 4 July

Note: Sitobion avenae and Metopolophium dirhodum were released on all plots, during a ten-day period from the end of May.

Basal applications: Manures: Chalk at 2.9 t. 'Nitro-Chalk' at 450 kg. Weedkillers: Glyphosate at 1.4 kg in 250 l. Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 220 l applied with the fungicide. Fungicide: Triadimefon at 0.12 kg in 220 l on two occasions, the first with the 'Brittox'. Insecticide: Pyrethrum dust (as 'Anti-ant' at 116 kg).

Seed: Maris Huntsman, sown at 190 kg.

Cultivations, etc.:- Glyphosate applied: 18 Aug, 1983. Chalk applied: 23 Aug. Ploughed: 31 Aug. Spring-tine cultivated, seed sown: 5 Oct. 'Brittox' with the fungicide applied, N applied: 10 Apr, 1984. Fungicide alone applied: 4 May. Pyrethrum applied: 21 May. Combine harvested: 22 Aug. Previous crops: Fallow 1982, w. rape 1983.

NOTE: Samples of live aphids were taken weekly from mid June until late July to determine proportions infected with Erynia, and the total population was estimated weekly.

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

INOCULUM	NONE	E NEO 1	E NEO 2	MEAN
COVER				
NONE	7.00	6.88	7.07	6.98
CAGED	4.04	3.61	3.79	3.82
MEAN	5.52	5.24	5.43	5.40

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	INOCULUM	COVER	I NOCULUM COVER
SED	0.232	0.190	0.328

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 10 0.402 7.5

GRAIN MEAN DM% 86.9

WINTER WHEAT

PERSISTENCE OF APHICIDES

Object: To examine the persistence of aphicides applied at two growth stages and their effect on the yield of winter wheat - Bones Close.

Sponsors: N. Carter.

Design: 4 randomised blocks of 12 plots.

Whole plot dimensions: 3.0×13.0 .

Treatments: All combinations of:-

1. APHICIDE Aphicides:

DELTAMET Deltamethrin at 0.012 kg
DEMETON Demeton-S-methyl at 0.24 kg
PIRIM ST Pirimicarb (standard formulation) at 0.14 kg

PIRIM NF Pirimicarb (new formulation) at 0.14 kg
PIRIM EN Pirimicarb (encapsulated) at 0.14 kg

2. APH TIME Timing of aphicides:

GS 45 Booting, growth stage 45 on 4 June, 1984, repeated on 12 June

Flowering, growth stage 65 on 25 June

Plus one extra treatment:

EXTRA

GS 65

NONE No aphicide (duplicated)

NOTE: Aphicide treatments were applied in 220 1 on 4 June and in 200 1 on 12 June and 25 June.

Basal applications:

Manures: (5:14:30) at 340 kg. 'Nitro-Chalk' at 560 kg. Weedkillers: Isoproturon at 2.5 kg with mecoprop (as 'CMPP' at 3.6 l) in 250 l. Fungicides: Propiconazole on two occasions, at 0.25 kg in 250 l on the first occasion, at 0.12 kg in 200 l on the second.

Seed: Stetson, sown at 170 kg.

Cultivations, etc.:-

Ploughed: 23 Aug, 1983. Spring-tine cultivated: 20 Sept. NPK applied: 28 Sept. Rotary harrowed, seed sown: 17 Oct. Weedkillers applied: 1 Dec. N applied: 10 Apr, 1984. Fungicide applied: 4 June, 29 June. Combine harvested: 20 Aug. Previous crops: W. barley 1982, w. rape 1983.

NOTE: Aphicide persistence was bioassayed, using Sitobion avenae, on the day after spraying and at weekly intervals for three weeks thereafter. Naturally occuring aphids were counted during this period.

GRAIN TONNES/HECTARE

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

APHICIDE APH TIME	DELTAMET	DEMETON	PIRIM ST	PIRIM NF	PIRIM EN	MEAN
GS 45 GS 65	11.41 11.35	11.57 11.33	10.85 11.39	11.32 11.48	11.47 11.51	11.32 11.41
MEAN	11.38	11.45	11.12	11.40	11.49	11.37

NONE 10.89

GRAND MEAN 11.29

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE APH TIME APHICIDE APH TIME APHICIDE

SED 0.082 0.130 0.184

SED FOR COMPARING EXTRA NONE WITH ANY ITEM IN APHICIDE.APH TIME TABLE IS 0.159

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 34 0.260 2.3

GRAIN MEAN DM% 87.8

WINTER WHEAT

ELECTROSTATIC APPLICATION OF POST-EMERGENCE WEEDKILLER

Object: To study the effects of post-emergence weedkiller applied by charged rotary atomisers on weed survival and on the yield of winter wheat - Claycroft.

Sponsor: G.R. Cayley, P. Etheridge, D.C. Griffiths, B.J. Pye, G.C. Scott.

Design: 4 randomised blocks of 7 plots.

Whole plot dimensions: 3.0×10.0 .

Treatments: All combinations of:-

SPRAYER Spraying machines:

HYDRAUL Conventional hydraulic sprayer in 200 l
ELECT J 'Jumbo' electrostatic in 8 l
ELECT M 'Micronex' electrostatic in 9.3 l

ISOPRATE Rates of isoproturon applied 1 Mar, 1984:

1.05 Half standard rate 2.10 Standard rate

plus one extra treatment:

EXTRA

NONE No weedkiller

NOTE: The 'Jumbo' electrostatic sprayer has electrostatically charged spinning cone nozzles, the 'Micronex' is a commercial prototype with electrostatically charged spinning disc nozzles.

Basal applications: Manures: 'Nitro-Chalk' on two occasions, at 130 kg on the first and at 750 kg on the second. Weedkiller: Paraquat at 0.42 kg ion in 250 l. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg in 250 l. Maneb at 1.6 kg and zineb at 0.17 kg with prochloraz at 0.4 kg in 500 l. Insecticide: Pirimicarb at 0.14 kg in 200 l.

Seed: Avalon, sown at 170 kg.

Cultivations, etc.:- Heavy spring-tine cultivated: 12 Sept, 1983.

Weedkiller applied: 20 Sept. First N applied: 26 Sept. Heavy spring-tine cultivated, rotary harrowed, seed sown: 27 Sept. Second N applied: 9 Apr, 1984. Prochloraz and carbendazim applied: 25 Apr. Maneb, zineb and prochloraz applied: 14 June. Insecticide applied: 27 June. Combine harvested: 22 Aug. Previous crops: S. beans 1982, s. wheat 1983.

NOTE: Crop and weed samples were taken immediately after spraying to assess weedkiller deposits. Weeds were assessed in April.

GRAIN TONNES/HECTARE

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

SPRAYER	HYDRAUL	ELECT J	ELECT M	MEAN
ISOPRATE				
1.05	10.15	9.54	8.78	9.49
2.10	10.75	10.26	10.58	10.53
MEAN	10.45	9.90	9.68	10.01

NONE 8.51

GRAND MEAN 9.79

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	ISOPRATE	SPRAYER	ISOPRATE SPRAYER
SED	0.209	0.256	0.362

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 18 0.512 5.2

GRAIN MEAN DM% 86.6

WINTER WHEAT

CHLORIDE AND TAKE-ALL

Object: To study the effects of different spring nitrogen top dressings, that include chloride and ammonium ions, on the incidence of take-all and on the yield of winter wheat - Gt. Knott I.

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

Design: 4 randomised blocks of 4 plots.

Whole plot dimensions: 3.0×12.0 .

Treatments:

SPRING N

Spring nitrogen, 40 kg N on 9 March, 1984; 160 kg N on

16 April:

AMM CHL

Ammonium chloride

AMM NIT

Ammonium nitrate as 'Nitro-Chalk'

AMM SUL Ammonium sulphate

UREA Urea

Basal applications: Manures: Muriate of potash at 410 kg. 'Nitro-Chalk' at 130 kg. Weedkillers: Isoproturon at 2.5 kg with bromoxynil and ioxynil (as 'Deloxil' at 1.0 l) in 250 l. Dicamba, mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 250 l applied with the prochloraz and carbendazim. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg. Maneb at 1.6 kg with carbendazim at 0.15 kg and tridemorph at 0.38 kg in 250 l. Insecticide: Pirimicarb at 0.14 kg in 250 l.

Seed: Longbow, sown at 170 kg.

Cultivations, etc.:- Disced: 3 Sept, 1983. Basal N and K applied: 7 Sept. Rotary harrowed, seed sown: 11 Oct. Isoproturon with 'Deloxil' applied: 30 Nov. 'Herrisol' with prochloraz and carbendazim applied: 17 Apr, 1984. Maneb with carbendazim and tridemorph applied: 13 June. Insecticide applied: 27 June. Combine harvested: 22 Aug. Previous crops: W. wheat 1982 and 1983.

NOTE: Take-all assessments were made monthly from early March to late June and foot rot assessments were made in June.

GRAIN TONNES/HECTARE

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

SPRING N AMM CHL AMM NIT AMM SUL UREA MEAN 7.92 8.59 8.25 8.33 8.27

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE TREATMNT

SED 0.453

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 11 0.641 7.8

GRAIN MEAN DM% 88.0

WINTER BARLEY

FACTORS LIMITING YIELD

Object: To study the importance of factors that may limit the yield of early-sown winter barley - Pastures.

Sponsors: F.V. Widdowson, R.J. Darby, R.J. Gutteridge, J.F. Jenkyn, B.R. Kerry, D.W. Lawlor, R.T. Plumb, G.J.S. Ross, G.C. Scott. D.W. Wood.

Design: Half replicate of 2^6 x 2 (E FUNG) arranged in 2 blocks of 32 plots + 10 extra plots in each block.

Whole plot dimensions: 3.0 x 15.2.

Treatments: Combinations of the following treatments, all variety Panda following a previous barley crop:-

1. SEEDRATE Seed rate (seeds per m2):

300 450

2. WINTER N Rates of nitrogen fertilizer in winter (kg N) as prilled urea (46% N):

0 None 30+30 30 on 9 Nov, 1983, 30 on 1 Feb, 1984

3. SPRING N Rates of nitrogen fertilizer in spring (kg N) as 'Nitro-Chalk' on 2 Apr:

90 150

4. E FUNG Early fungicides:

NONE

TFSD Triadimenol and fuberidazole seed dressing

5. L FUNG Late fungicides:

NONE None

TR+CA+MA Tridemorph at 0.52 kg in 220 l on 10 Feb, 1984.

Carbendazim at 0.25 kg with prochloraz at 0.39 kg in 220 1 on 27 Mar. Carbendazim at 0.15 kg with maneb at 1.6 kg and tridemorph at 0.038 kg in 220 l on

1 May and 21 May

6. GRTH REG Growth regulator:

NONE

CHLORMEQ Chlormequat applied at GS 13, 24, 30, at 0.52 kg in

220 1 on 21 Oct, 1983, 29 Nov, 21 Mar. 1984

7. INSCTCDE

Insecticide:

NONE

None

CY Cypermethrin at 0.02 kg in 220 1 on 28 Oct, 1983

plus 8 extra treatments with variety Panda sown at 300 seeds per m2 and given cypermethrin, late fungicides, no chlormequat and all combinations of the following: -

1. PRECROPX

Previous cropping:

OATS FALLOW

2. N DIVX

Division of nitrogen fertilizer (kg N):

30+30+90

30 on 9 Nov, 1983, 30 on 1 Feb, 1984 (both as prilled

urea) plus 90 as 'Nitro-Chalk' on 2 Apr

150

150 as 'Nitro-Chalk' on 2 Apr

3. E FUNGX

Early fungicide:

NONE

TFSD

Triadimenol and fuberidazole seed dressing

plus 8 extra treatments with variety Pirate sown at 300 seeds per m2 and given cypermethrin, late fungicides, no chlormequat and all combinations of the following:-

1. PRECROPY

Previous cropping:

BARLEY OATS

2. N DIVV

Division of nitrogen fertilizer (kg N):

30+30+90

30 on 9 Nov, 1983, 30 on 1 Feb, 1984 (both as prilled urea) plus 90 as 'Nitro-Chalk' on 2 Apr 150 as 'Nitro-Chalk' on 2 Apr

150 3. E FUNGV

Early fungicide:

NONE

None

TFSD

Triadimenol and fuberidazole seed dressing

plus 2 extra treatments following previous barley, with variety Panda and given no nitrogen fertilizer or chlormequat but given early fungicide, late fungicide and cypermethrin.

EXTRA NO

Seed sown at 300 seeds per m_2^2 (duplicated) Seed sown at 450 seeds per m_2^2 (duplicated) SD 300 SD 450

Basal applications: Manures: (0:18:36) at 280 kg. Weedkillers: Paraquat at 0.42 kg ion in 250 l on two occasions. Methabenzthiazuron at 2.4 kg in 250 l. Growth regulator: Mepiquat chloride with ethephon (as 'Terpal' at 2.8 l) in 220 l.

Cultivations, etc.:- Heavy spring-tine cultivated: 22 Aug, 1983. PK applied: 23 Aug. Heavy spring-tine cultivated: 7 Sept. First paraquat applied: 13 Sept. Second paraquat applied, rotary harrowed, seed sown: 19 Sept. Methabenzthiazuron applied: 24 Sept. Basal growth regulator applied: 25 Apr, 1984. Combine harvested: 26 July.

NOTES: (1) Samples were taken at the end of February, March and May for measurements of dry weight, shoot numbers, leaf area index and percentage N. Soil samples were taken in October 1983, November and February 1984, for amounts of nitrate and ammonium.

and February 1984, for amounts of nitrate and ammonium.

(2) Measurements were made of leaf diseases, take-all, eyespot, and barley yellow dwarf virus. Counts were made of aphids, and plants examined for stem borers.

(3) A cage was erected over the crop from late May to maturity to prevent damage by birds.

GRAIN TONNES/HECTARE

WINTER N SEEDRATE	0	30+30	MEAN
300	8.92	9.27	9.09
450	9.02	9.13	9.07
430	3.02	3.13	3.07
MEAN	8.97	9.20	9.08
5 5000	NONE	7500	
E FUNG	NONE	TFSD	MEAN
SEEDRATE			
300	9.03	9.16	9.09
450	8.89	9.26	9.07
MEAN	8.96	9.21	9.08
E FUNG	NONE	TFSD	MEAN
WINTER N	NONE	11.20	MEAN
	0.05	0 10	0.07
0	8.85	9.10	8.97
30+30	9.07	9.32	9.20
MEAN	8.96	9.21	9.08
	0.50	****	3.00
L FUNG	NONE	TR+CA+MA	MEAN
SEEDRATE			.,
300	8.89	9.29	9.09
450	8.68	9.46	9.07
430	0.00	9.40	3.07
MEAN	8.79	9.38	9.08

84/R/B/1 GRAIN TONNES/HECTARE

L FUNG WINTER N	NONE	TR+CA+MA	MEAN
0	8.69	9.25	8.97
30+30	8.88	9.51	9.20
MEAN	8.79	9.38	9.08
L FUNG E FUNG	NONE	TR+CA+MA	MEAN
NONE	8.69	9.23	8.96
TFSD	8.89	9.53	9.21
MEAN	8.79	9.38	9.08
SPRING N SEEDRATE	90	150	MEAN
300	8.89	0.20	0.00
450		9.30	9.09
450	8.87	9.28	9.07
MEAN	8.88	9.29	9.08
SPRING N WINTER N	90	150	MEAN
0	8.70	9.25	8.97
30+30	9.06	9.33	9.20
MEAN	8.88	9.29	9.08
SPRING N E FUNG	90	150	MEAN
NONE	8.69	9.22	8.96
TFSD	9.06	9.36	9.21
MEAN	8.88	9.29	9.08
SPRING N L FUNG	90	150	MEAN
NONE	8.62	8.96	8.79
TR+CA+MA	9.14	9.62	9.38
MEAN	8.88	9.29	9.08
INSCTCDE SEEDRATE	NONE	CY	MEAN
300	9.06	9.13	9.09
450	9.05	9.10	9.07
MEAN	9.06	9.11	9.08

84/R/B/1

GRAIN TONNES/HECTARE

*** IABLES OF	MEANS *	***	
INSCTCDE	NONE	CY	MEAN
WINTER N			
0	9.01	8.94	8.97
30+30	9.11	9.29	9.20
MEAN	9.06	9.11	9.08
INSCTCDE E FUNG	NONE	CY	MEAN
NONE	8.93	8.98	0 06
TFSD	9.18		8.96
11.20	9.18	9.24	9.21
MEAN	9.06	9.11	9.08
INSCTCDE	NONE	CY	MEAN
L FUNG			
NONE	8.77	8.81	8.79
TR+CA+MA	9.34	9.42	9.38
MEAN	9.06	9.11	9.08
INSCTCDE	NONE	CY	MEAN
SPRING N			
90	8.83	8.92	8.88
150	9.28	9.30	9.29
MEAN	9.06	9.11	9.08
GRTH REG	NONE	CHLORMEQ	MEAN
SEEDRATE			
300	9.01	9.18	9.09
450	9.07	9.08	9.07
MEAN	9.04	9.13	9.08
GRTH REG WINTER N	NONE	CHLORMEQ	MEAN
0	8.90	0.05	0.07
30+30	9.18	9.05 9.21	8.97 9.20
			9.20
MEAN	9.04	9.13	9.08
GRTH REG	NONE	CHLORMEQ	MEAN
E FUNG			
			8.96
TFSD	9.18	9.24	9.21
MEAN	9.04	9.13	9.08
NONE TFSD MEAN	8.90 9.18 9.04	9.01 9.24 9.13	9.21

GRAIN TONNES/HECTARE

GRTH REG	NONE	CHLORMEQ	MEAN
L FUNG			
NONE	8.74	8.84	8.79
TR+CA+MA	9.34	9.42	9.38
MEAN	9.04	9.13	9.08
GRTH REG	NONE	CHLORMEQ	MEAN
SPRING N			
90	8.85	8.90	8.88
150	9.23	9.35	9.29
MEAN	9.04	9.13	9.08
GRTH REG	NONE	CHLORMEQ	MEAN
INSCTCDE			
NONE	9.06	9.05	9.06
CY	9.02	9.21	9.11
01			J.11
MEAN	9.04	9.13	9.08
N DIVX	30+30+90	150	MEAN
PRECROPX			
OATS	9.30	9.89	9.59
FALLOW	8.56	8.54	8.55
MEAN	8.93	9.22	9.07
E FUNGX	NONE	TFSD	MEAN
PRECROPX	HOHE	11.00	HEAT
OATS	9.40	9.79	9.59
FALLOW	8.46	8.64	8.55
FALLOW	0.40	0.04	0.55
MEAN	8.93	9.22	9.07
E FUNGX	NONE	TFSD	MEAN
N DIVX			
30+30+90	8.76	9.10	8.93
150	9.10	9.34	9.22
MEAN	8.93	9.22	9.07
	E FUN	GX NONE	TFSD
PRECROPX	N DI		11.30
OATS	30+30+		0 52
UNIS			9.52
541.00		50 9.72	10.06
FALLOW	30+30+		8.67
	1	50 8.47	8.61

GRAIN TONNES/HECTARE

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

N DIVV	30+30+90	150	MEAN
PRECROPV			
BARLEY	10.89	10.22	10.56
OATS	11.04	10.60	10.82
		2000	10.01
MEAN	10.97	10.41	10.69
E FUNGV	NONE	TFSD	MEAN
PRECROPV			
BARLEY	10.55	10.57	10.56
OATS	10.63	11.01	10.82
OATS	10.03	11.01	10.02
MEAN	10.59	10.79	10.69
E FUNGV	NONE	TFSD	MEAN
N DIVV			
30+30+90	10.73	11.20	10.97
150	10.44	10.37	10.41
100	20011	10.07	10.41
MEAN	10.59	10.79	10.69
	E FUNGV	NONE	TFSD
PRECROPY	N DIVV	110112	11 35
BARLEY	30+30+90	10.82	10.97
DANLLI	150	10.02	
OATC			
OATS	30+30+90		
	150	10.61	10.58
EXTRA NO	SD 300 SD	450	MEAN
LAIRA NO			MEAN
	0.95	6.81	6.88

GRAND MEAN 9.13

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

(NOT INCLUDING EXTRA PLOTS)
MARGIN OF TWO FACTOR TABLES 0.065
TWO FACTOR TABLES 0.093

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 34
 0.262
 2.9

GRAIN MEAN DM% 86.2

84/R/B/1

WINTER N	0	30+30	MEAN
SEEDRATE			
300	5.01	5.79	5.40
450	4.97	5.76	5.36
MEAN	4.99	5.78	5.38
E FUNG SEEDRATE	NONE	TFSD	MEAN
300	5.42	5.38	5.40
450	5.25		
450	3.23	5.48	5.36
MEAN	5.33	5.43	5.38
E FUNG	NONE	TFSD	MEAN
WINTER N			
0	4.94	5.04	4.99
30+30	5.73	5.82	5.78
	0.,0	3.02	3.70
MEAN	5.33	5.43	5.38
L FUNG	NONE	TR+CA+MA	MEAN
SEEDRATE			
300	5.38	5.43	5.40
450	5.25	5.48	5.36
MEAN	5.31	5.45	5.38
L FUNG	NONE	TDACAAMA	MEAN
	NONE	TR+CA+MA	MEAN
WINTER N	4 00	5.00	
0	4.90	5.08	4.99
30+30	5.73	5.82	5.78
MEAN	5.31	5.45	5.38
L FUNG	NONE	TR+CA+MA	MEAN
E FUNG			rierui
NONE	5.28	5.39	5.33
TFSD			
11-20	5.34	5.52	5.43
MEAN	5.31	5.45	5.38
SPRING N	90	150	MEAN
SEEDRATE			
300	5.21	5.59	5.40
450	5.18	5.55	5.36
400		5.55	3.30
MEAN	5.20	5.57	5.38

