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ROTHAMSTED RESEARCH

Yields of the Field Experiments 1984



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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.

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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% P_2O_5, 10% K_2O), granular unless otherwise stated.

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

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

Standard errors

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

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

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84/R/BK/1

BROADBALK

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

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:

	Section	
Wheat:	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	Plot	Fertilizers and organic manures:- Treatments until 1967	Treatments from 1968	Changes 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	08	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)	N0+3 1/2(PK (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.

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84/R/BK/1

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:-

SECTION	Section	68	69	70, 71, 72, 73, 74, 75, and 76 and 77 and 78	79	80	81	82	83	84
SC0/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

* No weedkillers

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.

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84/R/BK/1

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.

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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	SC0/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	7.34	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

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84/R/BK/1

POTATOES

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

PLOT	TOTAL TUBERS TONNES/ HECTARE	% WARE 3.81 CM(1.5 INCH) RIDDLE
01DN2PK	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
19C	16.4	94.8

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84/R/HB/2

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	-	-
NP---	N	P	-
N-K--	N	K(Na)Mg	-
NPK--	N	PK(Na)Mg	-
N--S-	N	Si	Si omitted
NP-S-	N	P Si	"
N-KS-	N	K(Na)MgSi	"
NPKS-	N	PK(Na)MgSi	"
N---S	N	-	Si added
NP--S	N	P	"
N-K-S	N	K(Na)Mg	"
NPK-S	N	PK(Na)Mg	"
N--SS	N	Si	-
NP-SS	N	P Si	-
N-KSS	N	K(Na)MgSi	-
NPKSS	N	PK(Na)MgSi	-
C(--)	C	-	PKMg omitted
C(P-)	C	P	"
C(-K)	C	K(Na)Mg	"
C(PK)	C	PK(Na)Mg	"
D	None	D	-
(D)	(D)	-	-
(A)	(Ashes)	-	-
-	None	-	-

Form of N: A, sulphate of ammonia: N, nitrate of soda - each to supply 48 kg N: C, castor meal to supply 96 kg N
P: 35 kg P as single superphosphate (triple superphosphate in 1974)
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)

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Si: Silicate of soda at 450 kg
D: Farmyard manure at 35 tonnes. (D): until 1871 only
(Ashes): Weed ash 1852-1916, furnace ash 1917-1932, none since

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

0
48
96
144

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:

0
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 l) 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.

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84/R/HB/2

BARLEY

GRAIN TONNES/HECTARE

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

N	0	48	96	144	MEAN
MANURE					
---	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
N--S	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
N---S	1.44	1.95	2.89	2.81	2.27
NP--S	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
N--SS	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
D	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

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84/R/HB/2

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	551AN2PK	561--PK	571NN2--	581NN2--	MEAN
MGNESIUM					
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

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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

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

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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

1. PLOTFERT(01) Plot numbers and manuring 1876-1901:

1-	Plot 1 None
2-	Plot 2 None
3D	Plot 3 D
4D	Plot 4 D
5N	Plot 5 N
6N*	Plot 6 N*
7NMIN	Plot 7 N P K Na Mg
8N*MIN	Plot 8 N* P K Na Mg
9P	Plot 9 P
10MIN	Plot 10 P K Na Mg

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 l) 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.

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84/R/EX/4

GRAIN TONNES/HECTARE

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

N PLOTFERT(01)	0	48	96	144	MEAN
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
10MIN	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 PLOTFERT(01)	0	48	96	144	MEAN
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
8N*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

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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 and organic manures:

N1	Plot 1	N1
0(D)	Plot 2	None (D until 1863)
0/PLOT3	Plot 3	None
P	Plot 4-1	P
N2P	Plot 4-2	N2 P
N1MIN	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, 144 kg N as sulphate of ammonia
N1*, N2*:	48, 96 kg N as nitrate of soda (30 kg N to Plot 20, only in years with no farmyard manure)
P:	35 kg P (15 kg P to Plot 20, only in years with no farmyard manure) as single superphosphate (triple superphosphate in 1974)
K:	225 kg K (45 kg K to Plot 20, only in years with no farmyard manure) as sulphate of potash
Na:	15 kg Na as sulphate of soda
Mg:	10 kg Mg as sulphate of magnesia
Si:	Silicate of soda at 450 kg
D:	Farmyard manure at 35 tonnes every fourth year
F:	Fish meal every fourth year to supply 63 kg N
MIN:	P K Na Mg

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84/R/PG/5

Sub plots

2. LIME Liming:

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

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

Additional sub plots (Plots 18, 19 and 20 only) (tonnes $CaCO_3$ applied every fourth year 1920-1964):

N2KNAMG0	18-1	None
N2KNAMG2	18-2	13.5
N2KNAMG1	18-3	7.9
D0	19-1	None
D2	19-2	6.3
D1	19-3	1.1
D/N*PK0	20-1	None
D/N*PK2	20-2	5.6
D/N*PK1	20-3	1.1

Since 1965 Plot 18-1 has been split into two for treatments 'c' and 'd' above and Plot 18-3 split into two for treatments 'a' and 'b'. 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.

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84/R/PG/5

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

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

LIME / MANURE	A	B	C	D	MEAN
N1	1.66	1.77	1.27	0.52	1.31
0(D)	1.49	1.69	1.28	1.20	1.42
0/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
N1MIN	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/PLOT12	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
D0	2.11				2.11
D2	2.86				2.86
D1	2.68				2.68
D/N*PK0	3.80				3.80
D/N*PK2	3.67				3.67
D/N*PK1	3.51				3.51

1ST CUT MEAN DM% 21.3

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84/R/PG/5

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

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

LIME / MANURE	A	B	C	D	MEAN
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
P	0.48	0.47	0.63	0.68	0.57
N2P	0.84	1.56	0.92	0.87	1.05
N1MIN	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
N2KNAMGO			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

2ND CUT MEAN DM% 20.1

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84/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	2.45	2.75	1.68	0.69	1.89
O(D)	2.05	2.19	1.62	1.59	1.86
O/PLOT3	2.01	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			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
O/PLOT12	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
N2KNAMG0			0.53	0.33	0.43
N2KNAMG2	2.83				2.83
N2KNAMG1	2.22	2.06			2.14
D0	2.87				2.87
D2	3.93				3.93
D1	3.75				3.75
D/N*PK0	5.26				5.26
D/N*PK2	5.29				5.29
D/N*PK1	5.05				5.05

TOTAL OF 2 CUTS MEAN DM% 20.7

PLOT AREA HARVESTED 0.00002

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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	P K Na Mg
NPKNAMGC	N P K Na Mg C

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:

P
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

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84/R/AG/6

Sixteenth plots

5. P_2O_5 64 K_2O 64

Rates of 1964 treatments (kg):

P_2O_5 to P-test half plots	K_2O to K-test half plots
0	0
500	315
1000	630
2000	1260

Thirty second plots

6. To RN CROP F/WHEAT. Residues of P_2O_5 applied 1970-72 (kg) and in 1979, 1981 and 1983 (kg):

P_2O_5 723

(0)0	None
(375)450	375 total in 1970-72, 150 in 1980, 1981 and 1983

To RN CROP F/WHEAT. Residues of K_2O applied 1973-76 (kg) and in 1979, 1981 and 1983 (kg):

K_2O 763

(0)0	None
(870)900	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 l.

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.

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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						
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	
	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

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84/R/BN/7

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

P: 35 kg P as single superphosphate (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.

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84/R/BN/7

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

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 spring-tine cultivated: 22 Mar, 1984. Rotary harrowed: 25 Apr. Seed sown: 26 Apr. Weedkillers applied: 3 July. Topped: 23 July.

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84/R/BN/7

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

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

N PERCUT MANURE	75	100	125	150	MEAN
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 MANURE	75	100	125	150	MEAN
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
P	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
MEAN	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

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84/R/BN/7

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	2.42	2.37
PKMG	1.59	2.43	2.58	2.66	2.32
P	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 PERCUT / 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

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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	Benomyl 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_2O 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.

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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

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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.

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Treatments to crops in these sections were:

TREATMENT 1899-1965	NEWTREAT Grass 1966-1984	W. wheat and w. beans 1984
	MANURE	MANURE
D	(D)N	(D)P2
B	BN	B
N	(N)P2N	(N)P2
P	(P)P1N	(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

D: Farmyard manure at 15 tonnes
(D): Farmyard manure at 30 tonnes, 60 tonnes in autumn 1969, none since.
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
P: 1899-1965, 40 kg P_2O_5 as single superphosphate. 1966-79, 50 kg P_2O_5 as triple superphosphate
P1,P2: 50, 100 kg P_2O_5 as triple superphosphate
K: 1899-1965, 63 kg K_2O as muriate of potash. Since 1966, 126 kg K_2O

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)
0
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.

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84/S/RN/1

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 K_2O) as muriate of potash, total applied 1977-80

   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+120 — 40 on 9 March, 1984 + 120 on 10 Apr
   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 Apr

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 l) applied with the permethrin in 220 l. Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 2.1 l) in 220 l 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 l. 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 l. 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.

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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 l. 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 *****

MANURE	1ST CUT(11/6/84)	2ND CUT(23/8/84)	TOTAL OF 2 CUTS
(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
(PK)P1KN	1.80	2.50	4.30
(NK)P2KN	1.82	2.53	4.35
(NP)P1N	1.43	1.45	2.88
(NPK)P1KN	2.08	2.13	4.21
MEAN	1.68	1.99	3.67
MEAN DM%	35.6	32.8	34.2

PLOT AREA HARVESTED 0.00095

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84/S/RN/1-1

W.WHEAT AFTER W.WHEAT

GRAIN TONNES/HECTARE

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

N(NC) MANURE	120	160	200	240	MEAN
(D)P2	10.63	10.77	10.76	11.92	11.02
B	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	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 *****

N(NC) MANURE	120	160	200	240	MEAN
(D)P2	9.21	11.98	12.17	10.76	11.03
B	8.30	10.78	10.31	8.74	9.53
(N)P2	10.12	7.50	8.03	10.66	9.08
(P)P1	10.60	8.05	8.70	11.60	9.74
(K)P2K	9.98	11.60	11.76	10.14	10.87
(-)P2	9.93	11.73	11.03	9.34	10.51
(PK)P1K	11.17	12.29	11.92	11.49	11.72
(NK)P2K	12.00	11.47	11.01	12.41	11.72
(NP)P1	9.88	11.52	10.62	11.36	10.84
(NPK)P1K	11.49	11.87	11.87	12.29	11.88
MEAN	10.27	10.88	10.74	10.88	10.69

MEAN DM% 86.2

PLOT AREA HARVESTED 0.00075

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84/S/RN/1-1

W.WHEAT AFTER W.BEANS

GRAIN TONNES/HECTARE

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

N(PU) MANURE	0	160	200	MEAN
(D)P2	9.64	11.85	10.79	10.48
B	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

PLOT AREA HARVESTED 0.00075

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84/S/RN/1-2

W.WHEAT

GRAIN TONNES/HECTARE

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

K	0	440	MEAN
MANURE			
(D)P2	10.48	9.80	10.14
B	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	9.36
(-)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	8.90
(NPK)P1K	8.94	9.52	9.23
MEAN	9.03	9.03	9.03

N	40+120	40+160	MEAN
MANURE			
(D)P2	9.96	10.32	10.14
B	8.22	8.50	8.36
(N)P2	8.78	8.41	8.59
(P)P1	7.64	8.88	8.26
(K)P2K	9.22	9.50	9.36
(-)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	8.90
(NPK)P1K	9.37	9.08	9.23
MEAN	8.92	9.14	9.03

N	40+120	40+160	MEAN
K			
0	8.89	9.16	9.03
440	8.94	9.12	9.03
MEAN	8.92	9.14	9.03

K	0		440	
N	40+120	40+160	40+120	40+160
MANURE				
(D)P2	9.99	10.96	9.93	9.67
B	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 PLOT AREA HARVESTED 0.00075

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84/S/RN/1-3

S.BARLEY

GRAIN TONNES/HECTARE

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

TREATMNT MANURE	CNVNTIAL	SUBDUG	SUBDUG+F	MEAN
(D)P2	4.44	4.71	4.95	4.70
B	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 MANURE	30+30	30+60	30+90	30+120	MEAN
(D)P2	3.96	4.43	5.26	5.14	4.70
B	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
MEAN	3.08	3.66	4.23	4.77	3.93

N TREATMNT	30+30	30+60	30+90	30+120	MEAN
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

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84/S/RN/1-3

S.BARLEY

GRAIN TONNES/HECTARE

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

MANURE	N TREATMNT	30+30	30+60	30+90	30+120
(D)P2	CNVNTIAL	3.59	4.25	4.99	4.92
	SUBDUG	4.43	4.72	5.04	4.65
	SUBDUG+F	3.86	4.32	5.76	5.85
B	CNVNTIAL	2.91	3.21	4.00	4.33
	SUBDUG	3.82	4.38	4.53	5.12
	SUBDUG+F	3.42	4.13	3.85	5.22
(N)P2	CNVNTIAL	3.74	3.61	3.54	4.72
	SUBDUG	3.11	3.08	3.79	4.83
	SUBDUG+F	3.03	4.13	4.39	4.69
(P)P1	CNVNTIAL	2.90	3.38	4.30	4.36
	SUBDUG	2.65	3.46	3.24	2.98
	SUBDUG+F	1.55	2.76	4.83	4.60
(K)P2K	CNVNTIAL	3.14	4.78	4.35	5.43
	SUBDUG	3.14	4.52	4.04	5.24
	SUBDUG+F	3.64	3.43	4.24	4.85
(-)P2	CNVNTIAL	3.50	4.30	4.02	4.88
	SUBDUG	1.84	3.02	4.63	5.06
	SUBDUG+F	3.45	2.23	4.63	4.94
(PK)P1K	CNVNTIAL	3.12	3.82	3.91	4.68
	SUBDUG	1.97	3.20	4.29	4.65
	SUBDUG+F	2.67	3.53	4.63	4.01
(NK)P2K	CNVNTIAL	2.66	4.51	4.42	4.57
	SUBDUG	2.41	4.22	4.49	5.05
	SUBDUG+F	2.75	4.42	3.64	5.97
(NP)P1	CNVNTIAL	2.37	2.98	3.58	3.80
	SUBDUG	2.69	3.70	4.18	4.86
	SUBDUG+F	3.07	4.52	3.81	4.02
(NPK)P1K	CNVNTIAL	3.75	2.66	3.52	4.72
	SUBDUG	3.97	2.74	3.56	5.14
	SUBDUG+F	3.36	1.63	4.72	4.97

GRAIN MEAN DM% 86.9

PLOT AREA HARVESTED 0.00075

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84/S/RN/2

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:-

		Approximate total dressing 1899-1964	Total dressing 1965-1967
(0)0	Plot 1	None	None
(D)0	Plot 2	400 tonnes FYM	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

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84/S/RN/2

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: K_2O 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 l. Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 2.1 l) in 220 l 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 l. Fungicide: Benomyl at 0.56 kg in 220 l.

Seed: W. wheat: Hustler, sown at 400 seeds per m^2.
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.

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84/S/RN/2

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)0	(1)(3)1	7.17		8.36	
(D)0	(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)0	(1)(3)1		7.83		8.92
(DP)0	(2)(3)1	7.23		8.39	
(DP)0	(3)(3)0	5.66		8.00	
(DP)D2	(0)(0)0			8.20	8.94
(DP)D2	(0)(3)0	6.14	7.90		
(DP)D2	(1)(3)1		7.67		9.09
(DP)D2	(2)(3)1	7.37		9.48	
(DP)D2P1	(0)(0)0	7.59	7.63		
(DP)D2P1	(0)(3)0			8.35	9.26
(DP)D2P1	(1)(3)1		8.22		9.88
(DP)D2P1	(2)(3)1	7.73		8.63	
(DP)P1	(0)(0)0	7.09	7.93		
(DP)P1	(0)(3)0			8.58	9.08
(DP)P1	(1)(3)1	6.68		9.54	
(DP)P1	(2)(3)1		8.06		9.67
(DP)P2	(0)(0)0			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

PLOT AREA HARVESTED 0.00075

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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, O	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 un-ploughed, 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.

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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)	O, 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 None
FYM 30 tonnes on each occasion

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

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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 l) applied with the fungicide in 250 l. 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).

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
0	50	150

estimated values were used in the analysis.