84/R/B/1

	112/1110		
SPRING N WINTER N	90	150	MEAN
WINIER N	4.73	5.25	4.99
30+30	5.66	5.89	5.78
MEAN	5.20	5.57	5.38
SPRING N E FUNG	90	150	MEAN
NONE	5.09	5.58	5.33
TFSD	5.31	5.56	5.43
MEAN	5.20	5.57	5.38
SPRING N L FUNG	90	150	MEAN
NONE	5.15	5.47	5.31
TR+CA+MA	5.24	5.67	5.45
MEAN	5.20	5.57	5.38
INSCTCDE	NONE	CY	MEAN
SEEDRATE 300	5.32	5.48	5.40
450	5.36	5.37	5.36
MEAN	5.34	5.42	5.38
INSCTCDE WINTER N	NONE	CY	MEAN
0	4.98	5.01	4.99
30+30	5.71	5.84	5.78
MEAN	5.34	5.42	5.38
INSCTCDE	NONE	CY	MEAN
E FUNG NONE	5.27	F 40	F 22
TFSD	5.42	5.40 5.45	5.33 5.43
MEAN	5.34	5.42	5.38
INSCTCDE	NONE	CY	MEAN
L FUNG	F 04	F 20	r 01
NONE	5.24	5.38	5.31
TR+CA+MA	5.44	5.47	5.45
MEAN	5.34	5.42	5.38

84/R/B/1

" INDLES OF	MEANS ""		
INSCTCDE	NONE	CY	MEAN
SPRING N			
90	5.20	5.19	5.20
150	5.49	5.65	5.57
150	3.43	5.05	3.3/
MEAN	5.34	5.42	5.38
GRTH REG SEEDRATE	NONE	CHLORMEQ	MEAN
300	5.44	5.36	5.40
450			
450	5.38	5.35	5.36
MEAN	5.41	5.35	5.38
GRTH REG	NONE	CHLORMEQ	MEAN
WINTER N			
0	5.02	4.96	4.99
30+30	5.80	5.75	
30+30	3.00	5./5	5.78
MEAN	5.41	5.35	5.38
GRTH REG	NONE	CHLORMEQ	MEAN
E FUNG			,,,,,,,,,
NONE	5.27	5.39	5.33
TFSD	5.55	5.32	
1120	5.55	5.32	5.43
MEAN	5.41	5.35	5.38
GRTH REG	NONE	CHLORMEQ	MEAN
L FUNG		OHLOHITLQ	HEMI
NONE	5.36	5.26	5.31
TR+CA+MA	5.46	5.45	5.45
MEAN	5.41	5.35	5.38
GRTH REG SPRING N	NONE	CHLORMEQ	MEAN
	F 04	F 15	
90	5.24	5.15	
150	5.58	5.56	5.57
MEAN	5.41	5.35	5.38
GRTH REG	NONE	CHLORMEQ	MEAN
INSCTCDE			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
NONE	5.37	5.31	5.34
CY	5.45	5.39	5.42
MEAN	5.41	5.35	5.38

84/R/B/1

STRAW TONNES/HECTARE

**** TABLES OF MEANS ****

	, rieraro		
N DIVX	30+30+90	150	MEAN
PRECROPX			
OATS	5.69	5.63	5.66
FALLOW	7.44	7.57	7.51
	7.41	7.37	7.31
MEAN	6.57	6.60	6.59
E FUNCY	NONE	TECO	
E FUNGX	NONE	TFSD	MEAN
PRECROPX			
OATS	5.51	5.82	5.66
FALLOW	7.35	7.67	7.51
MEAN	6.43	6.74	6.59
E EUROV			
E FUNGX	NONE	TFSD	MEAN
N DIVX			
30+30+90	6.13	7.01	6.57
150	6.73	6.48	6.60
MEAN	C 42		
MEAN	6.43	6.74	6.59
	E FUNGX	NONE	TFSD
PRECROPX	N DIVX		
OATS	30+30+90	5.20	6.19
	150	5.82	5.44
FALLOW	30+30+90	7.06	7.83
	150	7.63	7.51
N DIVV	30+30+90	150	MEAN
PRECROPV			
BARLEY	6.07	5.32	5.69
OATS	5.76	5.12	5.44
01110	3.70	3.12	3.44
MEAN	5.91	5.22	5.57
E FUNCY	HONE		
E FUNGV	NONE	TFSD	MEAN
PRECROPV			
BARLEY	5.76	5.63	5.69
OATS	5.22	5.66	5.44
MEAN	5.49	F 64	
PIEAN	5.49	5.64	5.57
E FUNGV	NONE	TFSD	MEAN
N DIVV		00	1127111
30+30+90	5.64	6.18	5.91
150	5.34	5.10	
130	3.34	3.10	5.22
MEAN	5.49	5.64	5.57

STRAW TONNES/HECTARE

**** TABLES OF MEANS ****

	E FUNGV	NONE	TFSD
PRECROPV	N DIVV		
BARLEY	30+30+90	6.07	6.06
	150	5.44	5.19
OATS	30+30+90	5.21	6.30
	150	5.23	5.01

EXTRA NO SD 300 SD 450 MEAN 3.54 3.36 3.45

GRAND MEAN 5.42

STRAW MEAN DM% 93.1

WINTER AND SPRING BARLEY

MILDEW STUDY

Object: To study the effects of fungicides applied to w. and s. barley on the incidence of mildew and on yield and whether these effects are influenced by neighbouring treatments - Woburn, Far Field II.

Sponsor: D.W. Hollomon.

Design: W. barley: 2 blocks of 12 plots split into 2

S. barley: 2 blocks of 12 plots

Whole plot dimensions: 8.0×8.0 .

Treatments to W. BARLEY seed treated triadimenol + fuberidazole and crop sprayed with fenpropimorph at 0.79 kg in 280 l on 3 May, 1984:

All combinations of:-

Whole plots

 SD SB Seed dressings to one adjacent plot of s. barley, other adjacent plot given no mildewicidal seed dressing, sprayed tridemorph at 0.52 kg in 250 l on 3 May:

NONE None
TRI+FUB Triadimenol + fuberidazole

Variety of adjacent s. barley testing seed dressing, other adjacent s. barley plot sown to Golden Promise given no mildewicidal seed dressing, sprayed tridemorph at 0.52 kg in 250 l on 3 May:

G PROMIS Golden Promise KEG Keg

3. FS SB Foliar sprays to s. barley testing seed dressing, other adjacent s. barley plot given tridemorph at 0.52 kg in 250 l on 3 May:

NONE
FENPROP
FENPropimorph at 0.75 kg in 250 l on 15 June
ETHIRIM
Ethirimol at 0.28 kg in 250 l on 15 June

Sub plots

4. POSITION Position of w. barley plots in relation to s. barley plots testing seed dressing:

N EAST North east S WEST South west

Treatments to S. BARLEY, all flanked by plots of w. barley, seed treated triadimenol + fuberidazole and crop sprayed with fenpropimorph: All combinations of:-

1. SD SB Seed dressings:

NONE None

TRI+FUB Triadimenol + fuberidazole

2. VAR SB Variety:

G PROMIS Golden Promise

KEG Keg

3. FS SB Foliar sprays:

NONE None

FENPROP Fenpropimorph as above ETHIRIM Ethirimol as above

NOTE: Spring barley, variety Golden Promise, given no mildewicidal seed dressing, was sown on headlands and sprayed tridemorph at 0.52 kg in 250 l on 3 May, 1984.

Standard applications: 'Nitro-Chalk' at 550 kg. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 1.4 l) in 250 l to w. barley only. 3, 6-dichloropicolinic acid 0.07 kg with bromoxynil octanoate at 3.4 kg and mecoprop at 2.1 kg in 250 l to s. barley only.

Seed: W. barley: Maris Otter, sown at 190 kg. S. barley: Golden Promise and Keg, both sown at 160 kg.

Cultivations, etc.:- Heavy spring-tine cultivated twice, spring-tine cultivated with crumbler attached w. barley plots only: w. barley seed sown: 2 Nov, 1983. Heavy spring-tine cultivated s. barley plots: 20 Mar, 1984. Spring-tine cultivated with crumbler attached and s. barley seed sown: 21 Mar. N applied: 22 Mar. 'Brittox' applied: 3 May. 3, 6-dichloropicolinic acid with bromoxynil octanoate and mecoprop applied: 30 May. Combine harvested w. barley: 30 July. Combine harvested s. barley: 17 Aug. Previous crops: W. oats 1982, potatoes 1983.

- NOTES: (1) The incidence of barley powdery mildew (Erysiphe graminis f. sp. hordei) and leaf blotch (Rhynchosporium secalis) were assessed before and after application of fungicide treatments. Mildew and leaf blotch assessments were made on four occasions on spring barley in May, June and July. The sensitivity of powdery mildew to triadimenol was measured in June.
 - (2) Because of an error at drilling yields from three plots were not taken and estimated values were used in the analysis. Treatment combinations affected on winter barley were

SD SB	NONE	NONE	TRI+FUB
VAR SB	KEG	KEG	KEG
FS SB	NONE	NONE	NONE
POSITION	S WEST	N EAST	S WEST

WINTER BARLEY

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

INDEES	PILANS					
VAR SB SD SB	G PROMIS	KEG	MEAN.			
NONE	7.61	7.44	7.53			
TRI+FUB	7.53	7.75				
MEAN	7.57	7.60	7.58			
FS SB SD SB	NONE	FENPROP	ETHIRIM	M	EAN	,
NONE	7.20	7.65	7.72	7	.53	
TRI+FUB	7.74	7.66			.64	
MEAN	7.47	7.66	7.63	7	.58	
FS SB VAR SB	NONE	FENPROP	ETHIRIM	M	EAN	
G PROMIS	7.65	7.52	7.54	7	.57	
KEG	7.28	7.79			.60	
MEAN	7.47	7.66	7.63	7.	.58	
POSITION SD SB	N EAST	S WEST	MEAN			
NONE	7.68	7.37	7.53			
TRI+FUB	7.73	7.55				
MEAN	7.71	7.46	7.58			
POSITION VAR SB	N EAST	S WEST	MEAN			
G PROMIS	7.64	7.51	7.57			
KEG	7.78	7.42				
MEAN	7.71	7.46	7.58			
POSITION FS SB	N EAST	S WEST	MEAN			
NONE	7.53	7.40	7.47			
FENPROP	7.78	7.53	7.66			
ETHIRIM	7.80	7.45				
MEAN	7.71	7.46	7.58			
VAR SB	G PROMIS			KEG		
FS SB SD SB	NONE	FENPROP	ETHIRIM	NONE	FENPROP	ETHIRIM
NONE	7.64	7.54	7.64	6.76	7.77	7.80
TRI+FUB	7.67	7.50	7.43	7.80	7.81	7.63

WINTER BARLEY

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

	G PROMIS N EAST		KEG N FAST	S WEST			
SD SB	N LAST	3 MEST	IN ENST	3 MESI			
	7.62	7.59	7.74	7.15			
	7.65		7.81				
FS SB	NONE		FENPROP		ETHIRIM		
POSITION SD SB	N EAST	S WEST	N EAST	S WEST	N EAST	S WEST	
	7.38	7.03	7.77	7.54	7.90	7.54	
	7.69						
FS SB	NONE		FENPROP		ETHIRIM		
POSITION VAR SB	N EAST	S WEST	N EAST	S WEST	N EAST	S WEST	
	7.78	7.53	7.58	7.46	7.55	7.52	
	7.29						
	FS SB	NONE		FENPROP		ETHIRIM	
	POSITION					N EAST	S WEST
SD SB	VAR SB						
NONE	G PROMIS	7.80	7.49	7.52	7.56	7.55	7.73
	KEG	6.95	6.57	8.01	7.52	8.25	7.36
TRI+FUB	G PROMIS						
	KEG	7.63	7.98	7.95	7.68	7.86	7.40

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	SD SB	VAR SB	FS SB	POSITION
SED TABLE	0.100 SD SB VAR SB	0.100 SD SB FS SB	0.123 VAR SB FS SB	0.074 SD SB POSITION
SED EXCEPT WHEN SD SB	0.142 COMPARING MEANS	0.173 WITH SAME LEVE	The state of the s	0.124 0.104
TABLE	VAR SB POSITION	FS SB POSITION	SD SB VAR SB FS SB	
SED EXCEPT WHEN VAR SB	0.124 COMPARING MEANS 0.104	0.152 WITH SAME LEVI		0.176
FS SB SD SB.VAR	SB	0.128		0.148

WINTER BARLEY

GRAIN TONNES/HECTARE

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE SD SB VAR SB SD SB
FS SB FS SB VAR SB
POSITION POSITION FS SB
POSITION

SED 0.215 0.215 0.305

EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:

SD SB.FS SB 0.181 VAR SB.FS SB

SD SB.VAR SB.FS SB

0.255

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

0.181

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 10
 0.245
 3.2

 BLOCK.WP.SP
 10
 0.255
 3.4

GRAIN MEAN DM% 88.7

84/W/B/1						
SPRING BARLEY						
GRAIN TONNES/HE	CTARE					
**** TABLES OF	MEANS **	***				
VAR SB SD SB	G PROMIS	KEG	MEAN			
NONE	3.77	4.63	4.20			
TRI+FUB	4.12	4.04	4.08			
MEAN	3.95	4.34	4.14			
FS SB SD SB	NONE	FENPROP	ETHIRIM	ME	AN	
NONE	3.93	4.23	4.45	4.	20	
TRI+FUB	3.76	4.68	3.81	4.	80	
MEAN	3.84	4.46	4.13	4.	14	
FS SB VAR SB	NONE	FENPROP	ETHIRIM	ME	AN	
G PROMIS	3.67	4.20	3.97	3.	95	
KEG	4.01	4.71	4.28	4.	34	
MEAN	3.84	4.46	4.13	4.	14	
	G PROMIS	CENDDOD	CTUIDIM	KEG	CENDOOD	CTUID
FS SB SD SB	NONE	FENPROP	ETHIRIM	NONE	FENPROP	ETHIR
NONE	3.62	3.80	3.90	4.23	4.66	5.0
TRI+FUB	3.72	4.60	4.05	3.79	4.76	3.5
***** STANDARD	ERRORS OF	DIFFERENC	ES OF MEAN	IS ****		
TABLE	SD S	SB VA	R SB	FS SB	SD VAR	
SED	0.3	09 0	.309	0.378	0.4	37
TABLE	FS :	SB VA	S SB	VAR SB FS SB		
SED		35 0			•	
**** STRATUM S	STANDARD E	RRORS AND	COEFFICIEN	NTS OF V	ARIATION	****
STRATUM		DF	SE		CV%	
BLOCK.WP		11	0.756		18.3	

WINTER BARLEY

ELECTROSTATIC SPRAYING AND FOLIAR DISEASES

Object: To study the penetration of sprays and control of foliar diseases with a range of electrostatic sprayers - Black Horse II.

Sponsors: D.C. Griffiths, G.R. Cayley, B.J. Pye, P. Etheridge, G.C. Scott, F.T. Phillips.

Design: 4 randomised blocks of 8 plots.

Whole plot dimensions: 3.0 x 15.0.

Treatments:

SPRAYER	Sprayers applying propiconazole:
NONE	None
CNVNTL 2	Conventional hydraulic sprayer, at 125 g in 200 l
CNVNTL 1	Conventional hydraulic sprayer, at 62.5 g in 200 l
EL APE	'APE' electrostatic sprayer, at 62.5 g in 6 l (duplicated)
EL JUMBO	'Jumbo' electrostatic sprayer, at 62.5 g in 10 l (duplicated)
EL MICRO	'Micronex' electrostatic sprayer, at 62.5 g in 13 1

- NOTES: (1) Propiconazole was applied on 3 November, 1983 and 14 March, 1984 by all sprayers except the 'Micronex' which was on 14 March only.
 - (2) The 'APE' electrostatic sprayer had four spinning-disc nozzles mounted on a hand-held boom, the 'Jumbo' had spinning-cone nozzles. Both are charged at 30 kv.
 - (3) The 'Micronex' is a commercial prototype, electrostaticallycharged spinning-disc sprayer.
 - (4) Chopped straw infected with Rhynchosporium was spread evenly over the whole of the experimental area on 9 September, 1983.

Basal applications: Manures: (5:14:30) at 340 kg. 'Nitro-Chalk' on two occasions, at 190 kg on the first and at 440 kg on the second. Weedkillers: Methabenzthiazuron at 2.4 kg in 250 l. 3, 6-dichloropicolinic acid at 0.07 kg and bromoxynil at 0.34 kg with mecoprop (as 'CMPP' at 4.2 l) in 200 l. Desiccant: Diquat at 0.70 kg ion with 'Agral', a wetting agent, at 0.2 l, in 200 l.

Seed: Maris Otter, sown at 160 kg.

Cultivations, etc.:- Ploughed: 4 Aug, 1983. NPK applied: 23 Aug. Springtine cultivated: 7 Sept. Straw applied, rotary harrowed, seed sown: 9 Sept. Methabenzthiazuron applied: 13 Sept. First N applied: 9 Mar, 1984. Second N applied: 4 Apr. 3, 6-dichloropicolinic acid, bromoxynil and mecoprop applied: 13 Apr. Desiccant applied: 23 July. Combine harvested: 26 July. Previous crops: W. barley 1982 and 1983.

NOTE: Plant samples were taken immediately after spraying to assess weedkiller deposits. Mildew was assessed in November and Rhynchosporium in April.

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

NONE CNVNTL 2 CNVNTL 1 EL APE EL JUMBO EL MICRO MEAN SPRAYER 6.64 6.27 6.48 6.64 6.53 5.96 6.65

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

SPRAYER TABLE SED

0.238 MIN REP 0.206 MAX-MIN 0.168 MAX REP

SPRAYER

MAX REP EL APE V EL JUMBO
MAX-MIN EL APE OR EL JUMBO V ANY OF REMAINDER
MIN REP ANY OF REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

DF SE CV% STRATUM

0.336 5.2 BLOCK. WP 23

GRAIN MEAN DM% 78.6

SPRING BARLEY

SOWING DATES AND INSECTS

Object: To study the effects of omethoate on insect pests and on yields of s. barley sown on two dates - Woburn White Horse.

Sponsor: G.C. Scott.

Design: 4 randomised blocks of 8 plots.

Whole plot dimensions: 8.0 x 12.0.

Treatments: All combinations of:-

SOW DATE Dates of sowing:

9 MAR 9 Mar, 1984 16 APR 16 Apr

2. INSEARLY Insecticide applied early:

NONE None
OMETHO E Omethoate on 31 May

3. INS LATE Insecticide applied late:

NONE None
OMETHO L Omethoate on 29 June

NOTE: Omethoate was applied at 0.63 1 in 250 1 on both occasions.

Basal applications: Manures: Magnesian limestone at 7.5 t, FYM at 50 t, N at 110 kg as 'Nitro-Chalk'. Weedkiller: Mecoprop at 2.1 kg in 250 l. Fungicide: Tridemorph at 0.52 kg in 250 l.

Seed: Triumph, dressed with triadimenol plus fuberidazole, sown at 160 kg.

Cultivations, etc.:- Magnesian limestone applied: 30 Sept, 1983. FYM applied: 21-23 Nov. Ploughed: 25 Nov. N applied: 8 Mar, 1984. Springtine cultivated all plots, spring-tine cultivated with crumbler attached, seed sown for SOW DATE 9 MAR: 9 Mar. Spring-tine cultivated with crumbler attached, seed sown for SOW DATE 16 APR: 16 Apr. Weedkiller applied: 15 May. Fungicide applied: 31 May. Combine harvested: 15 Aug. Previous crops: Potatoes 1982, w. wheat 1983.

NOTES: (1) Aphids, thrips and stem borers were counted on several occasions during the growing season.

(2) Barley yellow dwarf virus infection was assessed.

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

INSEARLY SOWDATE	NONE	OMETHO E	MEA	N
9 MAR	7.13	6.81	6.9	7
16 APR	5.55	5.99	5.7	/
MEAN	6.34	6.40	6.3	7
INS LATE SOWDATE	NONE	OMETHO L	MEA	N
9 MAR	6.90	7.04	6.9	7
16 APR	5.58	5.97	5.7	7
MEAN	6.24	6.51	6.3	7
INS LATE	NONE	OMETHO L	MEA	N
NONE	6.20	6.49	6.3	4
OMETHO E	6.28			
MEAN	6.24	6.51	6.3	7
INSEARLY	NONE	(OMETHO E	
INS LATE		OMETHO L	NONE	OMETHO L
SOWDATE				
9 MAR	7.19	7.07	6.61	7.01
16 APR	5.20		5.95	6.04

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	SOWDATE	INSEARLY	INS LATE	SOWDATE INSEARLY
SED	0.265	0.265	0.265	0.375
TABLE	SOWDATE INS LATE	INSEARLY INS LATE	SOWDATE INSEARLY INS LATE	
SED	0.375	0.375	0.531	

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV% BLOCK.WP 21 0.751 11.8

GRAIN MEAN DM% 87.1

84/R/B/7 and 84/W/B/7

SPRING BARLEY

VARIETIES AND N

Object: To study the yields of some of the newer varieties of s. barley at three rates of nitrogen - Rothamsted (R), Stubbings and Woburn (W), Lansome II.