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84/R/RN/1 AND 84/R/RN/2

MUSEUM BLOCKS

DRY MATTER: TONNES/HECTARE

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

	HIGHFIELD	FOSTERS
CLOVER-GRASS LEY		
TOTAL OF 2 CUTS	5.77	5.48
MEAN DM%	21.1	25.2
ALL GRASS LEY		
TOTAL OF 2 CUTS	7.32	7.57
MEAN DM%	25.2	24.1
LUCERNE		
TOTAL OF 2 CUTS	6.73	7.69
MEAN DM%	19.5	17.6

OLD GRASS

	HIGHFIELD	
TOTAL OF 3 CUTS	C	N
36TH EXPTL YEAR		
BLOCKS 1 & 4	3.85	7.97
BLOCK 2	4.39	8.13
MEAN DM%	21.7	19.8

RESEEDED GRASS

TOTAL OF 3 CUTS

	HIGHFIELD			FOSTERS		
	BLOCKS	C	N	BLOCKS	C	N
36TH EXPTL YEAR	1 & 4	3.84	8.56	1 & 3	5.00	8.44
36TH EXPTL YEAR (SEEDED 1949 RESEEDED 1973)	2 & 3	4.36	8.80	2 & 4	5.61	7.95
MEAN DM%		21.3	20.7		19.7	19.9

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84/R/RN/1 HIGHFIELD

W.WHEAT 3RD TEST CROP - MUSEUM BLOCKS

GRAIN TONNES/HECTARE

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

FYMRES70 SEQUENCE	NONE	FYM	MEAN
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 SEQUENCE	0	50	100	150	MEAN
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 FYMRES70	0	50	100	150	MEAN
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 FYMRES70 SEQUENCE	0	50	100	150
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

GRAIN MEAN DM% 83.9

PLOT AREA HARVESTED 0.00675

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84/R/RN/2 FOSTERS

W.WHEAT 3RD TEST CROP - MUSEUM BLOCKS

GRAIN TONNES/HECTARE

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

FYMRES70	NONE	FYM	MEAN
SEQUENCE			
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					
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

GRAIN MEAN DM% 82.4

PLOT AREA HARVESTED 0.00675

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84/R/RN/1 HIGHFIELD

W.WHEAT 3RD TEST CROP - NEW SEQUENCE BLOCKS

GRAIN TONNES/HECTARE

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

N	0	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	6.55	8.45	8.46	7.26
ARABLE/A	4.91	5.30	6.74	7.88	6.20
ARABLE/R	5.25	6.87	7.75	8.15	7.01
GRASS/OG	6.63	7.31	7.75	9.26	7.74
MEAN	5.57	6.58	7.88	8.50	7.13

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

TABLE	SEQUENCE	N	SEQUENCE N
SED	0.261	0.201	0.501
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
SEQUENCE			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

SUB PLOT AREA HARVESTED 0.00322

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84/R/RN/1 HIGHFIELD

W.WHEAT 4TH TEST CROP - NEW SEQUENCE BLOCKS

GRAIN TONNES/HECTARE

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

N SEQUENCE	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

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

TABLE	SEQUENCE	N	SEQUENCE N
SED	0.385	0.189	0.557
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
SEQUENCE			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

SUB PLOT AREA HARVESTED 0.00322

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W.WHEAT 3RD TEST CROP - NEW SEQUENCE BLOCKS

GRAIN TONNES/HECTARE

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

N SEQUENCE	0	50	100	150	MEAN
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
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
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

SUB PLOT AREA HARVESTED 0.00322

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84/R/RN/2 FOSTERS

W.WHEAT 4TH TEST CROP - NEW SEQUENCE BLOCKS

GRAIN TONNES/HECTARE

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

N SEQUENCE	0	50	100	150	MEAN
LUCERNE	3.36	4.37	5.20	6.56	4.87
CLOGRA	4.08	5.08	6.44	7.21	5.70
GRASS/G	4.02	4.67	5.56	6.34	5.15
ARABLE/A	3.30	4.31	5.05	6.77	4.86
ARABLE/R	4.56	5.95	6.42	6.97	5.98
MEAN	3.86	4.87	5.74	6.77	5.31

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

TABLE	SEQUENCE	N	SEQUENCE N
SED	0.401	0.200	0.557
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
SEQUENCE			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

SUB PLOT AREA HARVESTED 0.00322

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84/W/RN/3

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

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

Rotations themselves followed different cycles:

On four plots in each block the rotations were repeated

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

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

LN 3	(Previous LEY) LN, LN, LN, W, B
LC 3	(Previous CLO) LC, LC, LC, W, B
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, LN, W, B
LC 8	LC, LC, LC, LC, LC, LC, LC, LC, W, B

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84/W/RN/3

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 — None
   FYM — 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

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84/W/RN/3

1/8 plots

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

0
60
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 K_2O) 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 l) in 250 l 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. K_2O at 48 kg as muriate of potash in spring and after the first cut. Weedkillers: MCPA with MCPB (as 'Trifolex-tra' at 7.0 l) 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.

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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 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 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.

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84/W/RN/3

LEYS

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

FYM RES LEY	NONE	FYM	MEAN
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	5.17
MEAN	4.40	4.56	4.48

1ST CUT MEAN DM% 16.7

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84/W/RN/3

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

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84/W/RN/3

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	0.14	0.12
LC3	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	0.04	0.05
LLN4	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

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84/W/RN/3

LEYS

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

FYM RES LEY	NONE	FYM	MEAN
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	7.84
LLN6	9.31	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

PLOT AREA HARVESTED 0.00183

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84/W/RN/3

BARLEY 2ND TEST CROP

GRAIN TONNES/HECTARE

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

FYMRES62	NONE	FYM	MEAN
ROTATION			
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					
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

PLOT AREA HARVESTED 0.00251

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84/W/RN/3

WINTER WHEAT

GRAIN TONNES/HECTARE

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

FYMRES63	NONE	FYM	MEAN
ROTATION			
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

N	0	70	140	210	MEAN
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
FYMRES63					
NONE	5.69	8.98	9.91	10.35	8.73
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	NONE	4.02	10.14	9.58	9.67
	FYM	4.54	7.74	8.66	9.04
AB	NONE	3.85	6.41	8.18	9.63
	FYM	3.46	6.70	7.30	9.18

GRAIN MEAN DM% 89.1

PLOT AREA HARVESTED 0.00251

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84/W/RN/4

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

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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.

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84/W/RN/4 RED BEET

ROOTS FRESH WEIGHT TONNES/HECTARE

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

OM RESID / OM RATE	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

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84/W/RN/4 RED BEET

TOPS FRESH WEIGHT TONNES/HECTARE

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

OM RESID OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
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

PLOT AREA HARVESTED 0.00022

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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	28.5	26.2	26.0	29.8	27.6
50	33.7	23.5	31.6	36.0	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

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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	11.6	10.6	10.8	11.6	11.2
50	12.1	8.6	11.8	12.9	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

PLOT AREA HARVESTED 0.00022

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84/W/RN/4 WHITE CLOVER

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

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

OM RESID / OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
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

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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	1.60	1.28	1.29	1.46	1.41
50	1.52	1.36	1.42	1.56	1.47
MEAN	1.56	1.32	1.35	1.51	1.44

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

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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
MEAN	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

PLOT AREA HARVESTED 0.00075

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84/R/RN/5

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
P
N1P
K
N1K
PK
N1PK
N2PK
D
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 P_2O_5 as superphosphate

K: 250 kg K_2O 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.

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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 P_2O_5 as potassium dihydrogen phosphate.
K: 251 kg K_2O total. As potassium dihydrogen phosphate (83 kg K_2O) on all PK plots. In addition plots without S receive 168 kg K_2O as potassium chloride, plots with S receive 92 kg K_2O as potassium sulphate plus 76 kg K_2O as potassium chloride. Since 1978 all PK plots receive, in addition to the standard total, 126 kg K_2O 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 220 l.

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.

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84/R/RN/5

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, 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.

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84/R/RN/5

GREAT FIELD IV (R): ORIGINAL PLOTS

TONNES/HECTARE

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

	WINTER WHEAT:		BARLEY:		LEY : DRY MATTER 1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
	GRAIN	STRAW	GRAIN	STRAW				
MANURE								
0	5.81	5.50	2.35	2.07	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
P	4.98	4.85	3.34	2.44	2.80	1.22	0.35	4.37
N1P	3.25	4.77	1.68	3.39	3.83	1.53	0.45	5.82
K	5.44	7.32	3.27	2.88	2.49	1.54	0.92	4.95
N1K	6.91	7.82	5.13	5.12	3.39	1.77	0.90	6.05
PK	6.82	7.33	3.32	2.58	3.49	2.07	3.15	8.71
N1PK	11.03	11.22	6.96	6.29	5.62	2.25	1.52	9.39
N2PK	12.11	13.31	9.08	7.69	6.85	2.33	0.98	10.15
D	8.71	10.50	4.75	3.99	4.83	2.12	1.34	8.28
N1PKD	12.24	15.53	8.30	6.95	6.11	2.85	2.50	11.46
N2PKD	10.83	13.95	9.47	8.57	7.37	2.90	0.84	11.11
MEAN DM%	76.6	59.0	85.8	66.2	27.0	31.7	21.4	26.7

	OATS:		POTATOES: TOTAL TUBERS	PERMANENT GRASS : DRY MATTER 1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
	GRAIN	STRAW					
MANURE							
0	3.79	3.39	8.8	0.61	0.68	0.18	1.46
N1	6.99	6.61	11.0	0.94	1.47	0.68	3.08
P	4.47	3.79	15.4	0.53	0.89	0.23	1.65
N1P	5.57	5.68	10.6	1.68	1.87	0.70	4.25
K	3.74	3.90	22.1	1.06	1.02	0.34	2.42
N1K	7.54	8.99	25.8	1.81	2.36	0.99	5.17
PK	3.84	3.55	26.5	0.63	0.83	0.29	1.75
N1PK	8.74	9.07	43.8	2.34	2.76	0.94	6.03
N2PK	8.22	11.10	49.6	3.85	3.56	1.78	9.19
D	6.02	6.10	40.8	3.68	2.06	0.61	6.36
N1PKD	9.71	11.60	59.8	4.84	3.17	1.23	9.24
N2PKD	9.03	13.34	60.5	5.87	4.40	1.95	12.22
MEAN DM%	83.0	43.7	24.2	27.4	32.7	26.6	28.9

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84/R/RN/5

GREAT FIELD IV (R): ADDITIONAL PLOTS

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

	WINTER WHEAT: GRAIN	WINTER WHEAT: STRAW	BARLEY: GRAIN	BARLEY: STRAW	OATS: GRAIN	OATS: STRAW	POTATOES: TOTAL TUBERS
MANURES							
0	6.91	6.63	2.87	2.33	4.28	3.67	9.4
N2PK	11.06	13.90	9.70	7.62	9.02	10.66	48.8
N2PKMG	12.48	14.46	8.57	7.39	9.20	11.14	53.8
N2PKS	11.42	14.31	8.24	7.17	9.31	12.28	51.9
N2PKMGS	11.47	12.18	8.58	8.35	9.53	12.25	50.4
N1PKMGS	11.80	12.67	7.40	6.25	9.22	9.52	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 : DRY MATTER 1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURES				
0	3.89	1.41	0.58	5.88
N2PK	5.55	2.21	0.67	8.44
N2PKMG	6.34	2.23	0.91	9.48
N2PKS	6.25	2.19	1.30	9.74
N2PKMGS	6.44	2.38	0.88	9.70
N1PKMGS	5.79	2.15	1.09	9.04
N3PKMGS	6.94	2.24	0.60	9.78
MEAN DM%	26.1	32.1	21.5	26.6

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84/R/RN/8

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.

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84/R/RN/8

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	None
CNVNTIAL	Conventional vertical tine
PARAPLOW	'Paraplow'

NOTES: (1) The conventional vertical tine sub soiler had tines 76 cm apart and worked at a depth of about 50 cm.
(2) The 'Paraplow' had rigid tines set at a 45° angle. The tip of each tine was in line with the attachment of an adjacent tine. The tines 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 *****

SUBSOIL(82) CULTIVTN	NONE	CNVNTIAL	PARAPLOW	MEAN
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) CULTIVTN	NONE	HORMONE	MEAN
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) SUBSOIL(82)	NONE	HORMONE	MEAN
NONE	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

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84/R/RN/8

GRAIN TONNES/HECTARE

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

WEEDKLLR(80)	NONE	PARAQUAT	MEAN
CULTIVTN			
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)	NONE	PARAQUAT	MEAN
SUBSOIL(82)			
NONE	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)	NONE	PARAQUAT	MEAN
WEEDKLLR(75)			
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	0.321	0.243	0.243	0.243
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CULTIVTN		0.222		0.222
SUBSOIL(82)			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

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GRAIN TONNES/HECTARE

EXTRA PLOTS

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

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

GRAIN MEAN DM% 85.3

SUB PLOT AREA HARVESTED 0.00347

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84/W/RN/12

ORGANIC MANURING

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

Sponsor: 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
FERT-FYM	P_2O_5 at 280 kg, K_2O at 560 kg, MgO at 100 kg
FERT-STR	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)	Clover/grass ley in preliminary period
LC(LN)	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

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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: P_2O_5 at 140 kg, K_2O 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.

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84/W/RN/12

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

PLOT AREA HARVESTED 0.00098

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84/W/RN/12

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

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5TH 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)	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

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84/W/RN/13

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, 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
L	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.

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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.

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.

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84/W/RN/16

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:

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

NOTES: (1) The rates of P and K were 1930 kg P_2O_5, as superphosphate and 460 kg K_2O 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

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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: 13 Aug.

SERIES II BARLEY AFTER FALLOW

GRAIN TONNES/HECTARE

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

PK SUB	- - -	- - S	P K T	P K 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	P K T	P K S	MEAN
	3.45	3.61	3.48	3.46	3.50

STRAW MEAN DM% 86.4

SUB PLOT AREA HARVESTED 0.00071

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SERIES IV BARLEY AFTER BARLEY

GRAIN TONNES/HECTARE

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

PK SUB	- - -	- - S	P K T	P K S	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	P K T	P K S	MEAN
	4.16	4.05	4.01	4.09	4.08

STRAW MEAN DM% 85.1

SUB PLOT AREA HARVESTED 0.00071

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SERIES III OATS

GRAIN TONNES/HECTARE

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

PK SUB	- - -	- - S	P K T	P K 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	P K T	P K S	MEAN
	3.03	3.04	2.57	3.18	2.96

STRAW MEAN DM% 79.2

SUB PLOT AREA HARVESTED 0.00071

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84/R/RN/17

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 x 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:

	P_2O_5(kg)	K_2O(kg)	Tool	
- - -	0	0	Plough	(duplicated)
P6 K6 T	1000	500 to topsoil	"	(")
- - S	0	0 " "	Wye double-digger	(four plots)
- - SR	0	0 " "	" " "	(duplicated)
P2 - SR	63	0 to subsoil	" " "	
P3 - S	125	0 " "	" " "	
P4 - S	250	0 " "	" " "	
P5 - S	500	0 " "	" " "	(duplicated)
P6 - S	1000	0 " "	" " "	
- K2 SR	0	31 " "	" " "	
- K3 S	0	63 " "	" " "	
- K4 S	0	125 " "	" " "	
- K5 S	0	250 " "	" " "	(duplicated)
- K6 S	0	350 " "	" " "	
P1 K1 SR	31	16 " "	" " "	
P1 K3 SR	31	63 " "	" " "	
P2 K2 SR	63	31 " "	" " "	
P3 K1 SR	125	16 " "	" " "	
P3 K3 SR	125	63 " "	" " "	
P3 K4 S	125	125 " "	" " "	
P4 K3 S	250	63 " "	" " "	
P4 K4 S	250	125 " "	" " "	
P4 K5 S	250	250 " "	" " "	(duplicated)
P4 K6 S	250	350 " "	" " "	
P5 K4 S	500	125 " "	" " "	(duplicated)
P5 K5 S	500	250 " "	" " "	
P5 K6 S	500	350 " "	" " "	
P6 K4 S	1000	125 " "	" " "	
P6 K5 S	1000	250 " "	" " "	
P6 K6 S	1000	350 " "	" " "	

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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 K_2O applied was in error for 500 kg K_2O.

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 l.
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 l) applied with the fungicide in 250 l. 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 l.

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.

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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
- K3 S	62.4
- K4 S	61.3
- K5 S	64.1
- 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
P4 K3 S	58.9
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
MEAN	60.8

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

TABLE	TREATMNT*
SED	2.91 MIN REP
	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	SE	CV%
WP	10	2.06	3.4

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84/R/RN/17

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
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
P6 K4 S	97.6
P6 K5 S	98.4
P6 K6 S	97.7
MEAN	98.2

PLOT AREA HARVESTED 0.00210

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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

PLOT AREA HARVESTED 0.00286

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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*	
SED	0.453	MIN REP
	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

PLOT AREA HARVESTED 0.00386

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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	10.44
P1 K1 SR	10.06
P1 K3 SR	10.36
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
P5 K6 S	10.40
P6 K4 S	10.03
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

PLOT AREA HARVESTED 0.00286

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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.

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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)):
0(S)	0 (sprayed with 2, 4-D ester to control legumes, duplicated)
0	0 (duplicated)
56	
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.