Sponsor: R. Moffitt.

Design: 2 randomised blocks of 3 plots split into 6.

Whole plot dimensions: (R) 33 x 10.0. (W) 32 x 10.0.

Treatments: All combinations of:-

Whole plots

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

75

113 150

Sub plots

2. VARIETY Varieties:

APEX

ATEM

DELTA

KLAXON

KYM

TRIUMPH

Basal applications:

Stubbings (R): Weedkillers: Glyphosate at 1.4 kg in 250 l.

3, 6-dichloropicolinic acid at 0.07 kg with bromoxynil octanoate at 0.34 kg and mecoprop at 2.5 kg applied with the fungicide in 250 l. Fungicide: Tridemorph at 0.52 kg.

Lansome II (W): Manures: (0:18:36) at 1000 kg. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 1) applied with the fungicide in 250 1. Fungicide: Tridemorph at 0.52 kg.

Seed: Stubbings (R), and Lansome II (W): Sown at 160 kg.

84/R/B/7 and 84/W/B/7

Cultivations, etc.:-

Stubbings (R): Glyphosate applied: 5 Oct, 1983. Ploughed: 1 Dec.
Spring-tine cultivated: 10 Mar, 1984. Test N applied: 15 Mar.
Spring-tine cultivated: 16 Mar. Rotary harrowed, seed sown: 17 Mar.
3, 6-dichloropicolinic acid with bromoxynil octanoate and mecoprop with fungicide applied: 23 May. Combine harvested: 20 Aug. Previous crops: Potatoes 1982, s. barley 1983.
Lansome II (W): PK applied: 4 Oct, 1983. Ploughed: 5 Dec. Spring-tine

Lansome II (W): PK applied: 4 Oct, 1983. Ploughed: 5 Dec. Spring-tine cultivated with crumbler attached, seed sown: 20 Mar, 1984. Test N applied: 16 Apr. Weedkillers with fungicide applied: 31 May. Combine harvested: 15-17 Aug. Previous crops: Potatoes 1982, w. wheat 1983.

84/R/B/7

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

N	75	113	150	MEAN
VARIETY				
APEX	7.60	8.12	8.82	8.18
ATEM	7.70	8.43	8.52	8.22
DELTA	8.76	9.30	9.13	9.07
KLAXON	8.22	8.87	8.78	8.62
KYM	7.37	8.42	8.06	7.95
TRIUMPH	6.97	7.24	7.43	7.21
MEAN	7.77	8.40	8.46	8.21

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	VARIETY	N*
		VARIETY
SED	0.171	0.297

^{*} WITHIN THE SAME LEVEL OF N ONLY

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	15	0.297	3.6

GRAIN MEAN DM% 88.6

GRAIN TONNES/HECTARE

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

N	75	113	150	MEAN
VARIETY APEX	5.53	5.88	5.35	5.59
ATEM	4.99	5.68	4.48	5.05
DELTA	5.46	4.91	5.14	5.17
KLAXON	5.14	5.88	5.52	5.51
KYM	5.11	6.17	5.45	5.58
TRIUMPH	5.42	5.70	5.14	5.42
MEAN	5.27	5.70	5.18	5.38

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	VARIETY	N
		VARIETY
SED	0.535	0.926

^{*} WITHIN THE SAME LEVEL OF N ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	15	0.926	17.2

GRAIN MEAN DM% 84.8

SPRING BARLEY

MILDEW SENSITIVITY

Object: To study the effects of varieties with differing resistance genes on the sensitivity of powdery mildew (Erysiphe graminis) to fungicides - Delafield.

Sponsor: D.W. Hollomon.

Design: 2 randomised blocks of 16 plots.

Whole plot dimensions: 9.0 x 9.0.

Treatments: All combinations of:-

1. VARIETY Varieties:

CARNIVAL TRIUMPH

2. FUNG SD Fungicidal seed dressings:

NONE None

ETHIRIMO Ethirimol at 4 g per kg seed

TR+FU Triadimenol at 0.38 g per kg seed and fuberidazole

at 0.045 g per kg seed (duplicated)

3. FUNG SP Fungicidal foliar spray:

NONE None

TRIADIME Triadimenol at 0.12 kg in 500 l on 11 June, 1984

NOTES: (1) The seed was sown at 160 kg.

(2) Plots were divided by 3m sown paths of undressed Golden Promise.

Basal applications: Manures: 'Nitro-Chalk' at 500 kg. Weedkillers: Dicamba, mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 250 l.

Cultivations, etc.:- Ploughed: 12 Dec, 1983. N applied: 9 Mar, 1984. Spring-tine cultivated: 16 Mar. Rotary harrowed, seed sown: 19 Mar. Weedkillers applied: 16 May. Combine harvested: 18 Aug. Previous crops: S. beans 1982, w. wheat 1983.

NOTE: Mildew was assessed on five occasions from mid-May to early July. Sensitivity of mildew to ethirimol and triadimenol was assessed by bioassay in early June.

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

FUNG SD	NONE	ETHIRIMO	TR+FU	ME	AN		
VARIETY		7 00	7 12	7	10		
CARNIVAL	6.92	7.23			10		
TRIUMPH	6.43	7.08	6.38	6.	57		
MEAN	6.67	7.16	6.75	6.	83		
FUNG SP VARIETY	NONE	TRIADIME	MEAN				
CARNIVAL	6.88	7.33	7.10)			
TRIUMPH	5.94	7.19					
IKIUMPH	3.34	7.13	0.37				
MEAN	6.41	7.26	6.83	3			
FUNG SP FUNG SD	NONE	TRIADIME	MEAN	ı			
NONE	6.42	6.93	6.67	7			
ETHIRIMO	6.88	7.43					
TR+FU	6.17	7.33					
IKITO	0.17	7.00	0.75	•			
MEAN	6.41	7.26	6.83	3			
	FUNG SD	NONE	E	THIRIMO		TR+FU	
	FUNG SP VARIETY		TRIADIME		TRIADIME	NONE	TRIADIME
	CARNIVAL	6.88	6.95	7.18	7.29	6.73	7.53
	TRIUMPH	5.95	6.91	6.58	7.58	5.62	
	INTOMPH	3.33	0.51	0.30	, .50	3.02	, .10

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	VARIETY	FUNG SD	FUNG SP	VARIETY FUNG SD	
SED	0.138	0.196 0.169	0.138	0.277 0.239	MIN REP MAX-MIN
TABLE	VARIETY FUNG SP	FUNG SD FUNG SP	VARIETY FUNG SD FUNG SP		
SED	0.196	0.277 0.239 0.196	0.391 0.339 0.277	MIN REP MAX-MIN MAX REP	

FUNG SD MAX REP TR FU ONLY
MAX-MIN TR FU V ANY OF REMAINDER
MIN REP ANY OF REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM

DF 19

SE 0.391 CV% 5.7

BLOCK.WP

GRAIN MEAN DM% 86.7 PLOT AREA HARVESTED 0.00248

268

SPRING BARLEY

PLOT SIZES AND MILDEW SPREAD

Object: To study the effects of plot size on the incidence of mildew (Erysiphe graminis) and on the yield of neighbouring plots - Gt. Harpenden II.

Sponsor: J.F. Jenkyn.

Design: A serially balanced sequence of 4 'blocks' of 3 plots with

separating and flanking plots.

Whole plot dimensions: Narrow plots: 3.0 x 10.0.

Wide plots: 10.0×10.0 .

Treatments:

TREATMNT Plot width (all 10m long) and fungicide treatment:

3M NONE 3m, no fungicide

3M TRID 3m, tridemorph spray at 0.52 kg in 220 1 on 25 May,

31 May, 1984

10M NONE 10m, no fungicide

NOTES: (1) The above plots were each separated by 3m wide plots sprayed with tridemorph.

(2) The effects of treatments to neighbouring plots (left - LHN, right - RHN) were estimated. In this experiment 'left' was north-west, 'right' was south-east.

Basal applications: Manures: 'Nitro-Chalk' at 480 kg. Weedkillers: Dicamba with mecoprop and MCPA (as 'Herrisol' at 5.0 1) in 200 l.

Seed: Georgie, sown at 160 kg.

Cultivations, etc.:- Ploughed: 5 Dec, 1983. N applied, spring-tine cultivated, rotary harrowed, seed sown: 22 Mar, 1984. Weedkillers applied: 15 May. Combine harvested: 19 Aug. Previous crops: Potatoes 1982, w. wheat 1983.

NOTE: Leaf diseases were assessed in mid-June and early July.

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

TRE	TAMATA	3M		3M		10M	NONE
			6.99		8.60		6.92
	LHN	3M	NONE	3M	TRID	10M	NONE
TREA	TMMT						
3M	NONE				6.87		7.12
3M	TRID		8.60				8.60
10M	NONE		6.87		6.97		
	RHN	3M	NONE	3M	TRID	1 OM	NONE
TREA	TMNT					20	
	100000000000000000000000000000000000000				7.02		6.97
			8 50		7.02		8.70
-					7 05		0.70
IUM	NUNE		0./9		7.05		
RAND	MEAN		7.50				
	TRE/ 3M 3M 10M TRE/ 3M 3M 10M	TREATMNT 3M NONE 3M TRID 10M NONE RHN TREATMNT 3M NONE 3M TRID	LHN 3M TREATMNT 3M NONE 3M TRID 10M NONE RHN 3M TREATMNT 3M NONE 3M TRID 10M NONE	6.99 LHN 3M NONE TREATMNT 3M NONE 3M TRID 8.60 10M NONE 6.87 RHN 3M NONE TREATMNT 3M NONE 3M TRID 8.50 10M NONE 6.79	6.99 LHN 3M NONE 3M TREATMNT 3M NONE 3M TRID 8.60 10M NONE 6.87 RHN 3M NONE 3M TREATMNT 3M NONE 3M TRID 8.50 10M NONE 6.79	## Company of the com	6.99 8.60 LHN 3M NONE 3M TRID 10M TREATMNT 3M NONE 6.87 3M TRID 8.60 10M NONE 6.87 6.97 RHN 3M NONE 3M TRID 10M TREATMNT 3M NONE 7.02 3M TRID 8.50 10M NONE 6.79 7.05

GRAIN MEAN DM% 85.0

SPRING BARLEY

INTERFERENCE BETWEEN PLOTS

Object: To study the influence of neighbouring varieties, on the occurrence of mildew and on yield, in three varieties grown singly or as a mixture - Gt. Harpenden II.

Sponsor: J.F. Jenkyn.

Designs: One was a serially balanced sequence of 9 'blocks' of 4 plots with

flanking plots on the outsides, the other was four randomised

blocks of 4 plots with spacing plots.

Whole plot dimensions: 2.04 x 18.3.

Treatments:

VARIETY

Varieties:

ATEM PATTY Atem Patty Triumph

TRIUMPH MIXTURE

Mixture of Atem, Patty and Triumph

- NOTES: (1) In the serially balanced design plots were separated only by fallow paths 61 cm wide; in the other design plots were separated by equal size 'plots' of Atem s. barley, seed dressed with triadimenol plus fuberidazole, with fallow paths 61 cm wide on each side.
 - (2) In the serially balanced design the effects of treatments to neighbouring plots (left - LHN, right - RHN) were estimated. In this experiment 'left' was north-west, 'right' was south-east.

Basal applications: Manures: 'Nitro-Chalk' at 480 kg. Weedkillers: Dicamba, mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 200 l.

Seed: Sown at 160 kg.

Cultivations, etc.:- Ploughed: 5 Dec, 1983. N applied: 21 Mar, 1984. Spring-tine cultivated, rotary harrowed, seed sown: 22 Mar. Weedkillers applied: 15 May. Combine harvested: 19 Aug. Previous crops: Potatoes 1982, w. wheat 1983.

NOTE: Leaf diseases were assessed in late June and mid-July.

84/R/B/11					
GRAIN TONNES/	HECTARE				
SERIALLY BALA	NCED DESIGN				
**** TABLES	OF MEANS ***	***			
VARIET			TRIUMPH	MIXTURE	
	9.30	8.74	7.64	8.80	
LHI VARIET		PATTY	TRIUMPH	MIXTURE	
ATE		9.31	9.26	9.33	
PATT			8.96	8.59	
TRIUMP	H 7.36	7.89		7.68	
MIXTUR	E 8.87	8.62	8.92		
RHI		PATTY	TRIUMPH	MIXTURE	
VARIET		9.21	9.15	9.53	
PATT		3.21	8.97		
TRIUMP		7.85	0.57	7.70	
MIXTUR			8.93		
GRAND MEA	N 8.62				
GRAND MEA		DIFFEREN	ICES OF ME	ANS ****	
**** STANDAR			RIETY	VARIETY	
***** STANDAR	D ERRORS OF	Y VA	RIETY LHN	VARIETY RHN	
***** STANDARI	D ERRORS OF	Y VA	RIETY LHN	VARIETY RHN	
***** STANDARI TABLE SED	VARIET	Y VA	LHN 0.109	VARIETY RHN 0.109	
***** STANDARI TABLE SED ***** STRATUM	VARIET	7Y VA	COEFFICE	VARIETY RHN 0.109 ENTS OF V	ARIATION **
***** STANDARI TABLE SED ***** STRATUM STRATUM BLOCK.WP	VARIET 0.06 STANDARD ER	Y VA	COEFFICE	VARIETY RHN 0.109	ARIATION **
***** STANDARI TABLE SED ***** STRATUM STRATUM BLOCK.WP GRAIN MEAN DM	VARIET 0.06 STANDARD ER	RRORS AND	COEFFICE	VARIETY RHN 0.109 ENTS OF V	ARIATION **
***** STANDARI TABLE SED ***** STRATUM STRATUM BLOCK.WP GRAIN MEAN DM	VARIET 0.06 STANDARD ER	RRORS AND	COEFFICE	VARIETY RHN 0.109 ENTS OF V	ARIATION **
**** STANDARI TABLE SED **** STRATUM STRATUM BLOCK.WP GRAIN MEAN DM: RANDOMISED BLOCK	VARIET 0.06 STANDARD ER 87.0 OCK DESIGN OF MEANS ***	RRORS AND DF 16	O.109 COEFFICI	VARIETY RHN 0.109 ENTS OF V	ARIATION ** CV% 1.5
**** STANDARI TABLE SED **** STRATUM STRATUM BLOCK.WP GRAIN MEAN DM: RANDOMISED BLOCK	VARIET 0.06 STANDARD ER 87.0 OCK DESIGN	RRORS AND DF 16	O.109 COEFFICI	VARIETY RHN 0.109 ENTS OF V	ARIATION ** CV% 1.5
**** STANDARI TABLE SED **** STRATUM STRATUM BLOCK.WP GRAIN MEAN DM: RANDOMISED BLOCK **** TABLES (VARIET O.06 STANDARD ER 87.0 OCK DESIGN OF MEANS *** ATEM 9.39	DF 16	COEFFICI 0.109 0.109 0.13 TRIUMPH 7.45	VARIETY RHN 0.109 ENTS OF V SE 33	ARIATION ** CV% 1.5 MEAN 8.62
***** STANDARI TABLE SED ***** STRATUM STRATUM BLOCK.WP GRAIN MEAN DM: RANDOMISED BLOCK ***** TABLES (VARIETY	VARIET O.06 STANDARD ER 87.0 OCK DESIGN OF MEANS *** ATEM 9.39	DF 16 PATTY 8.66 DIFFEREN	COEFFICI 0.109 0.109 0.13 TRIUMPH 7.45	VARIETY RHN 0.109 ENTS OF V SE 33	ARIATION ** CV% 1.5 MEAN 8.62

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV% BLOCK.WP 9 0.168 1.9

GRAIN MEAN DM% 86.8 PLOT AREA HARVESTED 0.00373

SPRING BARLEY

SOWING DATES AND INSECTS

Object: To study the effects of omethoate on insect pests and on yields of s. barley sown on two dates - Gt. Harpenden I.

Sponsor: G.C. Scott.

Design: 4 randomised blocks of 9 plots.

Whole plot dimensions: 9.0 x 10.0.

Treatments:

SDTE INS	Sowing dates and insecticides:
SE NONE	Sown 9 Mar, 1984, no insecticides
SE OME R	Sown 9 Mar, omethoate applied on 25 May, 13 June, 26 June, 11 July
SL NONE	Sown 13 Apr, no insecticides (duplicated)
SL OME 1	Sown 13 Apr, omethoate applied on 25 May
SL OME 2	Sown 13 Apr, omethoate applied on 13 June
SL OME 3	Sown 13 Apr, omethoate applied on 26 June
SL OME 4	Sown 13 Apr, omethoate applied on 11 July
SL OME R	Sown 13 Apr, omethoate applied 25 May, 13 June,
	26 June, 11 July

NOTE: Omethoate was applied at 0.64 kg in 450 l.

Basal applications: Manures: 'Nitro-Chalk' at 500 kg. Weedkillers: Dicamba, mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 200 l. Fungicide: Tridemorph at 0.52 kg in 500 l.

Seed: Triumph, dressed triadimenol plus fuberidazole, sown at 160 kg.

Cultivations, etc.:- Ploughed: 5 Dec, 1983. N applied: 8 Mar, 1984. Early-sown plots rotary harrowed, seed sown: 9 Mar. Late-sown plots rotary harrowed, seed sown: 13 Apr. Weedkillers applied: 15 May. Fungicide applied: 11 June. Combine harvested: 18 Aug. Previous crops: Potatoes 1982, w. wheat 1983.

NOTE: Aphids, thrips and stem borers were counted between late April and mid-July

GRAIN TONNES/HECTARE

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

SDTE INS	
SE NONE	8.32
SE OME R	8.86
SL NONE	7.85
SL OME 1	8.04
SL OME 2	8.09
SL OME 3	7.95
SL OME 4	7.76
SL OME R	8.14
MEAN	8.09

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE SDTE INS
SED 0.185 MIN REP
0.160 MAX-MIN

SDTE INS MAX-MIN SL NONE V ANY OF REMAINDER MIN REP ANY OF REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 25
 0.261
 3.2

GRAIN MEAN DM% 86.0

SPRING BARLEY

TIMING OF ELECTROSTATIC SPRAYS

Object: To study the effect of different times and rates of fungicides applied by hydraulic or electrostatic sprayers on mildew incidence and yield of spring barley - Webbs.

Sponsors: D.C. Griffiths, G.R. Cayley, P. Etheridge, R.E. Goodchild, B.J. Pye, G.C. Scott.

Design: 3 randomised blocks of 20 plots.

Whole plot dimensions: 3.0×15.0 .

Treatments: All combinations of:-

SPRAYER Spraying machines:

ELECTRO Electrostatic sprayer applying fungicide in 6 l water CNVNTL Conventional hydraulic sprayer applying fungicide in 200 l water

2. FUNGRATE Rates of fungicides:

Propiconazole at 0.03 kg, tridemorph at 0.06 kg
Twice rate 1

Four times rate 1

SPR TIME Spray timing:

E Early, 24 May, 1984

L Late, 8 June E+L Early + Late, 24 May and 8 June

plus one extra treatment:

EXTRA

NONE None (duplicated)

NOTES: (1) The electrostatic sprayer had 4 spinning-disc nozzles mounted on a hand-held boom.

(2) The conventional machine was a hand-held knapsack sprayer.

(3) Sides and ends of plots, 3 m and 5 m respectively, were seperated by Atem s. barley, seed dressed with triadimenol plus fuberidazole.

Basal applications: Manures: FYM at 25 t. 'Nitro-Chalk' at 500 kg. Weedkillers: 3, 6-dichloropicolinic acid at 0.05 kg and bromoxynil at 0.24 kg with mecoprop (as 'CMPP' at 3.0 1) in 250 l.

Seed: Georgie, sown at 160 kg.

Cultivations, etc.:- Heavy spring-tine cultivated: 1 Oct, 1983. FYM applied: 11 Nov. Ploughed: 28 Nov. N applied, spring-tine cultivated: 8 Mar, 1984. Rotary harrowed, seed sown: 9 Mar. Weedkillers applied: 15 May. Combine harvested: 19 Aug. Previous crops: S. barley 1982 and 1983.

NOTE: Mildew assessments were made twice during June.

GRAIN TONNES/HECTARE

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

1 6.24 6.54 6.39 E 6.44 6.40	2 6.54 6.98 6.76 L 6.14 6.58	4 6.62 6.79 6.71 E+L 6.83 7.33	MEAN 6.47 6.77 6.62 MEAN 6.47 6.77
6.54 6.39 E 6.44 6.40	6.98 6.76 L 6.14 6.58	6.79 6.71 E+L 6.83 7.33	6.77 6.62 MEAN 6.47 6.77
6.54 6.39 E 6.44 6.40	6.98 6.76 L 6.14 6.58	6.79 6.71 E+L 6.83 7.33	6.77 6.62 MEAN 6.47 6.77
6.39 E 6.44 6.40	6.76 L 6.14 6.58	6.71 E+L 6.83 7.33	6.77 6.62 MEAN 6.47 6.77
6.44 6.40 6.42	6.14 6.58	E+L 6.83 7.33	MEAN 6.47 6.77
6.44 6.40 6.42	6.14 6.58	E+L 6.83 7.33	MEAN 6.47 6.77
6.44 6.40 6.42	6.14 6.58	6.83 7.33	6.47 6.77
6.40 6.42	6.58	6.83 7.33	6.47 6.77
6.40 6.42	6.58	7.33	6.77
6.42	6.58		6.77
	6.36	7.08	
			6.62
Ε	L	E+L	MEAN
6.22	6.04	6.90	6.39
6.51	6.62	7.15	6.76
6.53	6.41	7.18	6.71
6.42	6.36	7.08	6.62
SPR TIME	F		E+L
	_	L	LTL
	6.40	5 81	6.51
			7.09
			6.89
1			7.30
			7.21
2			7.47
		6.42 6.36 SPR TIME E FUNGRATE 1 6.40 2 6.30 4 6.63 1 6.05	6.42 6.36 7.08 SPR TIME E L FUNGRATE 1 6.40 5.81 2 6.30 6.24 4 6.63 6.36 1 6.05 6.26

NONE 6.00 GRAND MEAN 6.56

GRAIN TONNES/HECTARE

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	SPRAYER	FUNGRATE	SPR TIME	SPRAYER FUNGRATE
SED	0.163	0.200	0.200	0.283
TABLE	SPRAYER SPR TIME	FUNGRATE SPR TIME	SPRAYER FUNGRATE SPR TIME	
SED	0.283	0.346	0.490	

SED FOR COMPARING EXTRA NONE WITH ANY ITEM IN SPRAYER.FUNGRATE.SPR TIME TABLE IS 0.424

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP 39 0.600 9.1

GRAIN MEAN DM% 88.9

SPRING BARLEY

MILDEW CONTROL BY ELECTROSTATIC SPRAYERS

Object: To compare the effects of a range of electrostatic sprayers on mildew (Erysiphe graminis) control and on the yield of spring barley -Webbs.

Sponsors: D.C. Griffiths, G.R. Cayley, P. Etheridge, R.E. Goodchild, B.J. Pye, G.C. Scott.

Design: 4 randomised blocks of 14 plots.

Whole plot dimensions: 3.0×15.0 .

Treatments:

SPRAYER	Sprayers and rates of application of propiconazole (kg):
CNVNTL 1 CNVNTL 2	Conventional, 0.125 kg Conventional, 0.250 kg
	Electrostatic sprayers, applying at 0.125 kg:
E NO 1 E NC 1 E JC 1 E AC 1 E MMC 1	NIAE, uncharged hydraulic sprayer in 60 1 NIAE, charged hydraulic sprayer in 60 1 'Jumbo', charged in 10.1 1 'APE' charged in 5.6 1 'Micromax' charged in 9.0 1
E MNC 1 E JAAC 1	'Micronex' charged in 9.0 l 'Jumbo', air assisted, nozzles mounted at 200 to vertical, charged, in 10.1 l
E JAVC 1	'Jumbo', air assisted, nozzles mounted vertically, charged, in 10.1]
E AAAC 1	'APE', air assisted, nozzles mounted at 20° to vertical, charged, in 5.6 l
E AAVC 1	'APE', air assisted, nozzles mounted vertically, charged, in 5.6 l
NONE	None (duplicated)

- NOTES: (1) Sides and ends of plots, 3m and 5m respectively, were separated by Atem s. barley, seed dressed with triadimenol plus fuberidazole.

 - (2) The 'Jumbo' has electrostatically charged spinning-cone nozzles.(3) The 'APE' has electrostatically charged spinning-disc nozzles.
 - (4) The 'Micromax' has inductively-charged spinning-cone nozzles.
 (5) The 'Micronex' is a commercial prototype, electrostatically-
 - charged spinning-disc sprayer. (6) Spray treatments were applied in the period 11 to 12 June, 1984.

Basal applications: Manures: FYM at 25 t. 'Nitro-Chalk' at 500 kg. Weedkillers: 3, 6-dichloropicolinic acid at 0.05 kg and bromoxynil at 0.24 kg with mecoprop (as 'CMPP' at 3.0 1) in 250 1.

Seed: Georgie, sown at 160 kg.

Cultivations, etc.:- Heavy spring-tine cultivated: 10 Oct, 1983. FYM applied: 11 Nov. Ploughed: 28 Nov. N applied, spring-tine cultivated: 8 Mar, 1984. Rotary harrowed, seed sown: 10 Mar. Weedkillers applied: 15 May. Combine harvested: 20 Aug. Previous crops: S. barley 1982 and 1983.

NOTE: Plant samples were taken immediately after spraying to assess weedkiller deposits. Mildew assessments were made in June.

GRAIN TONNES/HECTARE

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

SPRAYER	
CNVNTL 1	6.30
CNVNTL 2	6.19
E NO 1	5.96
E NC 1	6.20
E JC 1	5.65
E AC 1	5.74
E MMC 1	5.72
E MNC 1	5.83
E JAAC 1	6.19
E JAVC 1	6.12
E AAAC 1	5.92
E AAVC 1	6.19
NONE	5.42
MEAN	5.92

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	SPRAYER
SED	0.185 MIN REP
	0.160 MAX-MIN

SPRAY

MAX-MIN NONE V ANY OF REMAINDER MIN REP ANY OF REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP 40 0.261 4.4

GRAIN MEAN DM% 87.0

WINTER BEANS

EFFECTS OF PESTS AND PATHOGENS

Object: To assess the effects of three amounts of pest and disease control on w. beans - Highfield IV.

Sponsors: J. McEwen, R. Bardner, A.J. Cockbain, D.C. Griffiths, D.H. Lapwood, R.M. Webb, D.P. Yeoman.

Design: 6 randomised blocks of 3 plots.

Whole plot dimensions: 5.33 x 15.0.

Treatments:

PATHCONT Pest and pathogen control (in addition to basals):

STANDARD None

ENHANCED Seed dressed with carbendazim and thiram (1.1 g of each per

kg of seed)

Phorate at 1.7 kg as granules to foliage on 12 Apr, 1984

FULL Seed dressed with carbendazim and thiram

Aldicarb at 10 kg on 29 Sept, 1983 Fosetyl-Al at 1.6 kg on 14 Mar, 1984

Benomyl at 0.56 kg and chlorothalonil at 0.98 kg in 340 l

on 4 Apr

Carbofuran at 1.7 kg on 12 Apr Propiconazole at 0.12 kg on 4 July

NOTES: (1) Treatment sprays were applied in 220 1 except where stated.

(2) Sides of plots were separated by strips of w. beans 5.33 m wide plus 0.66 m fallow paths, ends of plots were separated by strips of w. beans 9.2 m wide plus 0.9 m fallow paths. The separating crops received basal applications as for the plots.

Basal applications: Weedkillers: Paraquat at 0.42 kg ion in 250 l. Propyzamide at 0.85 kg with simazine at 1.2 l in 250 l. Fungicides: Benomyl at 0.50 kg with chlorothalonil at 1.0 kg and 'Agral', a wetting agent at 0.08 l, in 250 l on the first two occasions and in 200 l on the third occasion.

Seed: Banner, sown at 220 kg.

Cultivations, etc.:- Heavy spring-tine cultivated: 1 Sept, 1983. Chisel ploughed twice: 2 Sept. Paraquat applied: 20 Sept. Heavy spring-tine cultivated: 24 Sept. Aldicarb treatment applied, rotary harrowed, seed sown: 29 Sept. Propyzamide and simazine applied: 30 Sept. Basal fungicides applied: 24 May, 5 June, 26 June, 1984. Combine harvested: 30 Aug. Previous crops: W. wheat 1982, s. barley 1983.

NOTE: Plant counts were made after establishment and components of yield were measured at maturity. Migratory nematodes, root and foliar fungi, aphids and weevils were counted at intervals during the season. Total above-ground dry matter and N content were measured in July. N content of grain was measured.

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

PATHCONT STANDARD ENHANCED FULL MEAN 4.15 4.34 4.26 4.25

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE PATHCONT
SED 0.230

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 10 0.398 9.4

GRAIN MEAN DM% 85.9

WINTER BEANS

SOWING METHODS, DATES AND SEED RATES

Object: To study the effects of drilling or ploughing in seed, on three dates and at three seed rates, on the yield of w. beans - Geescroft.

Sponsors: J. McEwen, D.P. Yeoman, G. Inions.

Design: 2 randomised blocks of 18 plots.

Whole plot dimensions: 6.0 x 10.0.

Treatments: All combinations of:-

1. SOW METH Methods of sowing:
DRILL By drill sowing rows 12 cm apart PLOUGH Seed broadcast on soil surface and ploughed in

2. SOW DATE Dates of sowing:

23 SEP 23 September, 1983 19 OCT 19 October 18 NOV 18 November

3. POPULATN Plant populations per hectare:

	Target Population	Mean population achieved
120	120,000	100,000
240	240,000	170,000
360	360,000	240,000

Basal applications: Weedkillers: Paraquat at 0.42 kg ion in 250 l. Propyzamide at 0.85 kg with simazine at 1.2 l in 250 l. Fungicides: Benomyl at 0.50 kg with chlorothalonil at 1.0 kg and 'Agral', a wetting agent, at 0.08 l, in 250 l on the first two occasions and in 200 l on the third. Insecticides: Permethrin at 0.12 kg in 250 l on the first occasion and 0.05 kg in 500 l on the second.

Seed: Banner, dressed with carbendazim and thiram.

Cultivations, etc.:- Heavy spring-tine cultivated once: 30 Aug, 1983 and twice more: 31 Aug. Chisel ploughed twice: 2 Sept. Paraquat applied: 20 Sept. SOWDATE 23 SEPT plots heavy spring-tine cultivated, spring-tine cultivated, rotary harrowed, seed sown or broadcast, broadcast plots ploughed: 23 Sept. SOWDATE 23 SEPT PLOUGH plots harrowed in: 30 Sept. Propyzamide with simazine applied to SOWDATE 23 SEPT plots: 30 Sept. SOWDATE 19 OCT and SOWDATE 18 NOV plots heavy spring-tine cultivated: 19 Oct. SOWDATE 19 OCT plots rotary harrowed, seed sown or broadcast, broadcast plots ploughed: 19 Oct. SOWDATE 19 OCT PLOUGH plots harrowed in: 21 Oct. Propyzamide with simazine applied to SOWDATE 19 OCT plots: 21 Oct. SOWDATE 18 NOV plots rotary harrowed, seed sown or broadcast, broadcast plots ploughed: 18 Nov. SOWDATE 18 NOV PLOUGH plots harrowed in, propyzamide and simazine applied to SOWDATE 18 NOV plots: 21 Nov. Permethrin applied: 18 Apr, 1984 and 9 May. Benomyl, chlorothalonil and 'Agral' applied: 24 May, 6 June, 26 June. Combine

harvested: 30 Aug. Previous crops: W. wheat 1982, s. barley 1983.

NOTE: Plant emergence counts were made and numbers of stems assessed in April and at maturity. Flowering dates were recorded. Chocolate spot and lodging were assessed. Components of yield were measured at maturity.

GRAIN TONNES/HECTARE

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

SOW DATE SOW METH	23 SEP	19 OCT	18 NOV	MEAN
DRILL	5.07	5.07	4.49	4.88
PLOUGH	5.21	5.25	4.78	5.08
. 2004.1	0122	3.23	1.70	3.00
MEAN	5.14	5.16	4.64	4.98
POPULATN	120	240	360	MEAN
SOW METH				
DRILL	4.60	5.04	4.99	4.88
PLOUGH	4.81	5.02	5.41	5.08
MEAN	4.70	5.03	5.20	4.98
POPULATN	120	240	360	MEAN
SOW DATE	5 53			
23 SEP	5.57	4.94	4.90	5.14
19 OCT	4.60	5.45	5.44	5.16
18 NOV	3.94	4.71	5.26	4.64
MEAN	4.70	5.03	5.20	4.98
	POPULATN	120	240	360
SOW METH	SOW DATE			
DRILL	23 SEP	5.57	5.06	4.58
	19 OCT	4.47	5.50	5.25
	18 NOV	3.75	4.57	5.15
PLOUGH	23 SEP	5.57	4.83	5.22
	19 OCT	4.72	5.40	5.63
	18 NOV	4.13	4.84	5.38

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SOW METH	SOW DATE	POPULATN	SOW METH SOW DATE
SED	0.104	0.127	0.127	0.180
TABLE	SOW METH POPULATN	SOW DATE POPULATN	SOW METH SOW DATE POPULATN	
SED	0.180	0.221	0.312	

GRAIN TONNES/HECTARE

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 17 0.312 6.3

GRAIN MEAN DM% 85.5

WINTER BEANS

CONTROL OF SITONA

Object: To study the effects of six insecticides on the numbers of Sitona and on the yield of w. beans - Road Piece East.

Sponsors: R. Bardner, D.C. Griffiths.

Design: 4 randomised blocks of 9 plots.

Whole plot dimensions: 5.33 x 13.7.

Treatments:

INSCTCDE	Forms, rates and methods of applying insecticides:
NONE	None (duplicated)
CF 1 G	Carbofuran at 0.425 kg, as granules, applied on 13 April, 1984
CF 2 G	Carbofuran at 0.850 kg, as granules, applied on 13 April, 1984
CF 4 G	Carbofuran at 1.700 kg, as granules, applied on 13 April, 1984
CY DS	Cyfluthrin at 0.050 kg as a divided spray, half applied on 30 April, half on 23 May, in 200 l
PE DS	Permethrin at 0.050 kg as a divided spray, half applied on 30 April, half on 23 May, in 200 l
PH G	Phorate at 1.700 kg, as granules, applied on 13 April
TR SS	Triazophos at 0.353 kg, as a single spray applied on 30 April in 200 l

Basal applications: Weedkillers: Paraquat at 0.42 kg ion in 250 l. Propyzamide at 0.85 kg with simazine at 1.2 l in 250 l. Fungicides: Benomyl at 0.50 kg with chlorothalonil at 1.0 kg and 'Agral', a wetter, at 0.08 l on two occasions, the first in 250 l, the second in 200 l.

Seed: Banner, dressed thiram and carbendazim, sown at 220 kg.

Cultivations, etc.:- Heavy spring-tine cultivated: 1 Sept, 1983. Chisel ploughed twice: 3 Sept. Paraquat applied: 20 Sept. Heavy spring-tine cultivated: 24 Sept. Seed sown: 29 Sept. Propyzamide and simazine applied: 30 Sept. Fungicides with wetter applied: 5 June, 26 June. Combine harvested: 30 Aug. Previous crops: W. wheat 1982, s. barley 1983.

NOTE: Leaf damage by Sitona was assessed in May, and larval and pupal counts were made in late June. Soil cores were taken at the end of June for assessment of soil animals.

GRAIN TONNES/HECTARE

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

INSCTCDE NONE 4.88 CF 1 G 4.69 CF 2 G 4.81 CF 4 G 5.07 CY DS 4.63 PE DS 5.17 PH G 4.82 TR SS 4.67 MEAN 4.85

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE INSCTCDE

SED 0.197 MIN REP
0.171 MAX-MIN

INSCTCDE
MAX-MIN NONE V ANY OF THE REMAINDER
MIN REP ANY OF THE REMAINDER

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 25
 0.279
 5.7

GRAIN MEAN DM% 85.8

WINTER BEANS

VARIETIES

Object: To compare agronomic characters and yields of four varieties of w. beans - Long Hoos V 6.

Sponsors: J. McEwen, D.P. Yeoman.

Design: 4 randomised blocks of 4 plots.

Whole plot dimensions: 2.03 x 2.13.

Treatments:

VARIETY

THROWS

Varieties:

BANNER BEAGLE BULLDOG

the row.

Banner Maris Beagle Bulldog

Throws MS

NOTE: Seed was sown by hand in rows 51 cm apart, seed spaced 5 cm apart in

Basal applications: Manures: Chalk at 2.9 t. Weedkillers: Trietazine at 1.2 kg with simazine at 0.17 kg, and paraquat at 0.28 kg ion in 340 l. Fungicides: Benomyl at 0.56 kg on three occasions, the first in 220 l, the second with the permethrin in 220 l and the third with the chlorothalonil in 340 l. Chlorothalonil at 0.98 kg, in 340 l on the first occasion, with the benomyl on the second. Propiconazole at 0.12 kg in 220 l. Insecticide: Permethrin at 0.14 kg with the benomyl.

Cultivations, etc.:- Ploughed: 29 July, 1983. Chalk applied: 25 Aug. Power harrowed, seed sown: 27 Sept. Weedkillers applied: 28 Sept. Benomyl applied: 14 Mar, 1984. Benomyl with permethrin applied: 13 Apr. Chlorothalonil applied: 25 May. Chlorothalonil with benomyl applied: 27 June. Propiconazole applied: 4 July. Harvested by hand: 22 Aug. Previous crops: Potatoes 1982, fallow 1983.

NOTES: (1) Plant counts were made after establishment. Components of yield were measured at maturity. N content of grain was measured.

(2) An examination of the results showed a fertility trend. The yields presented have been adjusted for this trend.

GRAIN TONNES/HECTARE

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

VARIETY BANNER BEAGLE BULLDOG THROWS MEAN 5.35 5.41 4.88 4.60 5.06

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE VARIETY
SED 0.144

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 8 0.201 4.0

GRAIN MEAN DM% 88.5

WINTER BEANS

SOWING METHODS AND NEMATODE CONTROL

Object: To study the effects of aldicarb and carbofuran, applied to the seed furrows during sowing behind a plough or behind a rotary harrow, on the control of stem nematode (Ditylenchus dipsaci) and on the yield of w. beans - Highfield O & E III.

Sponsor: A.G. Whitehead.

Design: 3 randomised blocks of 16 plots.

Whole plot dimensions: SOW METH DRILL 2.13 x 4.57. SOW METH PLOUGH 2.74 x 4.57.

JOH HEITI LEGOUN 2.74 X

Treatments: All combinations of:-

SOW METH Methods of sowing:

DRILL By drill sowing rows 30 cm apart

PLOUGH From a box attached to the plough, sowing into furrows

30 cm apart

2. NEMACIDE Nematicides, applied to the seed furrow:

ALDICARB Aldicarb CARBOFUR Carbofuran

3. NEM RATE Rates of nematicides (kg):

1.25

2.50

5.00

plus two extra treatments:

EXTRA

DRILL O Sown by drill, no nematicide (duplicated)
PLOUGH O Sown by plough, no nematicide (duplicated)

Basal applications: Manures: (0:20:20) at 620 kg. Weedkillers: Glyphosate at 1.4 kg in 250 l. Simazine at 1.1 l in 560 l. Fungicide: Benomyl at 0.56 kg on four occasions, in 560 l, 220 l, 280 l and 280 l respectively. Insecticide: Pirimicarb at 0.14 kg on two occasions, in 340 l and 280 l respectively.

Seed: Throws MS, sown at 290 kg.

Cultivations, etc.:- Glyphosate applied: 20 Oct, 1983. Shallow rotary cultivated, PK applied: 25 Oct. Seed sown SOW METH PLOUGH plots, treatments applied: 27 Oct. Rotary harrowed, seed sown SOW METH DRILL plots, treatments applied: 28 Oct. Simazine applied: 20 Feb, 1984. Fungicide applied: 17 Apr, 16 May, 19 June, 2 July. Insecticide applied: 13 June, 18 July. Harvested by hand: 14 Aug. Previous crops: W. beans 1982 and 1983.

NOTE: The percentage of stems infected with stem nematode was assessed in mid-July.

GRAIN TONNES/HECTARE

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

NEMACIDE SOW METH	ALDICARB	CARBOFUR	MEAN			
DRILL	3.72	4.80	4.26			
PLOUGH						
PLUUGH	3.03	3.25	3.14			
MEAN	3.37	4.02	3.70			
NEM RATE SOW METH	1.25	2.50	5.0	MEAN		
DRILL	3.85	4.37	A EE	4 00		
			4.55	4.26		
PLOUGH	3.16	3.15	3.10	3.14		
MEAN	3.51	3.76	3.82	3.70		
NEM RATE	1.25	2.50	5.0	MEAN		
NEMACIDE		2.00	3.0	HEAR		
ALDICARB	3.25	3.35	3.51	3.37		
CARBOFUR	3.76	4.17	4.13	4.02		
MEAN	3.51	3.76	3.82	3.70		
				0.,0		
NEMACIDE	ALDICARB		CAI	RBOFUR		
NEM RATE	1.25	2.50	5.0	1.25	2.50	5.0
SOW METH			•••	1.20	2.30	3.0
DRILL	3.29	3.55	4.31	4.42	5.18	4.79
PLOUGH	3.21	3.15	2.72	3.11	3.15	3.48
		-				0.10
EXTRA D	RILL O PL	OUGH 0	MEAN			
	3.74	2.99	3.37			
			27.000.000			

GRAND MEAN 3.61

**** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	SOW METH	NEMACIDE	NEM RATE
SED	0.369	0.213	0.213	0.261
TABLE	SOW METH NEMACIDE	SOW METH NEM RATE	NEMACIDE NEM RATE	SOW METH NEMACIDE NEM RATE
SED	0.302	0.369	0.369	0.522

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV% BLOCK.WP 32 0.640 17.7

GRAIN MEAN DM% 83.7 PLOT AREA HARVESTED 0.00042

SPRING BEANS

EFFECTS OF PESTS AND PATHOGENS

Object: To assess the effects of three amounts of pest and disease control on irrigated and unirrigated s. beans - Fosters Corner.

Sponsors: J. McEwen, R. Bardner, A.J. Cockbain, D.H. Lapwood, R.M. Webb, D.P. Yeoman.

Design: 4 randomised blocks of 2 plots split into 3.

Whole plot dimensions: 4.27 x 13.7.