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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	0.246	MIN REP
	0.213	MAX-MIN
	0.174	MAX REP

	TOTAL N
MAX REP	O(S) V 0
MAX-MIN	O(S) OR 0 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

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84/R/CS/13

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

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

TOTAL N	0(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 *****

TABLE	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 *****

TOTAL N	0(S)	0	56	112	168	225	281	338	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	
SED	0.528	MIN REP
	0.457	MAX-MIN
	0.373	MAX REP

***** 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

PLOT AREA HARVESTED 0.00086

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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:-

	1969	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
Series I	P	P	P*	SB	B	P	P*	W	B	P	P*	B	B	P	P*	W
Series II	P	P	P	P*	SB	B	P	P*	W	B	P	P*	W	B	P	P*
Series III	P	B	P	P	P*	SB	B	P	P*	W	B	P	P*	W	B	P
Series IV	P	B	P	P	P	P*	SB	B	P	P*	W	B	P	P*	W	B

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

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84/W/CS/34

Treatments to potatoes (Series II): All combinations of:-

1. NEMACIDE(84) Nematicides applied 1984:

   ALDICARB
   DS 38697
   DS 46995

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

   SINGLE Single (2.8 kg of aldicarb, 1.4 kg of DS materials)
   DOUBLE Double (5.6 kg of aldicarb, 2.8 kg of DS materials)
   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:-

1. NEMACIDE(81) Residues of nematicides applied 1981:

   ALDICARB
   HOE00668
   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:-

1. 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)
   QUAD Quadruple (6.0 kg of DS materials, 11.2 kg of oxamyl)

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84/W/CS/34

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.

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84/W/CS/34

POTATOES SERIES II

TOTAL TUBERS TONNES/HECTARE

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

RATE NEMACIDE(84)	SINGLE	DOUBLE	QUAD	MEAN
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 NEMACIDE(84)	RATE & 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 NEMACIDE(84)	SINGLE	DOUBLE	QUAD	MEAN
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

PLOT AREA HARVESTED 0.00130

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84/W/CS/34

POTATOES SERIES III

TOTAL TUBERS TONNES/HECTARE

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

RATE NEMACIDE(81)	2.8	5.6	11.2	MEAN
ALDICARB	16.2	16.5	26.4	19.7
HOE00668	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	NEMACIDE(81) RATE
SED	1.52	1.52	2.64

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	3.23	17.3

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

RATE NEMACIDE(81)	2.8	5.6	11.2	MEAN
ALDICARB	83.9	79.6	86.8	83.4
HOE00668	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

PLOT AREA HARVESTED 0.00130

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84/W/CS/34

WINTER WHEAT SERIES I

GRAIN TONNES/HECTARE

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

RATE NEMACIDE(83)	2.8	5.6	11.2	MEAN
FMC65201	4.07	4.28	4.19	4.18
FMC67825	5.24	5.25	5.58	5.36
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
SED	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

PLOT AREA HARVESTED 0.00251

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84/W/CS/34

SPRING BARLEY SERIES IV

GRAIN TONNES/HECTARE

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

RATE NEMACIDE(82)	SINGLE	DOUBLE	QUAD	MEAN
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

PLOT AREA HARVESTED 0.00130

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84/W/CS/35

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 II	P	P*	SB	B	P*	P	P	P*	W	B	B	P*	W
Series III	P	P	P*	SB	B	P*	P	P	P*	W	B	B	P*

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 applied to potatoes, subsequent crops test residual effects.

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

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

NONE	None
TELONE	'Telone' at 224 kg

3. S NEM — Nematicides applied in spring 1979 and 1983:

ALDICARB
OXAMYL

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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 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 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 l.

Seed: W. wheat: Avalon, sown at 200 kg.
Potatoes: Pentland Crown.

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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 spring-tine 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 after harvest for cyst and egg counts of Globodera rostochiensis.

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84/W/CS/35

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	2.5	5.0	7.5	10.0	MEAN
S NEM YR					
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	2.5	5.0	7.5	10.0	MEAN
S NEM					
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	29.6	30.8	38.9	34.0
	OXAMYL	30.2	30.6	34.3	31.3
1980+84	ALDICARB	49.1	47.6	51.7	48.0
	OXAMYL	49.9	46.5	46.4	54.8

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

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84/W/CS/35

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 S NEM YR	ALDICARB	OXAMYL	MEAN
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 S NEM YR S NEM	2.5	5.0	7.5	10.0
1980 ALDICARB	89.8	90.2	94.9	91.9
1980 OXAMYL	89.5	90.9	90.6	91.7
1980+84 ALDICARB	95.2	96.0	96.7	95.3
1980+84 OXAMYL	94.7	95.0	94.4	96.3

RATE 0.0 90.1

GRAND MEAN 93.0

PLOT AREA HARVESTED 0.00087

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84/W/CS/35

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 / A NEM(79)	ALDICARB	OXAMYL	MEAN
NONE	7.38	7.57	7.48
TELONE	7.71	7.50	7.60
MEAN	7.54	7.54	7.54

SNEMRATE / S NEM YR	2.5	5.0	7.5	10.0	MEAN
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
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 / S NEM	2.5	5.0	7.5	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	
S NEM	ALDICARB	OXAMYL	ALDICARB	OXAMYL
S NEM YR				
1979	7.18	7.66	7.81	7.18
1979+83	7.58	7.49	7.60	7.82

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84/W/CS/35

WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

S NEM YRA	NEM(79)	SNEMRATE 2.5	5.0	7.5	10.0
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

S NEM YR	S NEM	SNEMRATE 2.5	5.0	7.5	10.0
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

A NEM(79)	S NEM	SNEMRATE 2.5	5.0	7.5	10.0
NONE	ALDICARB	7.14	7.91	6.99	7.48
	OXAMYL	7.95	7.30	7.70	7.33
TELONE	ALDICARB	8.02	8.16	7.19	7.46
	OXAMYL	6.80	8.26	7.46	7.47

S NEM YRA	NEM(79)	S NEM	SNEMRATE 2.5	5.0	7.5	10.0
1979	NONE	ALDICARB	7.00	7.82	6.99	6.91
		OXAMYL	7.08	7.48	8.31	7.76
	TELONE	ALDICARB	8.25	7.89	7.35	7.75
		OXAMYL	6.15	8.03	7.50	7.03
1979+83	NONE	ALDICARB	7.29	7.99	7.00	8.05
		OXAMYL	8.82	7.13	7.10	6.90
	TELONE	ALDICARB	7.78	8.43	7.03	7.17
		OXAMYL	7.46	8.49	7.43	7.91

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

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84/W/CS/35

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

PLOT AREA HARVESTED 0.00168

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84/W/CS/66

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

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

   0
   450

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

   0
   450

Sub plots

3. 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
N120(CY)	120 kg N to seedbed + residues of 50 kg cyprofuram to 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 l.

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.

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84/W/CS/66

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

FORAGE DRY MATTER TONNES/HECTARE

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

DAZOMET(84)	0	450	MEAN
DAZOMET(79)			
0	13.61	14.19	13.90
450	12.74	15.40	14.07
MEAN	13.18	14.80	13.99

N+FNGRES	NONE	N78+N120	N120	N120(CY)	MEAN
DAZOMET(79)					
0	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	NONE	N78+N120	N120	N120(CY)	MEAN
DAZOMET(84)					
0	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

DAZOMET(79)	N+FNGRES DAZOMET(84)	NONE	N78+N120	N120	N120(CY)
0	0	7.60	16.92	14.48	15.45
	450	8.29	16.97	15.70	15.80
450	0	6.59	15.34	14.99	14.04
	450	10.83	17.49	14.63	18.66

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

TABLE	N+FNGRES	DAZOMET(79)* N+FNGRES	DAZOMET(84)* 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

SUB PLOT AREA HARVESTED 0.00039

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84/W/CS/99

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
B 11(S)A	F	BE	B	B	B	B	B	B(S)	B	B
B 9 A	B	B	F	BE	B	B	B	B	B	B
B 8(SI)A	B	B	B	F	BE	B	B	B(SI)	B	B
B 7(I)A	B	B	B	B	F	BE	B	B(I)	B	B
W 10	B	F	BE	B	B	B	B	B	B	W

All sequences were in s. barley 1968-71

Sub plots

2. INOC RES Residues of take-all inoculum:

0	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.