Treatments: All combinations of:-

Whole plots

1. IRRIGATN Irrigation:

NONE None

FULL Full (total 150 mm)

Sub plots

2. PATHCONT Pest and pathogen control:

STANDARD None

ENHANCED Phorate at 2.2 kg, applied to seed furrows

Pirimicarb at 0.14 kg on 4 June, 1984 Maneb at 0.8 kg with mancozeb at 0.8 kg on

1 Aug

Benomyl at 0.56 kg on 16 Aug FULL Aldicarb at 10 kg on 20 Mar

Phorate at 2.2 kg applied to seed furrows Fosetyl-Al at 1.6 kg on 16 May Pirimicarb at 0.14 kg on 4 June

Benomyl at 0.56 kg on 6 July and 16 Aug Maneb at 0.8 kg with mancozeb at 0.8 kg on

1 Aug and 16 Aug

NOTES: (1) A planned application of pirimicarb to all plots was omitted because black aphids were few.

(2) Irrigation was applied as follows (mm water):

3 May 25 15 May 15 June 25 24 July 25 1 Aug 25 15 Aug 25

Total 150 mm

(3) Treatment sprays were applied in 220 1.

Basal applications: Weedkillers: Simazine at 1.2 kg in 250 1.

Seed: Minden, sown at 200 kg.

Cultivations, etc.:- Ploughed: 6 Dec, 1983. Heavy spring-tine cultivated, aldicarb broadcast, rotary harrowed, phorate applied and seed sown: 20 Mar, 1984. Weedkiller applied: 22 Mar. Combine harvested: 31 Aug. Previous crops: W. wheat 1982, s. barley 1983.

NOTE: Plant counts were made after establishment and components of yield were measured at maturity. Total above ground dry matter and N content were measured in August. Migratory nematodes, root and foliar fungi, aphids, weevils and viruses were counted at intervals during the season. N content of grain was measured.

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

PATHCONT IRRIGATN	STANDARD	ENHANCED	FULL	MEAN
NONE FULL	3.46 4.69	4.13 5.39	4.57 5.59	4.05 5.22
MEAN	4.08	4.76	5.08	4.64

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	PATHCONT	IRRIGATN* PATHCONT
SED	0.118	0.167

^{*} WITHIN THE SAME LEVEL OF IRRIGATN ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	12	0.235	5.1

GRAIN MEAN DM% 85.7

SPRING BEANS

CONTROL OF PRATYLENCHUS

Object: To study the effects of aldicarb and carbofuran on numbers of Pratylenchus nematodes and on the yield of s. beans - Highfield VI.

Sponsor: R.M. Webb.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 5.33 x 13.7.

Treatments:

NEMACIDE Nematicides, rates and methods of application:

NONE None

AL BC Aldicarb at 10 kg, worked into seedbed

Carbofuran applied to seed furrows at sowing:

CA 1 CD At 1.7 kg
CA 2 CD At 2.2 kg
CA 3 CD At 3.2 kg

Basal applications: Weedkiller: Simazine at 1.2 kg in 250 l.

Seed: Minden, sown at 240 kg.

Cultivations, etc.:- Heavy spring-tine cultivated: 12 Sept, 1983.
Ploughed: 15 Dec. Heavy spring-tine cultivated: 19 Mar, 1984. Aldicarb treatment applied, rotary harrowed, seed sown: 21 Mar. Weedkiller applied: 22 Mar. Combine harvested: 31 Aug. Previous crops: W. wheat 1982, s. barley 1983.

NOTE: Soil was sampled for nematodes just before treatments were applied, soil and plants were sampled in late May, and soils and roots in mid-June.

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

NEMACIDE NONE AL BC CA 1 CD CA 2 CD CA 3 CD MEAN 5.03 5.84 6.22 5.90 5.54 5.71

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE NEMACIDE
SED 0.178

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM

DF SE CV%

BLOCK. WP

12 0.252

4.4

GRAIN MEAN DM% 87.6

SPRING BEANS

ERYNIA AND APHID CONTROL

Object: To study the effects of applying two amounts of the aphidpathogenic fungus Erynia neoaphidis to two s. bean cultivars differing in susceptibility to black aphids (Aphis fabae) - Sawyers I East.

Sponsor: S.K. Mardell.

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

Whole plot dimensions: 2.67 x 2.13.

Treatments: All combinations of:-

Whole plots

1. VARIETY Varieties and susceptibility to black aphids:

BEAD VS Maris Bead, very susceptible HERRA LS Herra, less susceptible

Sub plots

2. APH CONT Biological and chemical aphid control:

NONE None

E. neoaphidis applied as a powder of mummified aphids on 11 June and on 24 June, 1984:

E NEO 1 At 0.5 mg per plant on each occasion E NEO 2 At 5.0 mg per plant on each occasion

PIRIMICA Pirimicarb applied at 0.44 kg in 530 l on 11 June

NOTE: Basal irrigation was applied as follows (mm water):

4	May	25	3 July	12.5
9	May	16	6 July	12.5
15	May	25	13 July	12.5
15	June	20	20 July	12
19	June	12.5	25 July	12
29	June	12.5	27 July	12.5

Total 185 mm

Basal applications: Manures: Chalk at 5.0 t. Weedkiller: Simazine at 1.2 l in 250 l.

Seed: Sown at 200 kg.

Cultivations, etc.:- Chalk applied: 24 Oct, 1983. Heavy spring-tine cultivated twice: 11 Nov. Ploughed: 8 Dec. Heavy spring-tine cultivated, rotary harrowed: 20 Mar, 1984. Seed sown: 22 Mar. Weedkiller applied: 23 Mar. Harvested by hand: 12 Sept. Previous crops: S. barley 1982 and 1983.

NOTES: (1) Samples of live aphids were examined for infection with Erynia and other fungal pathogens at weekly intervals during June and July.

(2) Aphid numbers were assessed weekly from mid-June to early August.

GRAIN TONNES/HECTARE

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

APH CONT VARIETY	NONE	E NEO 1	E NEO 2	PIRIMICA	MEAN
BEAD VS HERRA LS	3.81 5.08	4.34 4.69	4.50 3.89	4.82 5.75	4.37 4.85
MEAN	4.44	4.51	4.19	5.29	4.61

**** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	APH CONT	VARIETY* APH CONT
CCD		
SED	0.472	0.667

^{*} WITHIN THE SAME LEVEL OF VARIETY ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	0.944	20.5

GRAIN MEAN DM% 89.3

SPRING BEANS

CONTROL OF STEM NEMATODE

Object: To study the effects of two chemicals, applied at three rates and at two times, on the control of seed-borne infestations of stem nematode (Ditylenchus dipsaci) in a spring and a winter variety of field bean sown in spring - ex-Allotments.

Sponsors: A.G. Whitehead.

Design: 2 randomised blocks of 18 plots.

Whole plot dimensions: 2.3 x 4.6.

Treatments: All combinations of:-

VARIETY

Varieties:

BEAD THROWS Maris Bead, spring variety Throws M.S., winter variety

2. NEMACIDE

Nematicides:

ALDICARB CARBOFUR Aldicarb Carbofuran

3. NEM RATE

Rates and times of applying nematicides:

1 2

1 kg to seed furrow at sowing 2 kg to seed furrow at sowing 4 kg to seed furrow at sowing

4 2+2

2 kg to seed furrow at sowing plus 2 kg on 30 May, 1984 to foliage

CO 1011a

plus two extra treatments:

EXTRA

BEAD 0 THROWS 0 Maris Bead given no nematicide Throws M.S. given no nematicide

Basal applications: Manures: (0:14:28) at 450 kg. Weedkiller: Simazine at 1.1 kg in 560 l. Fungicide: Benomyl at 0.56 kg in 280 l on two occasions. Insecticide: Pirimicarb on two occasions, at 0.14 kg in 340 l on the first and in 280 l on the second.

Seed: Throws MS, sown at 240 kg. Maris Bead, sown at 260 kg.

Cultivations, etc.:- PK applied: 5 Mar, 1984. Seed sown: 8 Mar. Weedkiller applied: 16 Mar. Pirimicarb applied: 13 June. Fungicide applied: 19 June, 2 July. Pirimicarb applied: 18 July. Combine harvested VARIETY BEAD: 13 Aug. Combine harvested VARIETY THROWS: 28 Aug. Previous crops: S. barley 1982, fallow 1983.

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

NEMACIDE VARIETY	ALDICARB C	ARBOFUR	MEAN		
BEAD	3.88	3.75	3.82		
THROWS	3.79	3.90	3.84		
MEAN	3.83	3.83	3.83		
NEM RATE VARIETY	1	2	4	2+2	MEAN
BEAD	3.71	3.46	3.78	4.32	3.82
THROWS	3.73	3.84	3.68	4.13	3.84
MEAN	3.72	3.65	3.73	4.22	3.83
NEM RATE NEMACIDE	1	2	4	2+2	MEAN
ALDICARB	3.66	3.59	3.79	4.28	3.83
CARBOFUR	3.77	3.71	3.67	4.16	3.83
MEAN	3.72	3.65	3.73	4.22	3.83
	NEM RATE	1	2	4	2+2
VARIETY	NEMACIDE			*	
BEAD	ALDICARB	3.90	3.36	3.86	4.40
	CARBOFUR	3.51	3.56	3.70	4.24
THROWS	ALDICARB	3.42	3.82	3.73	4.17
	CARBOFUR	4.03	3.86	3.63	4.08
EXTRA E	BEAD O THROW	VS 0 MI	EAN		

3.54

GRAND MEAN 3.80

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

3.63

3.45

TABLE	EXTRA	VARIETY	NEMACIDE	NEM RATE
SED	0.322	0.117	0.117	0.166
TABLE	VARIETY NEMACIDE	VARIETY NEM RATE	NEMACIDE NEM RATE	VARIETY NEMACIDE NEM RATE & EXTRA
SED	0.166	0.235	0.235	0.332

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV% BLOCK.WP 17 0.332 8.7

GRAIN MEAN DM% 80.3 PLOT AREA HARVESTED 0.00070

SPRING BEANS

VARIETIES

Object: To compare agronomic characters and yields of four varieties of s. beans - Long Hoos III 7.

Sponsors: J. McEwen, D.P. Yeoman.

Design: 4 randomised blocks of 4 plots.

Whole plot dimensions: 2.03 x 2.13.

Treatments:

VARIETY Varieties:

ALFRED MINDEN NABOR TROY

Note: Seed was sown by hand in rows 51 cm apart, seed spaced 5 cm apart in the row.

Basal applications: Manures: Chalk at 2.9 t. Weedkillers: Glyphosate at 0.72 kg in 200 l; trietazine at 0.95 kg with simazine at 0.14 kg in 220 l. Fungicides: Benomyl at 0.56 kg in 220 l on two occasions, the first with pirimicarb; propiconazole at 0.12 kg in 220 l. Insecticides: Permethrin at 0.15 kg in 220 l; cypermethrin at 0.025 kg in 220 l on two occasions; pirimicarb at 0.14 kg in 220 l on three occasions, the second with the benomyl.

Cultivations, etc.:- Chalk applied: 26 Aug, 1983. Glyphosate applied: 16 Dec. Ploughed: 30 Jan, 1984. Power harrowed, seed sown: 16 Mar. Trietazine and simazine applied: 30 Mar. Permethrin applied: 1 May. Cypermethrin applied: 16 May, 6 June. Pirimicarb applied: 4 June, 26 July. Pirimicarb with benomyl applied: 6 July. Propiconazole applied: 1 Aug. Benomyl applied: 14 Aug. Harvested by hand: 24 Aug. Previous crops: S. wheat 1982, mixed cereals 1983.

NOTE: Plant counts were made after establishment. Components of yield were measured at maturity. N content of grain was measured.

GRAIN TONNES/HECTARE

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

VARIETY ALFRED MINDEN NABOR TROY MEAN 4.47 4.31 4.60 4.82 4.55

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE VARIETY
SED 0.235

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP 9 0.333 7.3

GRAIN MEAN DM% 87.7

SPRING BEANS

SEED RATES AND PLANT HEALTH

Object: To study the effects of three seed rates and two standards of plant health on the yield of s. beans - Long Hoos III O and E.

Sponsors: J. McEwen, D.P. Yeoman.

Design: 4 randomised blocks of 6 plots.

Whole plot dimensions: 2.40 x 3.00.

Treatments: All combinations of:-

POPULATN Plant populations per hectare:

		Mean
	Target	Population
	population	achieved
200	200,000	210,000
400	400,000	420,000
600	600,000	560,000
2. PATHCONT	Pest and patho	gen control:
STANDARD	Pirimicarb at	0.14 kg in 220 l on 6 July, 1984
ENHANCED	Cypermethrin a Pirimicarb at Benomyl at 0.5	0.15 kg in 220 l on 1 May t 0.025 kg in 220 l on 16 May, 6 June 0.14 kg in 220 l on 4 June, 6 July 6 kg in 220 l on 6 July, 14 Aug at 0.12 kg in 220 l on 1 Aug

Basal applications: Weedkillers: Trietazine at 0.95 kg with simazine at 0.14 kg in 220 l.

Seed: Minden.

Cultivations, etc.:- Ploughed: 7 Dec, 1983. Spring-tine cultivated, seed sown: 20 Mar, 1984. Weedkillers applied: 2 Apr. Harvested by hand: 23 Aug. Previous crops: S. barley 1982 and 1983.

NOTE: Plant counts were made after establishment and components of yield were measured at maturity.

GRAIN TONNES/HECTARE

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

PATHCONT	STANDARD	ENHANCED	MEAN
POPULATN			
200	3.99	4.10	4.05
400	3.97	4.30	4.14
600	4.08	4.55	4.32
MEAN	4.01	4.32	4.17

**** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	POPULATN	PATHCONT	POPULAT N PATHCONT
SED	0.163	0.133	0.231

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 15 0.326 7.8

GRAIN MEAN DM% 88.8

SPRING BEANS

CONTROL OF RUST

Object: To study the effects of fungicides on the control of rust (Uromyces viciae-fabae) and on the yield of unirrigated and irrigated s. beans - Long Hoos IV 3.

Sponsors: D.H. Lapwood, J. McEwen, D.P. Yeoman.

Design: 2 randomised blocks of 2 plots split into 12.

Whole plot dimensions: 2.03 x 2.13.

Treatments: All combinations of:-

Whole plots

1. IRRIGATN Irrigation:

0 None

I Irrigated (86 mm)

Sub plots

2. C S FUNG Fungicide to control chocolate spot but not rust:

NONE None

BENOMYL Benomyl at 0.56 kg in 220 l on 6 July, 14 Aug, 1984

3. RUSTFUNG Fungicides to control rust:

MAN+MANC Maneb at 0.8 kg + mancozeb at 0.8 kg in 340 l

PROPICON Propiconazole at 0.12 kg in 340 l

4. RFNGTIME Times of applying fungicides to control rust:

ONCE Once on 1 Aug

TWICE Twice, on 1 Aug and 8 Aug

plus two extra sub plot treatments:

EXTRA

NONE No fungicides (duplicated)

BENOMYL Benomyl at 0.56 kg in 220 l on 6 July, 14 Aug

(duplicated)

NOTE: After two post-flowering applications totalling 38 mm irrigation was applied subsequently at 8 mm, on two occasions per week, unless 4 mm or more of rain had fallen since the last application.

Date	mm water
13 July	13
20 July	25
24 July	8
27 July	8
31 July	8
3 Aug	8
21 Aug	8
24 Aug	8
Total	86 mm

Basal applications: Manures: Chalk at 2.9 t. Weedkillers: Trietazine at 0.95 kg with simazine at 0.14 kg in 220 l. Insecticides: Permethrin at 0.15 kg in 220 l; cypermethrin at 0.025 kg in 220 l on two occasions; pirimicarb at 0.14 kg in 220 l on two occasions.

Seed: Minden, sown at 200 kg.

Cultivations, etc.:- Chalk applied: 25 Aug, 1983. Ploughed: 17 Nov. Spring-tine cultivated, seed sown: 19 Mar, 1984. Weedkillers applied: 2 Apr. Permethrin applied: 1 May. Cypermethrin applied: 16 May, 6 June. Pirimicarb applied: 4 June, 6 July. Harvested by hand: 23 Aug (unirrigated plots), 30 Aug (irrigated plots). Previous crops: Potatoes 1982, s. wheat 1983.

NOTE: Plant counts were made after establishment. The incidence of chocolate spot and rust were assessed from early July until maturity. Components of yield were measured at maturity.

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

C S FUNG	NONE	BENOMYL	MEAN
		D211011112	
IRRIGATN			
0	4.78	4.47	4.63
T	5.37		
1	5.3/	5.27	5.32
MEAN	5.08	4.87	4.97
HEAR	3.00	4.07	7.31
RUSTFUNG	MAN+MANC	PROPICON	MEAN
IRRIGATN		The state of the s	
0	4.77	4.48	4.63
Ţ	5.43	5.21	5.32
	3.40	3.21	3.32
MEAN	5.10	4.85	4.97
	0.10		1001

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

RUSTFUNG C S FUNG	MAN+MANC	PROPICO	N ME	AN
NONE	5.35	4.8	0 5.	0.0
BENOMYL				
DENUMIL	4.85	4.8	9 4.	87
MEAN	5.10	4.8	5 4.	97
RFNGTIME IRRIGATN	ONCE	TWIC	E ME	AN
0	4.86	4.4	0 4.	63
I	5.31	5.3		
•	3.31	3.51		J.C.
MEAN	5.09	4.8	6 4.	97
RFNGTIME	ONCE	TWICE	E ME	AN
C S FUNG				
NONE	5.22	4.9	3 5.0	18
BENOMYL	4.95	4.78		
DEMONTE	4.33	4.70	9 4.0	0/
MEAN	5.09	4.8	6 4.9	97
RFNGTIME RUSTFUNG	ONCE	TWICE	E ME	AN
MAN+MANC	5.26	4.0		
		4.9		
PROPICON	4.91	4.78	3 4.8	35
MEAN	5.09	4.86	6 4.9	97
C S FUNG	NONE		BENOMYL	
RUSTFUNG	MAN+MANC	PROPICON	MAN+MANC	PROPICON
IRRIGATN	10.111.11110	. NOI TOOK	PIANTPIANO	PROFICON
0	E 00	1 10	4 45	4 40
	5.09			
I	5.61	5.13	5.24	5.29
C S FUNG	NONE		BENOMYL	
RFNGTIME	ONCE	TWICE	ONCE	TWICE
IRRIGATN	0.102		OHOL	INTOL
0	5.04	4.53	4.68	4.26
Ĭ	5.41	5.33		
	3.41	3.33	5.22	5.31
RUSTFUNG	MAN+MANC		PROPICON	
RFNGTIME	ONCE	TWICE	ONCE	TWICE
IRRIGATN	OHOL	INICL	ONCL	IMICE
0	5.06	4.49	1 66	4 21
I			4.66	4.31
	5.46	5.39	5.17	5.25
RUSTFUNG	MAN+MANC		PROPICON	
RFNGTIME	ONCE	TWICE	ONCE	TWICE
C S FUNG			31102	HIOL
NONE	5.42	5.28	5.02	4 50
BENOMYL	5.09			4.59
BENOMIL	5.09	4.60	4.81	4.97

GRAIN TONNES/HECTARE

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

	RUSTFUNG	MAN+MANC	PR	OPICON	
	RFNGTIME	ONCE	TWICE	ONCE	TWICE
IRRIGATN	C S FUNG				
. 0	NONE	5.29	4.89	4.78	4.17
	BENOMYL	4.82	4.08	4.54	4.44
I	NONE	5.56	5.66	5.25	5.00
	BENOMYL	5.36	5.12	5.08	5.50
EXTRA IRRIGATN	NONE	BENOMYL	MEAN		
0	4.41	4.45	4.43		
I	5.24	5.41	5.32		
MEAN	4.82	4.93	4.87		

GRAND MEAN 4.94

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	EXTRA	C S FUNG	RUSTFUNG	RFNGTIME
SED	0.140	0.099	0.099	0.099
TABLE	IRRIGATN* C S FUNG	IRRIGATN* RUSTFUNG	C S FUNG RUSTFUNG	IRRIGATN* RFNGTÍME
SED	0.140	0.140	0.140	0.140
TABLE	C S FUNG RFNGTIME	RUSTFUNG RFNGTIME	IRRIGATN* C S FUNG RUSTFUNG	IRRIGATN* C S FUNG RFNGTIME
SED	0.140	0.140	0.198	0.198
TABLE	IRRIGATN* RUSTFUNG RFNGTIME	C S FUNG RUSTFUNG RFNGTIME	IRRIGATN* C S FUNG RUSTFUNG RFNGTIME	IRRIGATN* EXTRA
SED	0.198	0.198	0.281	0.198

^{*} WITHIN THE SAME LEVEL OF IRRIGATN

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP 26 0.281 5.7

GRAIN MEAN DM% 89.2

SPRING BEANS

FUNGICIDES FOR RUST CONTROL

Object: To study the effects of a range of fungicides on the control of rust (Uromyces viciae-fabae) and on the yield of s. beans - Long Hoos IV 3.

Sponsors: D.H. Lapwood, J. McEwen, D.P. Yeoman.

Design: 2 randomised blocks of 18 plots.

Whole plot dimensions: 2.03 x 2.13.

Treatments: All combinations of:-

1. RUSTFUNG Fungicides to control rust:

FENPROP Fenpropimorph at 0.7 kg
MANEB Maneb at 0.8 kg
MANCOZEB Mancozeb at 0.8 kg
MAN+MANC Maneb at 0.8 kg plus manc

MAN+MANC Maneb at 0.8 kg plus mancozeb at 0.8 kg

PROPICON Propiconazole at 0.12 kg
THIRAM Thiram at 2.5 kg

THIRAM Thiram at 2.5 kg
TRIADIME Triadimefon at 0.5 kg

ZIN+TRID Zineb polyethylene thiram disulphide at 1.6 kg

plus tridemorph at 0.53 kg

2. RFNGTIME Times of applying fungicides to control rust:

ONCE Once on 1 Aug, 1984
TWICE Twice, on 1 Aug and 8 Aug

plus one extra treatment:

EXTRA

NONE No fungicides to control rust (duplicated)

NOTE: All sprays were applied in 340 1.

Basal applications: Manures: Chalk at 2.9 t. Weedkillers: Trietazine at 0.95 kg with simazine at 0.14 kg in 220 l. Fungicide: Benomyl at 0.56 kg in 220 l with pirimicarb. Insecticides: Permethrin at 0.15 kg in 220 l; cypermethrin at 0.025 kg in 220 l on two occasions; pirimicarb at 0.14 kg in 220 l on two occasions, the second with the benomyl.

Seed: Minden, sown at 200 kg.

Cultivations, etc.:- Chalk applied: 25 Aug, 1983. Ploughed: 17 Nov. Spring-tine cultivated, seed sown: 19 Mar, 1984. Weedkillers applied: 2 Apr. Permethrin applied: 1 May. Cypermethrin applied: 16 May, 6 June. Pirimicarb applied: 4 June. Pirimicarb with benomyl applied: 6 July. Harvested by hand: 6 Sept. Previous crops: Potatoes 1982, s. wheat 1983.

NOTES: (1) Plant counts were made after establishment. Amounts of chocolate spot and rust were assessed from early July until maturity. Components of yield were measured at maturity.

(2) One plot was accidentally damaged while laying out irrigation equipment, with treatment combination FENPROP ONCE, an estimated value was used in the analysis.

GRAIN TONNES/HECTARE

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

RFNGTIME	ONCE	TWICE	MEAN
RUSTFUNG			
FENPROP	5.08	5.53	5.30
MANEB	5.26	4.81	5.03
MANCOZEB	6.31	5.70	6.01
MAN+MANC	6.03	5.41	5.72
PROPICON	5.33	4.98	5.16
THIRAM	5.63	4.87	5.25
TRIADIME	5.25	5.70	5.48
ZIN+TRID	5.56	5.42	5.49
MEAN	5.55	5.30	5.43

NONE

5.53

GRAND MEAN

5.44

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	RUSTFUNG	RFNGTIME	RUSTFUNG RFNGTIME
SED	0.386	0.193	0.546

SED FOR COMPARING NONE WITH ANY ITEM IN RUSTFUNG.RFNGTIME TABLE IS 0.473

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%	
BLOCK.WP	17	0.546	10.0	

GRAIN MEAN DM% 89.8

84/R/PE/1

PEAS

CONTROL OF PESTS AND DISEASES

Object: To study the effects of aldicarb, tolclofos methyl and permethrin on soil-inhabiting pests and pathogens and on the yield of peas - Long Hoos V 7.

Sponsors: J. McEwen, R. Bardner, A.J. Cockbain, C.D. Green, D.H. Lapwood, R.M. Webb, A.G. Whitehead, D.P. Yeoman.

Design: 3 randomised blocks of 8 plots.

Whole plot dimensions: 3.05 x 4.57.

Treatments: All combinations of:-

1. NEMACIDE

Nematicide:

NONE

None

ALDICARB

Aldicarb at 5 kg combine drilled

2. FUNGCIDE

Fungicide:

NONE

None

TOL METH

Tolclofos methyl at 50 kg worked into the seedbed

3. INSCTCDE

Insecticide:

NONE

None

PERMETH

Permethrin at 0.15 kg in 220 l on 4 May, 1984 and

31 May

Basal applications: Manures: Chalk at 2.9 t. Muriate of potash at 520 kg. Weedkillers: Trietazine at 0.95 kg with simazine at 0.14 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 220 l.

Seed: Progreta, dressed metalaxyl and thiram, sown at 290 kg.

Cultivations, etc.:- Muriate of potash applied: 17 Aug, 1983. Chalk applied: 25 Aug. Ploughed: 22 Nov. Spring-tine cultivated twice, seed sown: 9 Mar, 1984. Weedkillers applied: 13 Mar. Insecticide applied: 6 June. Combine harvested: 10 Aug. Previous crops: Potatoes 1982, s. barley 1983.

NOTE: Plants were counted after establishment. Weevils, migratory nematodes, root fungi and viruses were counted during the season. N content of grain was measured.

84/R/PE/1

GRAIN TONNES/HECTARE

****	TABL	FS	OF	MEANS	****
	IADL	E D	UF	MEANS	****

FUNGCIDE	NONE	TOL METH	MEA	N
	5 77	E 0E	E 0	1
ALDICARD	0.25	6.19	6.2	2
MEAN	6.01	6.02	6.0	1
INSCTCDE NEMACIDE	NONE	PERMETH	MEA	N
NONE	5.60	6.02	5.8	1
ALDICARB	6.17	6.27		
MEAN	5.88	6.14	6.0	1
INSCTCDE	NONE	PERMETH	MEA	N
NONE	5.94	6.08	6.0	1
TOL METH	5.83	6.21		-
MEAN	5.88	6.14	6.0	1
FUNGCIDE	NONE	T0	L METH	
INSCTCDE NEMACIDE	NONE	PERMETH	NONE	PERMETH
NONE	5.54	5.99	5 65	6.05
ALDICARB	6.34	6.16	6.00	6.38
	NEMACIDE NONE ALDICARB MEAN INSCTCDE NEMACIDE NONE ALDICARB MEAN INSCTCDE FUNGCIDE NONE TOL METH MEAN FUNGCIDE INSCTCDE NEMACIDE NONE	NEMACIDE NONE NONE NONE ALDICARB MEAN INSCTCDE NONE NONE NONE ALDICARB INSCTCDE NONE FUNGCIDE NONE TOL METH S.83 FUNGCIDE NONE INSCTCDE NONE TOL METH S.83 FUNGCIDE NONE NONE NONE S.94 TOL METH S.83 MEAN FUNGCIDE NONE NONE NONE NONE NONE NONE NONE NO	NEMACIDE NONE NONE ALDICARB 5.77 6.25 5.85 6.19 MEAN 6.01 6.02 INSCTCDE NONE NONE ALDICARB NONE 6.17 PERMETH 6.27 MEAN 5.88 6.14 INSCTCDE FUNGCIDE NONE TOL METH NONE 5.94 6.08 6.21 MEAN 5.83 6.21 MEAN 5.88 6.14 FUNGCIDE INSCTCDE NONE NONE NONE TO NONE PERMETH TOL METH NONE NONE TO NONE FUNGCIDE NONE NONE NONE TO PERMETH TOL METH TO NONE TO NONE TOL METH TO NONE TO NONE TOL METH TO NONE TO NONE TOL METH TO NONE TO NONE	NEMACIDE NONE 5.77 5.85 5.8 ALDICARB 6.25 6.19 6.2 MEAN 6.01 6.02 6.0 INSCTCDE NONE PERMETH MEA NONE 5.60 6.02 5.8 ALDICARB 6.17 6.27 6.2 MEAN 5.88 6.14 6.0 INSCTCDE NONE PERMETH MEA FUNGCIDE NONE 6.08 6.0 TOL METH 5.83 6.21 6.0 MEAN 5.88 6.14 6.0 FUNGCIDE NONE TOL METH NONE NONE PERMETH NONE NONE NONE 5.54 5.99 5.65

**** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	NEMACIDE	FUNGCIDE	INSCTCDE	NEMACIDE FUNGCIDE
SED	0.156	0.156	0.156	0.220
TABLE	NEMACIDE INSCTCDE	FUNGCIDE INSCTCDE	NEMACIDE FUNGCIDE INSCTCDE	
SED	0.220	0.220	0.312	

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%
BLOCK.WP 14 0.382 6.3

GRAIN MEAN DM% 82.9

84/R/FE/1

FENUGREEK

N, RHIZOBIUM AND PEST CONTROL

Object: To study the effects of inoculation with Rhizobium, application of insecticide and times of applying nitrogen fertilizer on nodulation and yield of fenugreek (Trigonella foenum - graecum) - Long Hoos III 7.

Sponsor: D.P. Yeoman.

Design: 2 randomised blocks of 14 plots.

Whole plot dimensions: 2.64 x 8.00.

Treatments: All combinations of:-

INOCULUM Inoculum applied to the seed:

NONE None

RHIZOBUM Rhizobium meliloti, strain 2012, as a peat culture

2. N Nitrogen fertilizer (kg N) and times of application:

None

150 S 150 to the seedbed, on 14 May, 1984

150 F 150 at flowering, on 16 July

3. INSCTCDE Insecticide:

NONE None

PERMETH Permethrin foliar spray at 0.053 kg in 220 l on 15 June

and 6 July

plus two extra treatments, each given 30 kg N to the seedbed and permethrin as above:

EXTRA

O N3OS P No inoculum

R N3OS P Rhizobium inoculum as above

Basal applications: Manures: Chalk at 2.9 t. Weedkillers: Glyphosate at 0.72 kg in 200 l. MCPB at 2.24 kg in 220 l. Trifluralin at 0.81 kg in 220 l. Desiccant: Diquat at 0.84 kg ion in 220 l on two occasions.

Seed: Barbara, sown at 29 kg.

Cultivations, etc.:- Chalk applied: 26 Aug, 1983. Glyphosate applied: 16 Dec. Ploughed: 30 Jan, 1984. Spring-tine cultivated, trifluralin applied, power harrowed, seed sown: 14 May. MCPB applied: 5 July. Hand weeded: 24 July. Desiccant applied: 7 Sept, 12 Sept. Combine harvested: 27 Sept. Previous crops: S. wheat 1982, mixed cereals 1983.

NOTE: Plant counts were made after establishment. N content of grain was measured.

0.4	10	155	14
84	10	/ - -	/ 1

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

N INOCULUM	0	150 S	150	F ME	AN	
NONE	0.05	0.11	0.0	7 0.0	10	
RHIZOBUM	0.09	0.11				
KHIZODOM	0.09	0.11	0.0	7 0.0	19	
MEAN	0.07	0.11	0.0	7 0.0	8	
INSCTCDE	NONE	PERMETH	MEA	N		
INOCULUM	HOHL	LINE	HLA			
NONE	0.06	0.09	0.0	8		
RHIZOBUM	0.09	0.09	0.0	9		
MEAN	0.08	0.09	0.0	8		
INSCTCDE	NONE	PERMETH	MEA	N		
N						
0	0.06	0.08	0.0	7		
150 S	0.08	0.14	0.1	1		
150 F	0.08	0.05	0.0			
MEAN	0.08	0.09	0.08	8		
N	0		150 S		150 F	
INSCTCDE	NONE	PERMETH	NONE	PERMETH	NONE	PERMETH
INOCULUM						
NONE	0.05	0.05	0.05	0.17	0.09	0.05
RHIZOBUM	0.08	0.11	0.12	0.11	0.07	0.06
					3.07	3.00
EXTRA 0 N305	SPR	N3OS P	MEAN			
	.09	0.10	0.09			

GRAND MEAN 0.09

**** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	INOCULUM	N	INSCTCDE
SED	0.043	0.018	0.022	0.018
TABLE	I NOCULUM N	INOCULUM INSCTCDE	N INSCTCDE	INOCULUM N INSCTCDE & EXTRA
SED	0.031	0.025	0.031	0.043

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV%

BLOCK.WP 13 0.043 50.5

GRAIN MEAN DM% 55.9 PLOT AREA HARVESTED 0.00154

WINTER OILSEED RAPE

UREA AND INHIBITORS

Object: To study the effects of adding nitrification inhibitors to prilled urea, applied to the seedbed and in spring on the yield and nitrogen uptake of w. oilseed rape - Whittlocks.

Sponsors: G.A. Rodgers, A. Penny, M.V. Hewitt.

Design: 2 randomised blocks of 17 plots.

Whole plot dimensions: 4.0 x 20.0.

Treatments: All combinations of:-

1. N INHIB	Forms of nitrogen and nitrification inhibitor used for	
	seedbed and spring nitrogen applications:	

AN O	Ammonium nitrate (as 'Nitro-Chalk'), no inhibitor
PU 0	Prilled urea, no inhibitor
PU DIC	Prilled urea and dicyandiamide
PU HYD	Prilled urea and hydroquinone
	The state of the s

2. SEEDBD N Nitrogen rates (kg N) to seedbed (on 22 August, 1983):

50

3. SPRING N Nitrogen rates (kg N) and times in spring:

75E+75L 75 on 10 Feb and 75 on 21 Mar, 1984.

150M 150 on 5 Mar.

plus one extra treatment:

EXTRA

NONE No nitrogen fertilizer or inhibitor

NOTE: Dicyandiamide and hydroquinone were applied at 25 and 10 kg respectively in combination with SEEDBD N 0 and at 33 kg and 13 kg with SEEDBED N 50.

Basal applications: Weedkillers: TCA at 11 kg in 250 l. Propyzamide and 3, 6-dichloropicolinic acid (as 'Matrikerb' at 1.6 kg) in 500 l. Fungicide: Prochloraz at 0.50 kg in 250 l. Desiccant: Diquat at 0.6 kg ion with 'Agral', a wetting agent at 0.5 l, in 500 l.

Seed: Jet Neuf, dressed gamma HCH, thiram, fenpropimorph and iprodione, sown at 9.0 kg.

Cultivations, etc.:- Disced: 17 Aug, 1983. TCA applied: 23 Aug. Springtine cultivated: 24 Aug. Seed direct drilled: 25 Aug. 'Matrikerb' applied: 25 Oct. Fungicide applied: 18 Apr, 1984. Desiccant applied: 25 July. Combine harvested: 30 July. Previous crops: W. wheat 1982, w. barley 1983.

NOTES: (1) Dry matter and N contents of plants were measured in February, May and June

(2) S contents of leaves were measured in May.

(3) Oil and protein contents of grain were measured.

GRAIN (AT 90% DM) TONNES/HECTARE

**** TABLES OF MEANS ****

SEEDBD N	0	50	MEAN	
N INHIB				
AN O	3.10	3.16		
PU 0	2.87	2.83	2.85	
PU DIC	2.65	2.86	2.76	
PU HYD	3.09	3.04	3.07	
MEAN	2.93	2.97	2.95	
SPRING N	75E+75L	150M	MEAN	
N INHIB				
AN O	3.06	3.21	3.13	
PU 0	2.92	2.78	2.85	
PU DIC	2.79	2.72	2.76	
PU HYD	3.06	3.08	3.07	
MEAN	2.96	2.95	2.95	
SPRING N SEEDBD N	75E+75L	150M	MEAN	
0	3.01	2.85	2.93	
50	2.90	3.04	2.97	
MEAN	2.96	2.95	2.95	
SEEDBD N	0		50	
SPRING N	75E+75L	150M	75E+75L	150M
N INHIB				
AN O	3.13	3.08	2.98	3.35
PU 0	3.00	2.74	2.83	2.82
PU DIC	2.71	2.59	2.87	2.85
PU HYD	3.18	3.01	2.94	3.14

1.33

2.86

NONE

GRAND MEAN

GRAIN (AT 90% DM) TONNES/HECTARE

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	N INHIB	SEEDBD N	SPRING N	N INHIB SEEDBD N
SED	0.089	0.063	0.063	0.126
TABLE	N INHIB SPRING N	SEEDBD N SPRING N	N INHIB SEEDBD N SPRING N & NONE	
SED	0.126	0.089	0.179	

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 16 0.179 6.3

GRAIN MEAN DM% 87.6

WINTER OILSEED RAPE

SPRING NITROGEN INHIBITORS

Object: To study the effects of adding nitrification inhibitors to prilled urea, applied in spring, on the yield and nitrogen uptake of w. oilseed rape - Whittlocks.

Sponsors: G.A. Rodgers, A. Penny, M.V. Hewitt.

Design: 2 randomised blocks of 9 plots.

Whole plot dimensions: 4.0 x 20.0.

Treatments: All combinations of:-

1.	N INHIB	Forms of nitrogen and nitrification inhibitors:
	AN O PU O	Ammonium nitrate (as 'Nitro-Chalk'), no inhibitor Prilled urea, no inhibitor
	PU DIC PU HYD	Prilled urea and dicyandiamide at 33 kg Prilled urea and hydroquinone at 13 kg
2.	SPRING N	Nitrogen rates (kg N) and times:
	75E+75L 150M	75 on 10 Feb and 75 on 21 Mar, 1984 150 on 5 Mar

plus one extra treatment

EXTRA

NONE No spring nitrogen fertilizer or inhibitor

Basal applications: Manures: 'Nitro-Chalk' at 220 kg. Weedkillers: TCA at 11 kg in 250 l. Propyzamide with 3, 6-dichloropicolinic acid (as 'Matrikerb' at 1.6 kg) in 500 l. Fungicide: Prochloraz at 0.50 kg in 250 l. Desiccant: Diquat at 0.6 kg ion with 'Agral', a wetting agent, at 0.5 l, in 500 l.

Seed: Jet Neuf, dressed thiram, fenpropimorph and iprodione, sown at $9.0\ \mathrm{kg}.$

Cultivations, etc.:- Disced: 17 Aug, 1983. N applied: 22 Aug. TCA applied: 23 Aug. Spring-tine cultivated: 24 Aug. Seed direct drilled: 25 Aug. 'Matrikerb' applied: 25 Oct. Fungicide applied: 18 Apr, 1984. Desiccant applied: 25 July. Combine harvested: 30 July. Previous crops: W. wheat 1982, w. barley 1983.

NOTES: 1) Ammonia volatilisation was measured after application of N dressings.

2) Soil samples were taken from February to June for N analyses.

3) Oil and protein contents of grain were measured.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

**** TABLES OF MEANS ****

SPRING N	75E+75L	150M	MEAN
N INHIB			
AN O	3.09	3.41	3.25
PU 0	3.17	3.11	3.14
PU DIC	2.96	3.16	3.06
PU HYD	3.33	3.29	3.31
MEAN	3.14	3.24	3.19

NONE 1.77

GRAND MEAN 3.03

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE

N INHIB SPRING N

N INHIB

SPRING N & NONE

0.109 0.077 0.155

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM

DF

SE

CV%

BLOCK. WP

8

0.155

5.1

GRAIN MEAN DM% 88.9

WINTER OILSEED RAPE

METHODS OF APPLYING GROWTH REGULATOR

Object: To compare electrostatic and conventional spray application of a growth regulator and to study effects on plant growth, diseases and yield of w. oilseed rape - Whittlocks.

Sponsors: C.J. Rawlinson, G.R. Cayley.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 3.0×10.0 .

Treatments: All combinations of:-

METHOD Methods of applying the growth regulator, triapenthenol:

CNVNTIAL Conventional hydraulic sprayer in 200 l on 19 Mar, 1984.

ELECTROS Electrostatic sprayer in 9.3 1 on 19 Mar.

2. RATE Rates of triapenthenol (kg):

0.35

plus one extra treatment:

EXTRA

NONE

Basal applications: Manures: 'Nitro-Chalk' at 220 kg on the first occasion, and at 460 kg on the second and third occasions. Weedkillers: TCA at 11 kg in 250 l. Propyzamide and 3, 6-dichloropicolinic acid (as 'Matrikerb' at 1.63 kg) in 500 l. Desiccant: Diquat at 0.60 kg ion with 'Agral', a wetting agent at 0.5 l, in 500 l.

Seed: Jet Neuf, seed dressed gamma HCH, thiram, fenpropimorph and iprodione, seed sown at 9 kg.

Cultivations, etc.:- Disced: 17 Aug, 1983. N applied: 22 Aug. TCA applied: 23 Aug. Spring-tine cultivated: 24 Aug. Seed direct drilled: 25 Aug. 'Matrikerb' applied: 25 Oct. N applied: 15 Feb, 1984. N applied: 5 Apr. Desiccant applied: 25 July. Combine harvested: 1 Aug. Previous crops: W. wheat 1982, w. barley 1983.

NOTE: Disease incidence and severity was assessed on seven occasions between March and July. Cuticular wax on leaves was measured on all plots in April. Plant height, internode length and branch number and length, were measured in July.

GRAIN (90% DM) TONNES/HECTARE

**** TABLES OF MEANS ****

0.35 0.70 MEAN RATE METHOD CNVNTIAL 3.47 3.76 3.62 ELECTROS 3.66 3.58 3.62 3.67 3.62 MEAN 3.57

NONE

3.44

GRAND MEAN

3.58

**** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM DF SE CV%

BLOCK.WP 12 0.259 7.2

GRAIN MEAN DM% 89.5

WINTER OILSEED RAPE

MUSTARD OIL

Object: To study the effects of carbendazim, prochloraz and a synthetic mustard oil formulation on fungal diseases and yield of w. oilseed rape - Whittlocks.

Sponsors: C.J. Rawlinson, G.R. Cayley, J.A. Pickett.

Design: 8 randomised blocks of 4 plots.

Whole plot dimensions: 2.0×6.0 .

Treatments:

FUNGCIDE

Fungicides:

NONE

None

MSTD OIL

Mustard oil at 0.25 kg

PROCHLOR

Prochloraz at 0.40 kg

PROC+CAR

Prochloraz at 0.40 kg plus carbendazim at 0.15 kg

NOTES: (1) Treatment sprays were applied to four blocks on 4 Apr, 1984 to the other four on 13 Apr.