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84/W/CS/99

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
B 3	F	B	B	B	B	B	B	F	BE	0	B
B 5	B	B	B	B	B	F	BE	0	B	B	B
B 4	B	B	B	B	B	B	F	BE	0	B	B

B = S. barley, W = S. wheat, BE = S. beans, 0 = 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

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84/W/CS/99

GRAIN TONNES/HECTARE

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

AUT CROP TREATMNT(2)	NONE	BARLEY	MEAN
B 17	5.20	6.21	5.70

EXTRA	B 3	B 5	B 4	MEAN
	5.95	6.38	6.30	6.21

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	0.661

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

PLOT AREA HARVESTED 0.00193

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84/R/CS/133

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 1984)
PHORATE	Phorate, 1.68 kg as granules to seedbed
PIRIMICA	Pirimicarb, 0.14 kg as foliar spray (1979 & 1984 only)
BE+DA+PH	Benomyl + dazomet (not applied 1975, 1979 & 1981) + 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 l in 220 l.

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 harrowed, seed sown: 11 May. Weedkiller applied: 14 May. N applied: 18 May. Foliar treatments applied: 17 July. Harvested by hand: 30 Oct.

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84/R/CS/133

FORAGE MAIZE DRY MATTER TONNES/HECTARE

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

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

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

TABLE	CHEMICAL	
SED	0.959	MIN REP
	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

PLOT AREA HARVESTED 0.00059

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84/R/CS/140

CHEMICAL REFERENCE PLOTS

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

Sponsors: 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 l) in 220 l.

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

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84/R/CS/140

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)	NONE	TRIADIM	MEAN
WEEDKLLR			
NONE	5.16	5.20	5.18
GLYPHOS	5.09	5.11	5.10
MEAN	5.12	5.16	5.14

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

FUNGCIDE(2)	NONE	BENOMYL	MEAN
FUNGCIDE(1)			
NONE	5.10	5.14	5.12
TRIADIM	5.09	5.23	5.16
MEAN	5.09	5.18	5.14

INSCTCDE	NONE	CHLORFEN	MEAN
WEEDKLLR			
NONE	5.26	5.10	5.18
GLYPHOS	5.00	5.19	5.10
MEAN	5.13	5.15	5.14

INSCTCDE	NONE	CHLORFEN	MEAN
FUNGCIDE(1)			
NONE	5.13	5.11	5.12
TRIADIM	5.13	5.18	5.16
MEAN	5.13	5.15	5.14

INSCTCDE	NONE	CHLORFEN	MEAN
FUNGCIDE(2)			
NONE	5.07	5.12	5.09
BENOMYL	5.20	5.17	5.18
MEAN	5.13	5.15	5.14

NEMACIDE	NONE	ALDICARB	MEAN
WEEDKLLR			
NONE	5.02	5.33	5.18
GLYPHOS	4.85	5.34	5.10
MEAN	4.94	5.34	5.14

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GRAIN TONNES/HECTARE

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

NEMACIDE FUNGCIDE(1)	NONE	ALDICARB	MEAN
NONE	4.92	5.32	5.12
TRIADIM	4.95	5.36	5.16
MEAN	4.94	5.34	5.14

NEMACIDE FUNGCIDE(2)	NONE	ALDICARB	MEAN
NONE	4.93	5.26	5.09
BENOMYL	4.95	5.42	5.18
MEAN	4.94	5.34	5.14

NEMACIDE INSCTCDE	NONE	ALDICARB	MEAN
NONE	4.95	5.31	5.13
CHLORFEN	4.93	5.37	5.15
MEAN	4.94	5.34	5.14

FUNGCIDE(1)	NONE		TRIADIM	
FUNGCIDE(2)	NONE	BENOMYL	NONE	BENOMYL
WEEDKLLR				
NONE	5.16	5.15	5.17	5.23
GLYPHOS	5.05	5.13	5.00	5.22

FUNGCIDE(1)	NONE		TRIADIM	
INSCTCDE	NONE	CHLORFEN	NONE	CHLORFEN
WEEDKLLR				
NONE	5.30	5.01	5.22	5.19
GLYPHOS	4.96	5.21	5.05	5.17

FUNGCIDE(2)	NONE		BENOMYL	
INSCTCDE	NONE	CHLORFEN	NONE	CHLORFEN
WEEDKLLR				
NONE	5.19	5.14	5.33	5.05
GLYPHOS	4.94	5.10	5.06	5.28

FUNGCIDE(2)	NONE		BENOMYL	
INSCTCDE	NONE	CHLORFEN	NONE	CHLORFEN
FUNGCIDE(1)				
NONE	5.15	5.06	5.11	5.16
TRIADIM	4.98	5.19	5.28	5.17

FUNGCIDE(1)	NONE		TRIADIM	
NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
WEEDKLLR				
NONE	4.97	5.34	5.08	5.33
GLYPHOS	4.88	5.30	4.83	5.39

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GRAIN TONNES/HECTARE

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

FUNGCIDE(2)	NONE		BENOMYL	
NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
WEEDKLLR				
NONE	5.11	5.22	4.94	5.44
GLYPHOS	4.75	5.30	4.96	5.39

FUNGCIDE(2)	NONE		BENOMYL	
NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
FUNGCIDE(1)				
NONE	4.95	5.26	4.90	5.38
TRIADIM	4.91	5.26	5.00	5.45

INSCTCDE	NONE		CHLORFEN	
NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
WEEDKLLR				
NONE	5.11	5.41	4.94	5.25
GLYPHOS	4.80	5.21	4.91	5.48

INSCTCDE	NONE		CHLORFEN	
NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
FUNGCIDE(1)				
NONE	4.97	5.30	4.88	5.34
TRIADIM	4.94	5.32	4.97	5.39

INSCTCDE	NONE		CHLORFEN	
NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
FUNGCIDE(2)				
NONE	4.89	5.24	4.97	5.28
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

PLOT AREA HARVESTED 0.00075

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84/R/CS/212

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 l.
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.

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84/R/CS/212

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

PLOT AREA HARVESTED 0.00434

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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 N0	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 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.

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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.

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84/R/CS/216

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

PLOT AREA HARVESTED 0.00251

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84/W/CS/245

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:

1. SER CROP	Series, crops and 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

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84/W/CS/245

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 P_2O_5, as superphosphate, 250 kg K_2O 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 l with 'Citowett', a wetting agent, at 0.09 l) in 250 l.

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.

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84/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

PK SUB N PATH	---	--S	PKS	MEAN
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
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

YEAR PK SUB	1980	1983	MEAN
---	7.87	7.39	7.63
--S	7.94	7.42	7.68
PKS	8.27	7.50	7.88
MEAN	8.03	7.44	7.73

DRILL N PATH	CNVNTIAL	DIRECT	MEAN
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

DRILL 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
MEAN	7.21	7.99	7.73

DRILL YEAR	CNVNTIAL	DIRECT	MEAN
1980	7.22	8.43	8.03
1983	7.19	7.56	7.44
MEAN	7.21	7.99	7.73

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84/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

N PATH EXTRA	75 ENHD	150 ENHD	225 ENHD	150 STND	MEAN
TPK 80 D	7.46	8.56	8.54	7.71	8.07
TPK 80 C	7.08	7.68	7.63	7.44	7.46
MEAN	7.27	8.12	8.08	7.58	7.76

PK SUB	---		--S		PKS	
YEAR	1980	1983	1980	1983	1980	1983
N PATH						
75 ENHD	6.99	6.83	6.89	6.86	7.23	7.01
150 ENHD	8.23	7.81	7.82	7.54	8.61	7.69
225 ENHD	7.73	7.38	8.75	7.93	8.50	7.78
150 STND	8.54	7.53	8.30	7.36	8.73	7.52

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	8.31
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

YEAR	1980		1983	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	6.35	7.38	6.48	7.11
150 ENHD	7.44	8.61	7.61	7.71
225 ENHD	7.14	8.92	7.26	7.92
150 STND	7.97	8.80	7.41	7.50

YEAR	1980		1983	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
PK SUB				
---	7.29	8.17	6.96	7.60
--S	6.46	8.68	7.15	7.56
PKS	7.92	8.44	7.45	7.52

YEAR		1980		1983	
DRILL		CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH	PK SUB				
75 ENHD	---	6.54	7.22	6.35	7.07
	--S	5.77	7.45	6.31	7.13
	PKS	6.73	7.49	6.78	7.12
150 ENHD	---	7.85	8.42	7.68	7.88
	--S	6.49	8.49	7.48	7.57
	PKS	7.97	8.93	7.67	7.69
225 ENHD	---	6.87	8.17	6.72	7.72
	--S	6.24	10.01	7.34	8.23
	PKS	8.30	8.60	7.71	7.82
150 STND	---	7.89	8.86	7.10	7.74
	--S	7.33	8.79	7.47	7.30
	PKS	8.69	8.75	7.65	7.45