(2) Treatments were applied by electrostatic sprayer in 9.3 1 water.

Basal applications: Manures: 'Nitro-Chalk' at 220 kg on the first occasion, and at 460 kg on the second and third occasions. Weedkillers: TCA at 11 kg in 250 l. Propyzamide and 3, 6-dichloropicolinic acid (as 'Matrikerb' at 1.63 kg) in 500 l. Desiccant: Diquat at 0.60 kg ion with 'Agral', a wetting agent, at 0.5 l, in 500 l.

Seed: Jet Neuf, seed dressed gamma HCH, thiram, fenpropimorph and iprodione, sown at 9 kg.

Cultivations, etc.:- Disced: 17 Aug, 1983. N applied: 22 Aug. TCA applied: 23 Aug. Spring-tine cultivated: 24 Aug. Seed direct drilled: 25 Aug. 'Matrikerb' applied: 25 Oct. N applied: 15 Feb, 1984. N applied: 5 Apr. Desiccant applied: 25 July. Combine harvested: 31 July. Previous crops: W. wheat 1982, w. barley 1983.

NOTE: Disease incidence and severity, to all parts of the plant, was assessed fortnightly from April to July.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

FUNGCIDE NONE MSTD OIL PROCHLOR PROC+CAR MEAN 4.56 4.63 4.59 4.65 4.61

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE FUNGCIDE
SED 0.161

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

0.321

7.0

STRATUM DF SE

21

GRAIN MEAN DM% 83.7

BLOCK. WP

84/R/MA/1

MAIZE

VARIETIES, SOWING DATES AND POLYTHENE COVERS

Object: To study the effects of two sowing dates and polythene covers to the seedbed on the maturity dates and yield of three maize varieties grown for forage and grain - Long Hoos IV 6.

Sponsor: A.J. Barnard.

Design: 3 randomised blocks of 12 plots.

Whole plot dimensions: 2.13 x 11.6.

Treatments: All combinations of:-

1. VARIETY Varieties:

BASTILLE BEAUPRE

FRONICA

2. SOW DATE Dates of sowing:

11 APR 11 April, 1984

10 MAY 10 May

3. COVERS Covers to seedbed after sowing:

NONE None

POLYTHNE Polythene sheet

NOTE: The covers were photo-degradable and were laid by hand, within 5 days of sowing, and then perforated at about 10 cm intervals over the drill rows to allow seedling emergence.

Basal applications: Manures: 'Nitro-Chalk' at 560 kg. Weedkiller: Atrazine at 1.7 l in 220 l. Insecticides: Omethoate at 0.64 kg in 220 l. Pirimicarb at 0.14 kg in 220 l.

Seed: Varieties sown at 100,000 seeds per hectare.

Cultivations, etc.:-

Ploughed: 18 Nov, 1983. Spring-tine cultivated, N applied to all plots, early sown plots, power harrowed, and sown: 11 Apr, 1984. Weedkiller applied to early-sown plots: 12 Apr. Power-harrowed, late-sown plots, seed sown: 10 May. Weedkiller applied to late-sown plots: 14 May. Omethoate applied: 19 June. Pirimicarb applied: 17 July. Harvested by hand:-

Forage harvest: First sowing date, polythene-covered Beaupre harvested: 5 Sept, Bastille and Fronica: 13 Sept. Remaining plots: 4 Oct. Grain harvest: (Cobs picked by hand, threshed by stationary combine harvester). All varieties, first sowing: 24 Oct, second sowing: 7 Nov. Previous crops: Mixed cereals 1982, potatoes 1983.

84/R/MA/1

NOTE: Plant counts were made at establishment, mid-season and pre-harvest. Growth rates, plant heights, length of selected leaves at harvest and the ratio of cob weight to stems were measured.

84/R/MA/1 FORAGE DRY MATTER TONNES/HECTARE

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

SOW DATE VARIETY	11 APR	10 MAY	ME	AN
BASTILLE	15.79	15.49	15.	6.1
BEAUPRE				
	13.59		13.	
FRONICA	14.47	14.08	14.	27
MEAN	14.61	14.65	14.6	53
COVERS	NONE	POLYTHNE	ME	AN
VARIETY				
BASTILLE	16.22	15.06	15.	54
BEAUPRE	13.75	14.22	13.9	
FRONICA	13.79	14.76	14.	
			- 101	- /
MEAN	14.58	14.68	14.6	53
COVERS	NONE	POLYTHNE	ME	AN
SOW DATE				
11 APR	14.25	14.98	14.6	51
10 MAY	14.92	14.38	14.6	
		200	2 1 00	, ,
MEAN	14.58	14.68	14.6	53
SOW DATE	11 APR		10 MAY	
COVERS	NONE	POLYTHNE		POLYTHNE
VARIETY	HOHE	OLITHIAL	HONE	PULTITIVE
BASTILLE	15.13	16.45	17.31	12 67
BEAUPRE	14.30			
FRONICA			13.20	
PRUNICA	13.33	15.61	14.25	13.91

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	VARIETY	SOW DATE	COVERS	VARIETY SOW DATE
SED	0.958	0.782	0.782	1.355
TABLE	VARIETY COVERS	SOW DATE COVERS	VARIETY SOW DATE COVERS	
SED	1.355	1.107	1.917	

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 22
 2.347
 16.0

GRAIN MEAN DM% 29.6

84/R/MA/1

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

Y MEAN 8 7.61 2 7.13 5 7.47 5 7.40 E MEAN 7 7.61
7.13 7.47 7.40 E MEAN 7.61
7.13 7.47 7.40 E MEAN 7.61
5 7.47 5 7.40 E MEAN 7 7.61
5 7.40 E MEAN 7 7.61
E MEAN 7.61
7 7.61
3 7.13
3 7.47
5 7.40
E MEAN
4 7.75
5 7.05
5 7.40
10 MAY
NONE POLYTHNE
7.64 7.12
6.36 6.67
6.56 7.95
1

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	VARIETY	SOW DATE	COVERS	VARIETY SOW DATE
SED	0.448	0.366	0.366	0.634
TABLE	VARIETY COVERS	SOW DATE COVERS	VARIETY SOW DATE COVERS	
SED	0.634	0.518	0.897	

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM DF SE CV% BLOCK.WP 22 1.098 14.8

GRAIN MEAN DM% 62.0

POTATOES

VARIETIES AND STEM CANKER

Object: To study the effects of stem canker (Rhizoctonia solani) on plant growth and yield of a range of early and maincrop potato varieties using chitted and unchitted seed - Gt. Knott II.

Sponsors: G.A. Hide, P.J. Read, J.P. Sandison.

Design: Early varieties: 3 randomised blocks of 20 plots.

Maincrop varieties: 3 randomised blocks of 28 plots.

Whole plot dimensions: 3.0×10.7 .

Treatments:

To EARLY varieties, all combinations of:-

VARIETY Varieties:

A COMET Arran Comet
ESTIMA Estima
M PEER Maris Peer
U PRINCE Ulster Prince
U SCEPTR Ulster Sceptre

2. INOCULUM Inoculum to seed at planting:

NONE None

RHIZOCT R. solani inoculum

3. SD TREAT Seed treatment:

NONE CHITTED

To MAINCROP varieties, all combinations of:-

VARIETY Varieties:

CARA Cara
DESIREE Desiree
K EDWARD King Edward
M PIPER Maris Piper
P CROWN Pentland Crown
P SQUIRE Pentland Squire

RECORD Record

2. INOCULUM Inoculum to seed at planting:

NONE None

RHIZOCT R. solani inoculum

3. SD TREAT Seed treatment:

NONE CHITTED

NOTE: Rhizoctonia inoculum was grown on horticultural vermiculite and sprinkled over seed tubers at planting before covering.

Basal applications: Manures: FYM at 45 t. (10:10:15+4.5 Mg) at 1960 kg. Weedkillers: Linuron at 1.3 kg with paraquat at 0.50 kg ion in 500 l. Fungicide: Fentin hydroxide at 0.28 kg in 200 l on seven occasions, applied with the insecticide on the first and third occasion. Insecticide: Pirimicarb at 0.14 kg on two occasions. Desiccant: Diquat at 0.56 kg ion in 200 l.

Cultivations, etc:- Subsoiled, tines 45 cm deep, 76 cm apart: 6 Oct, 1983. FYM applied: 4 Nov. Ploughed: 9 Nov. NPK Mg applied, heavy spring-tine cultivated: 23 Mar, 1984. Rotary harrowed: 10 Apr. Early potatoes planted by hand: 11 Apr. Maincrop potatoes planted by hand: 12 Apr. Weedkillers applied: 4 May. Fungicide with insecticide applied: 19 June, 17 July. Fungicide alone applied: 3 July, 30 July, 13 Aug, 28 Aug, 11 Sept. Haulm desiccant applied: 4 Oct. Lifted: 16 Oct. Previous crops: S. barley 1982, w. oats 1983.

NOTE: Plant samples were taken on four occasions to assess stem canker, weight of foliage and weight and numbers of tubers.

84/R/P/1	FARI Y	POTATOES

TOTAL TUBERS TONNES/HECTARE

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

	MEAN	RHIZOCT	NONE	INOCULUM
				VARIETY
	23.4	22.5	24.3	A COMET
	32.1	30.8	33.3	ESTIMA
	18.7		20.3	M PEER
	18.3	16.9	19.8	U PRINCE
	20.7	19.3	22.1	U SCEPTR
	22.7	21.3	24.0	MEAN
	MEAN	CHITTED	NONE	SD TREAT
				VARIETY
	23.4	23.0	23.9	A COMET
	32.1	31.7	32.4	ESTIMA
		19.8	17.7	M PEER
	18.3	18.6	18.0	U PRINCE
	20.7	21.2	20.3	U SCEPTR
	22.7	22.8	22.5	MEAN
	MEAN	CHITTED	NONE	SD TREAT
				INOCULUM
	24.0	24.3	23.6	NONE
	21.3	21.4	21.3	RHIZOCT
	22.7	22.8	22.5	MEAN
	RHIZOCT		NONE	INOCULUM
CHITTED	NONE	CHITTED	NONE	SD TREAT
				VARIETY
21.5	23.5	24.4	24.3	A COMET
31.0	30.7	32.4	34.2	ESTIMA
17.8	16.5	21.8	18.9	M PEER
16.9	16.8	20.2	19.3	U PRINCE
19.5	19.1	22.8	21.5	U SCEPTR

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	VARIETY	INOCULUM	SD TREAT	VARIETY INOCULUM
SED	1.44	0.91	0.91	2.03
TABLE	VARIETY SD TREAT	INOCULUM SD TREAT	VARIETY INOCULUM SD TREAT	
SED	2.03	1.29	2.88	
SED	2.03	1.29	2.88	

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 38
 3.52
 15.5

84/R/P/1 EARLY POTATOES

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

**** TABLES OF MEANS ****

INOCULUM	NONE	RHIZOCT	MEAN	
VARIETY	20.7	65.5	50.6	
A COMET	39.7	65.5	52.6	
ESTIMA	77.0	84.0	80.5	
M PEER	32.3	50.5	41.4	
U PRINCE	65.3	80.3	72.8	
U SCEPTR	42.5	67.5	55.0	
MEAN	51.4	69.6	60.5	
SD TREAT	NONE	CHITTED	MEAN	
VARIETY				
A COMET	50.7	54.5	52.6	
ESTIMA	80.9	80.2	80.5	
M PEER	41.9	40.9	41.4	
U PRINCE	78.1	67.5	72.8	
U SCEPTR	53.5	56.5	55.0	
MEAN	61.0	59.9	60.5	
SD TREAT	NONE	CHITTED	MEAN	
INOCULUM				
NONE	54.6	48.1	51.4	
RHIZOCT	67.4	71.7	69.6	
MEAN	61.0	59.9	60.5	
INOCULUM	NONE		RHIZOCT	
SD TREAT	NONE	CHITTED	NONE	CHITTED
VARIETY				
A COMET	35.1	44.2	66.2	64.7
ESTIMA	79.8	74.3	82.0	86.0
M PEER	39.7	24.9		56.9
U PRINCE	74.8	55.8	81.4	79.2
U SCEPTR	43.9	41.1	63.1	71.9

84/R/P/1 MAIN CROP POTATOES

TOTAL TUBERS TONNES/HECTARE

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

INOCULUM VARIETY	NONE	RHIZOCT	MEAN	
CARA	47.7	43.0	45.4	
DESIREE	29.3		28.3	
K EDWARD	32.1			
M PIPER	30.1		29.0	
P CROWN	44.4	28.4	29.2	
			41.9	
P SQUIRE RECORD	40.4	32.9 22.2	36.6	
RECORD	25.5	22.2	23.9	
MEAN	35.6	31.3	33.5	
SD TREAT	NONE	CHITTED	MEAN	
VARIETY				
CARA	43.8	46.9	45.4	
DESIREE	29.5	27.2	28.3	
K EDWARD	27.9	30.1	29.0	
M PIPER	29.3	29.2	29.2	
P CROWN	41.6		41.9	
P SQUIRE	37.6		36.6	
RECORD	24.3	23.5	23.9	
MEAN	33.4	33.5	33.5	
SD TREAT	NONE	CHITTED	MEAN	
NONE	35.7	35.6	35.6	
RHIZOCT	31.1	31.5		
KHIZUCI	31.1	31.5	31.3	
MEAN	33.4	33.5	33.5	
INOCULUM	NONE		RHIZOCT	
SD TREAT	NONE	CHITTED	NONE	CHITTED
VARIETY				
CARA	46.8	48.6	40.8	45.2
DESIREE	30.7	27.9	28.3	26.4
K EDWARD	31.6	32.6	24.2	27.5
M PIPER	29.0	31.2	29.6	27.2
P CROWN	43.9	45.0	39.3	39.4
P SQUIRE	41.9	38.9	33.2	32.5
RECORD	26.3	24.8	22.2	22.2
P SQUIRE	41.9	38.9	33.2	32

84/R/P/1 MAIN CROP POTATOES

TOTAL TUBERS TONNES/HECTARE

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	VARIETY	INOCULUM	SD TREAT	VARIETY INOCULUM
SED	1.71	0.91	0.91	2.42
TABLE	VARIETY SD TREAT	INOCULUM SD TREAT	VARIETY INOCULUM SD TREAT	
SED	2.42	1.29	3.42	

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

 STRATUM
 DF
 SE
 CV%

 BLOCK.WP
 54
 4.19
 12.5

84/R/P/1 MAIN CROP POTATOES

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

INOCULUM VARIETY	NONE	RHIZOCT	MEAN	
CARA	90.3	91.4	90.9	
DESIREE	77.9	78.5	78.2	
K EDWARD	49.9	55.1	52.5	
M PIPER	72.3	72.9	72.6	
P CROWN	91.2	91.5		
P SQUIRE	90.8		91.4	
RECORD	65.0	89.1	90.0	
KECOKD	05.0	68.7	66.8	
MEAN	76.8	78.2	77.5	
SD TREAT	NONE	CHITTED	MEAN	
VARIETY				
CARA	90.1	91.6	90.9	
DESIREE	78.9	77.5	78.2	
K EDWARD	51.4	53.5	52.5	
M PIPER	70.8	74.4	72.6	
P CROWN	91.4	91.3	91.4	
P SQUIRE	88.7	91.2	90.0	
RECORD	67.8	65.9	66.8	
MEAN	77.0	77.9	77.5	
SD TREAT	NONE	CHITTED	MEAN	
INOCULUM				
NONE	77.0	76.5	76.8	
RHIZOCT	77.0	79.4	78.2	
MEAN	77.0	77.9	77.5	
HEAR	77.0	11.9	//.5	
INOCULUM	NONE		RHIZOCT	
SD TREAT	NONE	CHITTED	NONE	CHITTED
VARIETY				0.121120
CARA	90.0	90.6	90.2	92.6
DESIREE	79.3	76.5	78.5	78.6
K EDWARD	50.0	49.7	52.8	57.3
M PIPER	70.0	74.5	71.5	74.3
P CROWN	91.4	91.0	91.4	91.6
P SQUIRE	89.8	91.9	87.7	90.6
RECORD	68.7	61.3	66.9	70.5
		01.0	00.5	10.5

POTATOES

METHODS OF APPLYING FUNGICIDES TO SEED

Object: To compare spraying methods and rates of applying two fungicides to tubers on disease control and yield of potatoes - Gt. Knott II.

Sponsors: G.R. Cayley, G.A. Hide.

Design: 4 randomised blocks of 14 plots.

Whole plot dimensions: 1.5×9.52 .

Treatments: All combinations of:-

1. FUNGCIDE Fungicides applied to seed tubers:

IMAZALIL Imazalil

TOLC MET Tolclofos methyl

2. FUNGRATE Rates of applying fungicides, per tonne of tubers:

5 g imazalil, 12.5 g tolclofos methyl 10 g imazalil, 62.5 g tolclofos methyl

3. FUNGMETH Methods of applying fungicides:

CNVNTIAL Conventional, hydraulic, sprayer in 2.0 1 per tonne of

tubers

SP DS Spinning disc sprayer in 0.8 1 per tonne of tubers SP DS ES Spinning disc sprayer with electrostatically charged

particles in 0.8 1 per tonne of tubers

plus one extra treatment:

EXTRA

NONE No fungicides to seed tubers (duplicated)

Basal applications: Manures: FYM at 45 t. (10:10:15+4.5 Mg) at 1960 kg. Weedkiller: Metribuzin at 1.0 kg in 500 l. Fungicide: Fentin hydroxide at 0.28 kg in 200 l applied on seven occasions, the first and third occasion with the insecticide. Insecticide: Pirimicarb at 0.14 kg on two occasions. Desiccant: Diquat at 0.56 kg ion in 200 l.

Seed: King Edward.

Cultivations, etc:- Subsoiled, tines 45 cm deep, 76 cm apart: 6 Oct, 1983. FYM applied: 4 Nov. Ploughed: 9 Nov. NPK Mg applied, heavy spring-tine cultivated: 23 Mar, 1984. Rotary harrowed: 14 Apr. Planted by hand: 16 Apr. Weedkiller applied: 31 May. Fungicide with insecticide applied: 19 June, 17 July. Fungicide alone applied: 3 July, 30 July, 13 Aug, 28 Aug, 11 Sept. Haulm mechanically destroyed, haulm desiccant applied: 4 Oct. Lifted: 16 Oct. Previous crops: S. barley 1982, w. oats 1983.

NOTE: Assessments of stem base infections were made in mid-July.

84/R/P/2						
TOTAL TUBERS T	ONNES/HECTAR	E				
***** TABLES 0	F MEANS ****	*				
FUNGRATE FUNGCIDE	1	2	ME	AN		
IMAZALIL TOLC MET	30.5 29.9	32.8 29.4	31. 29			
MEAN	30.2	31.1	30.	.7		
FUNGMETH FUNGCIDE	CNVNTIAL	SP DS	SP DS E	S MEA	N	
IMAZALIL TOLC MET	31.5 28.9	30.5 31.5	33. 28.	1000000		
MEAN	30.2	31.0	30.	.8 30.	7	
FUNGMETH FUNGRATE	CNVNTIAL	SP DS	SP DS E	ES MEA	N	
1 2	28.8 31.6	31.1 30.9	30. 30.		45	
MEAN	30.2	31.0	30.	8 30.	7	
FUNGRATE FUNGMETH FUNGCIDE	CNVNTIAL 1	SP DS S	P DS ES	2 CNVNTIAL	SP DS SP	DS ES
IMAZALIL TOLC MET	29.5 28.0	29.6 32.6	32.6 29.1	33.5 29.8	31.4 30.4	33.4 28.0
NONE 30.7						
GRAND MEAN	30.7					
***** STANDARD	ERRORS OF DI	FFERENC	ES OF ME	ANS ****		
TABLE	FUNGCIDE			FUNGMETH	FUNGCIDE FUNGRATE	
SED				1.21	1.39	
TABLE	FUNGCIDE FUNGMETH	FUNG FUNG	METH	FUNGCIDE FUNGRATE FUNGMETH		
SED	1.70			2.41		
SED FOR COMPARI	NG NONE WITH	ANY ITE	EM IN S 2.09			
**** STRATUM S	STANDARD ERRO	RS AND	COEFFICI	ENTS OF VA	RIATION ***	**

SE

3.41

CV%

11.1

DF

40

STRATUM

BLOCK.WP

84/R/P/2

PERCENTAGE WARE 4.44 CM (1.75 INCH) RIDDLE

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

ES
6.6
1.0

NONE 66.5

GRAND MEAN 65.6

POTATOES

SEED HEALTH

Object: To study the effects of three amounts of pests and disease control on two potato varieties grown for seed - Summerdells I.

Sponsors: R.W. Gibson, R. Harrington, G.A. Hide, G.R. Cayley, D.H. Lapwood.

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

Whole plot dimensions: 18.0 x 7.62.

Treatments: All combinations of:-

Whole plots

VARIETY

Varieties:

K EDWARD M PIPER King Edward Maris Piper

Sub plots

2. PATHCONT

Pest and pathogen control (in addition to basals):

STANDARD

ENHANCED

None Seed treatment with tolclofos methyl at 0.24 kg and

imazalil at 0.010 kg per tonne of tubers, applied by hydraulic and uncharged electrostatic sprayers respectively. Cypermethrin at 0.04 kg with 7.0 l oil in 500 l applied by hydraulic sprayer on 31 May, 1984. Plants with 'virus' symptoms were removed on

11 June, 20 June and 5 July.

FULL

As for ENHANCED plus:-

The imazalil was applied by charged electrostatic sprayer. Plants with 'blackleg' symptons were removed on 11 June, 20 June and 5 July. Permethrin at 0.10 kg with oil at 7.0 l, in 200 l for the first and last occasions and 500 l for the remainder, was applied on 15 June, 29 June, 16 July, 27 July and

(to HAULM D LATER plots only) 13 Aug.