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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	N PATH* PK SUB YEAR	
SED	0.757	0.618			MIN REP
	0.656	0.536	1.289	0.744	MAX-MIN
	0.536	0.437			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	0.744	1.071	1.289	MIN REP
	0.789	0.644	0.928	1.116	MAX-MIN
	0.644	0.526	0.757	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

SUB PLOT AREA HARVESTED 0.00341

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84/W/CS/245 WINTER BARLEY SERIES I

GRAIN TONNES/HECTARE

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

PK SUB N PATH	---	--S	PKS	MEAN
75 ENHD	8.11	7.83	7.69	7.88
150 ENHD	8.86	8.66	8.90	8.81
225 ENHD	9.23	9.10	9.08	9.14
150 STND	8.66	8.44	8.37	8.49
MEAN	8.72	8.51	8.51	8.58

YEAR N PATH	1980	1983	MEAN
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 PK SUB	1980	1983	MEAN
---	8.55	8.89	8.72
--S	8.80	8.21	8.51
PKS	8.74	8.28	8.51
MEAN	8.70	8.46	8.58

DRILL N PATH	CNVNTIAL	DIRECT	MEAN
75 ENHD	7.17	8.23	7.88
150 ENHD	7.84	9.29	8.81
225 ENHD	8.04	9.69	9.14
150 STND	7.81	8.84	8.49
MEAN	7.71	9.01	8.58

DRILL PK SUB	CNVNTIAL	DIRECT	MEAN
---	7.74	9.20	8.72
--S	7.63	8.95	8.51
PKS	7.77	8.88	8.51
MEAN	7.71	9.01	8.58

DRILL YEAR	CNVNTIAL	DIRECT	MEAN
1980	7.81	9.14	8.70
1983	7.62	8.88	8.46
MEAN	7.71	9.01	8.58

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84/W/CS/245 WINTER BARLEY SERIES I

GRAIN TONNES/HECTARE

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

N PATH EXTRA	75 ENHD	150 ENHD	225 ENHD	150 STND	MEAN
TPK 80 D	7.48	7.93	8.91	8.93	8.31
TPK 80 C	6.52	7.94	8.41	7.39	7.57
MEAN	7.00	7.94	8.66	8.16	7.94

	PK SUB	---		--S		PKS	
	YEAR	1980	1983	1980	1983	1980	1983
N PATH							
75 ENHD		7.89	8.33	7.74	7.92	7.75	7.63
150 ENHD		8.55	9.17	9.07	8.25	9.11	8.68
225 ENHD		9.24	9.23	9.68	8.51	9.54	8.62
150 STND		8.51	8.82	8.73	8.15	8.56	8.19

	PK SUB	---		--S		PKS	
	DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH							
75 ENHD		7.29	8.52	7.26	8.11	6.98	8.05
150 ENHD		7.82	9.38	7.49	9.24	8.22	9.24
225 ENHD		7.92	9.89	7.90	9.69	8.29	9.47
150 STND		7.95	9.02	7.87	8.73	7.60	8.76

	YEAR	1980		1983	
	DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH					
75 ENHD		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	1980		1983	
	DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
PK SUB					
---		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	
		DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH	PK SUB					
75 ENHD	---		6.87	8.41	7.70	8.64
	--S		7.22	8.00	7.30	8.23
	PKS		6.66	8.30	7.30	7.80
150 ENHD	---		7.71	8.97	7.93	9.79
	--S		8.62	9.29	6.35	9.20
	PKS		7.81	9.77	8.63	8.70
225 ENHD	---		8.04	9.83	7.80	9.94
	--S		8.76	10.14	7.03	9.25
	PKS		8.05	10.28	8.53	8.67
150 STND	---		8.22	8.66	7.68	9.39
	--S		8.67	8.76	7.06	8.70
	PKS		7.09	9.30	8.12	8.22

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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	0.246	0.201			MIN REP
	0.213	0.174	0.472	0.272	MAX-MIN
	0.174	0.142			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	0.272	0.349	0.472	MIN REP
	0.289	0.236	0.302	0.408	MAX-MIN
	0.236	0.193	0.246	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

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84/W/CS/245 WINTER BARLEY SERIES III

GRAIN TONNES/HECTARE

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

PK SUB N PATH	---	--S	PKS	MEAN
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
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	6.91	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 PK SUB	1980	1983	MEAN
---	7.50	6.67	7.08
--S	7.51	7.07	7.29
PKS	7.54	6.86	7.20
MEAN	7.52	6.87	7.19

DRILL N PATH	CNVNTIAL	DIRECT	MEAN
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

DRILL PK SUB	CNVNTIAL	DIRECT	MEAN
---	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 YEAR	CNVNTIAL	DIRECT	MEAN
1980	6.61	7.97	7.52
1983	6.25	7.17	6.87
MEAN	6.43	7.57	7.19

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84/W/CS/245 WINTER BARLEY SERIES III

GRAIN TONNES/HECTARE

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

N PATH EXTRA	75 ENHD	150 ENHD	225 ENHD	150 STND	MEAN
TPK 80 D	7.60	8.33	9.21	7.82	8.24
TPK 80 C	6.16	6.79	7.23	7.22	6.85
MEAN	6.88	7.56	8.22	7.52	7.54

PK SUB	---		--S		PKS	
YEAR	1980	1983	1980	1983	1980	1983
N PATH						
75 ENHD	6.69	6.30	6.61	5.62	6.72	6.11
150 ENHD	7.72	6.47	7.54	7.36	7.66	6.90
225 ENHD	7.70	6.99	8.21	7.81	8.35	7.22
150 STND	7.88	6.92	7.68	7.50	7.42	7.20

PK SUB	---		--S		PKS	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH						
75 ENHD	5.77	6.86	5.52	6.42	6.23	6.51
150 ENHD	6.14	7.57	6.75	7.80	6.60	7.62
225 ENHD	6.01	8.01	7.38	8.32	7.06	8.15
150 STND	6.33	7.93	7.05	7.86	6.36	7.79

YEAR	1980		1983	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	5.78	7.12	5.89	6.07
150 ENHD	6.80	8.06	6.19	7.27
225 ENHD	7.06	8.60	6.58	7.72
150 STND	6.80	8.09	6.35	7.63

YEAR	1980		1983	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
PK SUB				
---	6.23	8.13	5.90	7.06
--S	6.82	7.86	6.53	7.34
PKS	6.78	7.92	6.34	7.12

YEAR		1980		1983	
DRILL		CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH	PK SUB				
75 ENHD	---	5.66	7.21	5.87	6.51
	--S	5.81	7.01	5.22	5.83
	PKS	5.88	7.14	6.58	5.88
150 ENHD	---	6.67	8.24	5.62	6.90
	--S	6.63	7.99	6.88	7.60
	PKS	7.11	7.93	6.08	7.31
225 ENHD	---	5.83	8.63	6.19	7.39
	--S	7.70	8.46	7.06	8.19
	PKS	7.64	8.71	6.47	7.59
150 STND	---	6.77	8.44	5.90	7.42
	--S	7.14	7.95	6.96	7.76
	PKS	6.51	7.88	6.20	7.70

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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	0.301			MIN REP
	0.319	0.261	0.797	0.460	MAX-MIN
	0.261	0.213			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	0.460	0.521	0.797	MIN REP
	0.488	0.398	0.452	0.690	MAX-MIN
	0.398	0.325	0.369	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

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84/R/CS/246

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)
- - S	Subsoiled
P - S	P to subsoil
- K S	K to subsoil
P K S	PK to subsoil
P K T	PK to topsoil, mouldboard ploughed

2. N — Nitrogen fertilizer (kg N) (cumulative to previous years):

0
40
80
120

NOTES: (1) Rates of P and K were 1000 kg P_2O_5, as superphosphate, 500 kg K_2O, 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 l.

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

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84/R/CS/246

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
P K S	4.86	6.50	8.56	8.38	7.07
P K T	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		0.976	MIN REP
	0.422	0.369	0.845	MAX-MIN
			0.690	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

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84/R/CS/246

STRAW TONNES/HECTARE

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

N	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
P K S	1.73	2.61	3.81	4.99	3.28
P K T	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

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84/R/CS/247

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:-

1. 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	Straw at 6.50 t for 1980, 3.25 t for 1981 and 1982
STR+FYM	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.