3. HAULM D

Dates of destroying haulm and of lifting:

EARLY

Haulm mechanically destroyed, 3 Aug, 1984. Haulm

LATER

desiccant applied 6 Aug and potatoes lifted 6 Sept. Haulm mechanically destroyed 8 Sept. Haulm desiccant

applied 22 Sept and potatoes lifted 11 Oct.

Basal applications: Manures: (0:18:36) at 690 kg. (10:10:15+4.5 Mg) at 1960 kg. Weedkillers: Paraquat at 0.80 kg ion in 250 l on two occasions, with the linuron on the second. Linuron at 1.3 kg. Fungicide: Fentin hydroxide at 0.28 kg in 200 l on six occasions (on the fifth and sixth to HAULM D LATER only) applied with the pirimicarb on all but the fifth occasion. Insecticides: Pirimicarb at 0.14 kg on five occasions (on the fifth to HAULM D LATER only). Phorate at 1.7 kg. Haulm desiccant: BOV at 170 l.

Cultivations, etc:- Disced: 2 Sept, 1983. PK applied: 5 Sept. Paraquat applied: 23 Sept. Ploughed: 22 Dec. NPK Mg applied: 3 Apr, 1984. Rotary harrowed, potatoes planted, phorate applied: 10 Apr. Linuron with paraquat applied: 3 May. Fentin hydroxide with pirimicarb applied to all plots: 19 June, 3 July, 17 July, 30 July. Fentin hydroxide applied to HAULM D LATER plots: 13 Aug. Fentin hydroxide with pirimicarb applied to HAULM D LATER plots: 28 Aug. Previous crops: S. barley 1982 and 1983.

NOTE: Aphids were counted throughout the season. Virus and blackleg counts were made in mid-June and mid-July.

TOTAL TUBERS TONNES/HECTARE

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

PATHCONT VARIETY	STANDARD	ENHANCED	FULL	MEAN
K EDWARD	33.8	33.7	25.3	30.9
M PIPER	32.3	31.4	23.8	29.2
MEAN	33.0	32.5	24.6	30.0
HAULM D	EARLY	LATER	MEAN	
K EDWARD	24.0	37.8	30.9	
M PIPER	22.2	36.2	29.2	
MEAN	23.1	37.0	30.0	
HAULM D	EARLY	LATER	MEAN	
STANDARD	25.5	40.6	33.0	
ENHANCED	25.1	39.9	32.5	
FULL	18.7	30.4	24.6	
MEAN	23.1	37.0	30.0	

TOTAL TUBERS TONNES/HECTARE

**** TABLES OF MEANS ****

PATHCONT	STANDARD		ENHANCED		FULL	
HAULM D	EARLY	LATER	EARLY	LATER	EARLY	LATER
VARIETY						
K EDWARD	26.3	41.3	26.5	40.8	19.3	31.2
M PIPER	24.7	39.9	23.8	39.1	18.0	29.6

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	PATHCONT	HAULM D	VARIETY* PATHCONT
SED	1.51	1.23	2.14
TABLE	VARIETY* HAULM D	PATHCONT HAULM D	VARIETY* PATHCONT HAULM D
SED	1.75	2.14	3.02

^{*} WITHIN THE SAME LEVEL OF VARIETY ONLY

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	10	3.02	10.1

84/R/P/3
PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

PATHCONT	STANDARD	ENHANCED	FULL	MEA	N	
VARIETY						
K EDWARD	65.8	59.6	57.0			
M PIPER	51.8	48.5	35.9	45.	4	
MEAN	58.8	54.1	46.4	53.	1	
HAULM D	EARLY	LATER	MEAN			
VARIETY						
K EDWARD	52.1	69.5	60.8			
M PIPER	34.4	56.5	45.4			
MEAN	43.2	63.0	53.1			
HAULM D	EARLY	LATER	MEAN			
STANDARD	49.0	68.6	58.8			
ENHANCED	41.3					
FULL	39.4	53.5	46.4			
MEAN	43.2	63.0	53.1			
PATHCONT	STANDARD	E	NHANCED		FULL	
HAULM D VARIETY		LATER	EARLY	LATER	EARLY	LATER
K EDWARD	57.5	74.1	51.4	67.8	47.4	66.5
M PIPER	40.5	63.1	31.3	65.8	31.4	40.5

84/W/M/1

MIXED 1

NITROGEN, SULPHUR AND STORAGE PROTEINS

Object: To study the effects of two nitrogen rates and sulphur on the storage proteins and yield of four varieties of s. wheat and s. barley - Woburn Butt Close.

Sponsor: J. Franklin.

Design: For each crop: 4 randomised blocks of 4 plots split into 4.

Whole plot dimensions: 4.0 x 19.0.

Treatments: All combinations of:-

Whole plots

1. VARIETY

Varieties:

S. wheat	S. barley	S. wheat	S. barley
HIGHBURY	GEORGIE	Hi ghbury	Georgie
M BUTLER	JUPITER	Maris Butler	Jupiter
SANDOWN	PORTER	Sandown	Porter
TIMMO	TASMAN	Timmo	Tasman

SUB PLOTS

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

50 200

Sulphur

0 None 50+8 50 kg S as gypsum at sowing + 8 kg S as 'Thiovit' spray at growth stage 30

Basal applications: Manures: Dolomite at 270 kg, triple superphosphate at 180 kg, muriate of potash at 160 kg. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 280 l. Fungicide: Propiconazole at 0.12 kg in 250 l on three occasions applied with the insecticide on the first and third occasions. Insecticide: Pirimicarb at 0.14 kg on two occasions.

Seed: Spring wheat varieties sown at 190 kg. Spring barley varieties sown at 160 kg.

Cultivations, etc.:- Ploughed: 7 Nov, 1983. Spring-tine cultivated with crumbler attached, seed sown: 19 Mar, 1984. Basal manures, test N and gypsum applied: 21-22 Mar. Weedkillers applied: 16 May. 'Thiovit' applied: 18 May. Fungicide with insecticide applied: 24 May, 27 June. Fungicide applied: 15 June. Spring barley combine harvested: 20 Aug. Spring wheat combine harvested: 21 Aug.

NOTE: Samples were taken at harvest for determination of storage proteins.

THIS WOLK IS	s ncenseu un	uei u <u>Cieutii</u>	ve Commons	Attribution	4.0 Intern
84/W/M/1					
01/11/11/1					
S. WHEAT					
GRAIN TONNES/HEC	TARE				
***** TABLES OF	MEANS ****	*			
N	50	200	MEAN		
VARIETY	30	200	PILAN		
HIGHBURY	2.82	4.44	3.63		
M BUTLER	2.58	3.51	3.05		
SANDOWN	2.73	4.07	3.40		
TIMMO	2.48	3.65	3.06		
MEAN	0.65	2 00	2 20		
MEAN	2.65	3.92	3.29		
S	0	50+8	MEAN		
VARIETY	U	3010	PILAN		
	2 57	2 60	2 62		
HIGHBURY	3.57	3.69	3.63		
M BUTLER	2.97	3.13	3.05		
SANDOWN	3.29	3.51	3.40		
TIMMO	3.10	3.03	3.06		
MEAN	2 02	2 24	2 00		
MEAN	3.23	3.34	3.29		
S	0	50+8	MEAN		
N	0	30.0	HEAR		
50	2.64	2 67	2 65		
		2.67	2.65		
200	3.83	4.01	3.92		
MEAN	3.23	3.34	3.29		
PILAN	3.23	3.34	3.23		
N	50		200		
S	0	50+8	0	50+8	
VARIETY				00.0	
HIGHBURY	2.98	2.66	4.16	4.71	
	2.43				
M BUTLER	2.43	2.73	3.50	3.52	
SANDOWN	2.54	2.92	4.05	4.10	
TIMMO	2.61	2.35	3.58	3.71	
**** STANDARD E	RRORS OF D	IFFERENCE	S OF MEAN	IS ****	
TABLE	VARIETY		N	S	VADIE
MULL	WILLI			,	VANIL
SED	0.202	0.	098	0.098	0.2
EXCEPT WHEN COMP	ARING MEAN	S WITH SA	ME LEVEL(S) OF:	
VARIETY			·		0.1
TARLC	VACICTY			ADICTU	
TABLE	VARIETY			ARIETY	
	S		S	N	
				S	

0.139

0.314

0.278

0.245

EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: VARIETY 0.196 0.278

SED

84/W/M/1

S. WHEAT

GRAIN TONNES/HECTARE

**** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.286	8.7
BLOCK.WP.SP	36	0.392	11.9

SUB PLOT AREA HARVESTED 0.00120

S. BARLEY

GRAIN TONNES/HECTARE

**** TABLES OF MEANS ****

	N	50	200	MEAN	
	IETY				
GE0	RGIE	3.86	5.83	4.85	
JUP	ITER	4.04	5.75	4.89	
PO	RTER	4.03	5.49	4.76	
TA	SMAN	3.82	5.27	4.55	
	MEAN	3.94	5.59	4.76	
	S	0	50+8	MEAN	
	IETY	4 00		4 05	
	RGIE	4.83	4.86	4.85	
	ITER	4.71	5.08	4.89	
	RTER	5.00	4.52	4.76	
TA	SMAN	4.60	4.49	4.55	
	MEAN	4.79	4.74	4.76	
	S	0	50+8	MEAN	
	N				
	50	3.95	3.92	3.94	
	200	5.62	5.56	5.59	
	MEAN	4.79	4.74	4.76	
	N	50		200	
	S	0	50+8	0	50+8
VA	RIETY				
GE	ORGIE	3.95	3.78	5.71	5.95
JU	PITER	3.77	4.31	5.65	5.86
P	ORTER	4.15	3.91	5.86	5.13
T	ASMAN	3.95	3.70	5.25	5.29
			320203020		

84/W/M/1

S. BARLEY

GRAIN TONNES/HECTARE

**** STANDARD ERRORS OF DIFFERENCES OF MEANS ****

TABLE	VARIETY	N	S	VARIETY N
SED EXCEPT WHEN	0.229 COMPARING MEANS WITH	0.174	0.174	0.337
VARIETY	COMPARING MEANS WITH	n SAME LEV	EL(3) UF:	0.349
TABLE	VARIETY	N	VARIETY	
	S	S	N	

SED 0.337 0.246 0.485
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:
VARIETY 0.349 0.493

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION ****

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.324	6.8
BLOCK.WP.SP	36	0.697	14.6

METEUROLOGICAL RECORDS 1984 - ROTHAMSTED

(Departure from long-period means in brackets)

			Mean temperature: C		
	Total			In gr	round
	sunshine:		Dew	under	
MONTH	hours	Air(1)	point	30cm	100cm
JAN	91 (+40)	3.3 (+0.4)	1.0	4.9	7.2
FEB	72 (+5)	2.9 (-0.5)	0.8	4.2	5.8
MAR	45 (-69)	4.4 (-0.8)	2.0	5.1	5.8
APR	233 (+83)	7.5 (-0.2)	1.4	7.4	6.7
MAY	136 (-57)	9.1 (-2.0)	5.7	10.1	8.9
JUNE	242 (+41)	14.2 (+0.2)	10.5	14.7	11.5
JULY	228 (+38)	16.5 (+0.6)	11.5	16.1	13.8
AUG SEPT	201 (+21)	17.6 (+2.0)	13.3	16.9	14.9
OCT	100 (-44)	13.3 (-0.1)	10.4	14.5	14.5
NOV	93 (-10)	10.9 (+1.3)	9.4	12.1	12.7
DEC	50 (-12)	7.9 (+2.0)	6.3	9.8	11.2
DEC	48 (+ 3)	4.7 (+0.9)	3.5	6.7	9.0
YEAR*	1541 (+39)	9.3 (+0.3)	6.3	10.2	10.2
	Ground	Total rainfall:mm 0.000405 ha (1/1000 acre)	Rain	Drainage through 50.8cm	Wind km
MONTH	frosts (2)	gauge	days (3)	(20 in) soil:mm	per hour (4)
JAN	28	99 (+35)	21	80	13.2
FEB	22	49 (0)	14	34	10.6
MAR APR	22	66 (+16)	14	42	9.4
MAY	22 14	8 (-42)	6	1	8.0
JUNE	3	82 (+27) 56 (0)	14	22	9.0
JULY	0	14 (-48)	10 7	17	6.5
AUG	0	49 (-15)	10	0	5.5
SEPT	3	98 (+37)	15	26	5.9 7.2
OCT	12	91 (+17)	17	60	7.8
NOV	10	112 (+41)	24	89	8.5
DEC	21	63 (-4)	23	56	6.8
YEAR*	157	787 (+64)	175	426	8.2

⁽¹⁾ Mean of maximum and minimum

⁽²⁾ Number of nights grass min. was below 0.0 C

⁽³⁾ Number of days rainfall was 0.2 mm or more

⁽⁴⁾At 2 metres above ground level *Mean or total

METEOROLOGICAL RECORDS 1984 - WOBURN

(Departure from long-period means in brackets)

				Me	ean ter	npera	ture:	C				
						In g	round		rainf	all:	W	ind km
		Total			ur	nder g	grass	Ground	mm		Rain	per
	suns	shine:			Dew	30	100	frosts	12.7	cm	days	hour
MONTH	ł	nours	Ai	ir(1)	point	cm	cm	(2)	(5in)	gauge	(3)	(4)
JAN	66	(+17)	3.7	(+0.5)	1.1	4.5	7.3	26	73	(+20)	19	13.0
FEB	56	(8-)	3.1	(-0.3)	0.5	4.0	5.9	18	45	(+5)	15	9.6
MAR	35	(-78)	4.5	(-1.0)	2.1	5.0	5.8	16	49	(+2)	12	7.1
APR	224	(+84)	7.4	(-0.6)	2.5	7.3	6.7	20	9	(-38)	6	6.8
MAY	134	(-48)	9.1	(-1.9)	5.9	10.1	8.8	10	88	(+32)	12	6.3
JUNE	158	(-36)	14.3	(+0.1)	10.6	15.3	11.8	1	49	(-2)	9	6.9
JULY	208			(+0.6)		17.3	14.3	1	12	(-41)	7	6.3
AUG	184			(+1.6)		17.6	15.5	2	69	(+7)	8	5.6
SEPT	93			(+0.0)		14.7	15.1	4	89	(+37)	16	7.9
OCT	94	(-7)	11.4	(+1.4)	9.9	12.1	13.3	6	48	(-7)	14	9.9
NOV	44	(-16)	8.1	(+1.8)	7.1	9.7	11.6	6	105	(+43)	16	8.7
DEC	61	(+17)	5.4	(+1.3)	3.6	6.7	9.4	2	49	(-5)	19	7.4
YEAR*	1357	(-76)	9.6	(+0.3)	6.5	10.4	10.5	131	683	(+53)	153	7.9

METEOROLOGICAL RECORDS 1984 - SAXMUNDHAM

	Mea	n temp	erature: C				
			In ground under	Ground	Total rainfall :mm	Rain	Wind km
		Dew	bare soil	frosts	12.7 cm	days	hour
MONTH	Air(1)	point	30 cm	(2)	(5 in) gauge	(3)	(4)
JAN	3.0 (-1.3)	1.1	4.0	23	102 (+45)	20	15.1
FEB	3.0 (-1.0)	1.1	3.7	18	48 (+5)	13	12.0
MAR	3.9(-1.7)	3.3	4.8	18	60 (+13)	14	10.8
APR	6.5(-0.7)	2.8	7.2	16	22 (-18)	5	8.7
MAY	8.4 (-2.4)	7.2	10.8	9	62 (+20)	13	
JUNE	13.1 (-1.0)	11.1	15.2	1	35 (-10)	7	#
JULY	15.7 (-0.6)	11.9	17.1	1	53 (+3)	12	6.1
AUG	17.6 (+1.2)	13.9	18.5	0	33 (-8)	5	6.3
SEPT	13.7 (-0.7)	11.7	14.1	0	89 (+23)	21	9.0
OCT	11.7 (+1.0)	9.4	11.8	4	63 (+13)	18	10.8
NOV	9.2 (+2.4)	7.8	9.4	4	64 (-5)	16	11.3
DEC	5.4 (+0.8)	4.4	6.3	17	57 (+2)	19	9.0
YEAR*	9.3 (-0.3)	7.1	10.2	111	688 (+83)	163	9.9

⁽¹⁾Mean of maximum and minimum

⁽²⁾ Number of nights grass min. was below 0.0 C (3) Number of days rainfall was 0.2 mm or more

⁽⁴⁾At 2 metres above ground level

^{*}Mean or total

[#]Anemometer failed, no readings available. Year mean is the average of the 10 months measured.

ROTHAMSTED REPORT FOR 1977, PART 1

CONVERSION FACTORS

Factors for the Conversion of Imperial to Metric Units

1 inch (in.)	= 2.540 centimetres (cm)
1 foot (ft) (=12 in.)	= 30·48 cm
1 yard (yd) (=3 ft)	= 0.9144 metre (m)
1 square yard (yd²)	$= 0.8361 \text{ m}^2$
1 acre (ac) (=4840 yd ²)	= 0.4047 hectare (ha)
1 ounce (oz)	= 28·35 grams (g)
1 pound (lb)	= 0.4536 kilogram (kg)
1 hundredweight (cwt) (=112	1b) = 50.80 kg
1 ton (=2240 lb)	= $1016 \text{ kg} = 1.016 \text{ metric tons (tonnes) (t)}$
1 pint	= 0.5682 litre (l)
1 gallon (gal) (=8 pints)	= 4.546 litres
1 fluid ounce $= 1/20$ pint	= 0.02841 litre = 28.41 ml
1 cubic foot	= 28:32 litres

To convert	Multiply by		
oz ac-1 to g ha-1	70-06		
lb ac-1 to kg ha-1	1.121		
cwt ac-1 to kg ha-1	125.5		
cwt ac-1 to t ha-1	0.1255		
ton ac-1 to kg ha-1	2511		
ton ac-1 to t ha-1	2.511		
gal ac-1 to 1 ha-1	11-233		

The following factors are accurate to about 2 parts in 100:

1 lb ac⁻¹ = $1 \cdot 1$ kg ha⁻¹ 1 gal ac⁻¹ = 11 litres ha⁻¹ 1 ton ac⁻¹ = $2 \cdot 5$ t ha⁻¹

In general reading of the text there will be no great inaccuracy in regarding:

1 lb = 0.5 kg $1 \text{ lb ac}^{-1} = 1 \text{ kg ha}^{-1}$

Temperatures

To convert °F into °C subtract 32 and multiply by $\frac{5}{9}$ (0.556) To convert °C into °F multiply by $\frac{9}{5}$ (1.8) and add 32

343

CONVERSION FACTORS

Factors for the Conversion of Metric to Imperial Units

1 centimetre (cm)	= 0.3937 inch (in.) $= 0.03281$ ft
1 metre (m)	= 1.094 yards (yd)
1 square metre (m ²)	= 1.196 square yards (yd²)
1 hectare (ha)	= 2.471 acres (ac)
1 gram (g)	= 0.03527 ounce (oz)
1 kilogram (kg)	= 2.205 pounds (lb)
1 kg	= 0.01968 hundredweight (cwt) $= 0.00098$

1 kg = 0.01968 hundredweight (cwt) = 0.0009842 ton

1 metric ton (tonne) (t) = 0.9842 ton

1 litre = 1.760 pints = 0.2200 gallon (gal)

1 litre = 1000 millilitres (ml) = 35.20 fluid ounces = 0.03531 cubic foot (ft³)

To convert	Multiply by
g ha-1 to oz ac-1	0.01427
kg ha-1 to lb ac-1	0.8921
kg ha-1 to cwt ac-1	0.007966
t ha-1 to cwt ac-1	7.966
kg ha-1 to tons ac-1	0.0003983
t ha-1 to tons ac-1	0.3983
l ha ⁻¹ to gal ac ⁻¹	0.08902

Plant nutrients

Plant nutrients are best stated in terms of amounts of the elements (P, K, Na, Ca, Mg, S); the old 'oxide' terminology (P₂O₅, K₂O, Na₂O, CaO, MgO, SO₃) is still used in work involving fertilisers and liming since Regulations require statements of P₂O₅, K₂O, etc.

For quick conversions

(accurate to within 2%) the following factors may be used:

$2\frac{1}{3}\times P = P_2O_5$	$\frac{3}{7} \times P_2O_5 = P$
$1\frac{1}{5} \times K = K_2O$	$\frac{5}{6} \times \mathrm{K}_2\mathrm{O} = \mathrm{K}$
$1\frac{2}{5} \times Ca = CaO$	$\frac{7}{10} \times \text{CaO} = \text{Ca}$
$1\frac{2}{3} \times Mg = MgO$	$\frac{3}{5} \times MgO = Mg$

For accurate conversions:

To convert	Multiply by	To convert	Multiply by
P ₂ O ₅ to P	0.4364	P to P ₂ O ₅	2.2915
K ₂ O to K	0.8301	K to K ₂ O	1.2047
CaO to Ca	0.7146	Ca to CaO	1.3994
MgO to Mg	0.6031	Mg to MgO	1.6581