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84/R/CS/247

GRAIN TONNES/HECTARE

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

ORG MATT / WORMINOC(80)	NONE	STR	STR+FYM	MEAN
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	WORMINOC(80)	ORG MATT	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

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84/W/CS/273

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 potato varieties:		
1. CROP SEQ	1982	1983	1984
PD B PP	Potatoes, Desiree	S. barley	Potatoes, Maris Piper
B B PD	S. barley	S. barley	Potatoes, Desiree (triplicated)
PD B PD	Potatoes, Desiree	S. barley	Potatoes, Desiree

Sub plots

2. SD TREAT	Seed treatment:
NONE	None
TOL+IMAZ	Tolclofos methyl at 250 g and imazalil at 10 g per tonne of tubers
3. NEMACIDE	Nematicide:
NONE	None
OXAMYL	Oxamyl at 5.0 kg worked in to seedbed
4. MOLLCIDE	Molluscicide:
NONE	None
METHIOCA	Methiocarb at 0.23 kg applied as pellets on 26 July, 1984, 8 Aug, 22 Aug, 5 Sept.

NOTES: (1) Additional plots were sown to s. barley for cropping sequences with differing frequencies of potatoes. Barley yields were not taken.

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(2) Irrigation was applied to the potatoes as follows (mm water):

10-11 May	12.5	11-12 July	25
18 May	12.5	13 July	12.5
15 June	12.5	23-24 July	25
18 June	12.5	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.
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.

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TOTAL TUBERS TONNES/HECTARE

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

SD TREAT CROP SEQ	NONE	TOL+IMAZ	MEAN
PD B PP	36.5	37.7	37.1
B B PD	51.3	48.5	49.9
PD B PD	31.0	26.5	28.8
MEAN	44.3	42.0	43.1

NEMACIDE CROP SEQ	NONE	OXAMYL	MEAN
PD B PP	23.9	50.3	37.1
B B PD	43.1	56.8	49.9
PD B PD	15.7	41.9	28.8
MEAN	33.8	52.5	43.1

NEMACIDE SD TREAT	NONE	OXAMYL	MEAN
NONE	34.3	54.3	44.3
TOL+IMAZ	33.2	50.7	42.0
MEAN	33.8	52.5	43.1

MOLLCIDE CROP SEQ	NONE	METHIOCA	MEAN
PD B PP	40.8	33.4	37.1
B B PD	51.6	48.3	49.9
PD B PD	31.4	26.1	28.8
MEAN	45.4	40.9	43.1

MOLLCIDE SD TREAT	NONE	METHIOCA	MEAN
NONE	45.9	42.7	44.3
TOL+IMAZ	44.9	39.0	42.0
MEAN	45.4	40.9	43.1

MOLLCIDE NEMACIDE	NONE	METHIOCA	MEAN
NONE	36.0	31.5	33.8
OXAMYL	54.7	50.2	52.5
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

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84/W/CS/273

TOTAL TUBERS TONNES/HECTARE

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

SD TREAT	NONE		TOL+IMAZ	
MOLLCIDE	NONE	METHIOCA	NONE	METHIOCA
CROP SEQ				
PD B PP	39.3	33.6	42.3	33.2
B B PD	52.6	50.1	50.6	46.5
PD B PD	32.2	29.8	30.7	22.3

NEMACIDE	NONE		OXAMYL	
MOLLCIDE	NONE	METHIOCA	NONE	METHIOCA
CROP SEQ				
PD B PP	27.9	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	NONE		OXAMYL	
MOLLCIDE	NONE	METHIOCA	NONE	METHIOCA
SD TREAT				
NONE	36.7	32.0	55.0	53.5
TOL+IMAZ	35.4	31.1	54.5	47.0

NEMACIDE		NONE		OXAMYL	
MOLLCIDE		NONE	METHIOCA	NONE	METHIOCA
CROP SEQ	SD TREAT				
PD B PP	NONE	30.0	15.6	48.6	51.7
	TOL+IMAZ	25.7	24.5	58.8	41.9
B B PD	NONE	44.8	43.3	60.4	56.8
	TOL+IMAZ	44.2	40.1	57.0	52.9
PD B PD	NONE	19.1	14.2	45.3	45.5
	TOL+IMAZ	18.9	10.5	42.4	34.2

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

TABLE	CROP SEQ	SD TREAT	NEMACIDE	MOLLCIDE	
SED	6.92				MIN REP
	5.65	1.86	1.86	1.86	MAX-MIN

TABLE	CROP SEQ SD TREAT	CROP SEQ NEMACIDE	SD TREAT NEMACIDE	CROP SEQ MOLLCIDE	
SED	7.53	7.53		7.53	MIN REP
	6.14	6.14	2.64	6.14	MAX-MIN
	4.34	4.34		4.34	MAX REP
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:					
CROP SEQ	4.17	4.17		4.17	MIN REP
	3.40	3.40		3.40	MAX-MIN
	2.41	2.41		2.41	MAX REP

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TOTAL TUBERS TONNES/HECTARE

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

TABLE	SD TREAT MOLLCIDE	NEMACIDE MOLLCIDE	CROP SEQ SD TREAT NEMACIDE	CROP SEQ SD TREAT MOLLCIDE	
SED			8.60	8.60	MIN REP
	2.64	2.64	7.02	7.02	MAX-MIN
			4.97	4.97	MAX REP
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:					
CROP SEQ			5.89	5.89	MIN REP
			4.81	4.81	MAX-MIN
			3.40	3.40	MAX REP

TABLE	CROP SEQ NEMACIDE MOLLCIDE	SD TREAT NEMACIDE MOLLCIDE	CROP SEQ SD TREAT NEMACIDE MOLLCIDE	
SED	8.60		10.43	MIN REP
	7.02	3.73	8.51	MAX-MIN
	4.97		6.02	MAX REP
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CROP SEQ	5.89		8.34	MIN REP
	4.81		6.81	MAX-MIN
	3.40		4.81	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

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PERCENTAGE WARE 4.44 CM (1.75 INCH) RIDDLE

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

SD TREAT	NONE	TOL+IMAZ	MEAN
CROP SEQ			
PD B PP	60.6	64.5	67.6
B B PD	70.1	73.1	71.6
PD B PD	53.8	61.7	57.7
MEAN	64.9	69.1	67.0

NEMACIDE	NONE	OXAMYL	MEAN
CROP SEQ			
PD B PP	60.6	64.5	62.6
B B PD	66.4	76.8	71.6
PD B PD	45.2	70.3	57.7
MEAN	61.0	73.0	67.0

NEMACIDE	NONE	OXAMYL	MEAN
SD TREAT			
NONE	59.2	70.7	64.9
TOL+IMAZ	62.9	75.3	69.1
MEAN	61.0	73.0	67.0

MOLLCIDE	NONE	METHIOCA	MEAN
CROP SEQ			
PD B PP	61.0	64.2	62.6
B B PD	73.1	70.1	71.6
PD B PD	59.2	56.2	57.7
MEAN	67.9	66.1	67.0

MOLLCIDE	NONE	METHIOCA	MEAN
SD TREAT			
NONE	65.0	64.8	64.9
TOL+IMAZ	70.8	67.5	69.1
MEAN	67.9	66.1	67.0

MOLLCIDE	NONE	METHIOCA	MEAN
NEMACIDE			
NONE	63.4	58.7	61.0
OXAMYL	72.4	73.6	73.0
MEAN	67.9	66.1	67.0

SD TREAT	NONE		TOL+IMAZ	
NEMACIDE	NONE	OXAMYL	NONE	OXAMYL
CROP SEQ				
PD B PP	58.5	62.7	62.8	66.3
B B PD	64.9	75.3	68.0	78.2
PD B PD	42.8	64.8	47.6	75.8

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84/W/CS/273

PERCENTAGE WARE 4.44 CM (1.75 INCH) RIDDLE

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

SD TREAT	NONE		TOL+IMAZ	
MOLLCIDE	NONE	METHIOCA	NONE	METHIOCA
CROP SEQ				
PD B PP	57.1	64.0	64.8	64.3
B B PD	71.2	69.0	75.0	71.2
PD B PD	54.4	53.1	64.0	59.3

NEMACIDE	NONE		OXAMYL	
MOLLCIDE	NONE	METHIOCA	NONE	METHIOCA
CROP SEQ				
PD B PP	62.6	58.6	59.3	69.7
B B PD	68.4	64.5	77.8	75.7
PD B PD	49.1	41.2	69.3	71.3

NEMACIDE	NONE		OXAMYL	
MOLLCIDE	NONE	METHIOCA	NONE	METHIOCA
SD TREAT				
NONE	60.6	57.8	69.5	71.9
TOL+IMAZ	66.2	59.6	75.3	75.3

NEMACIDE		NONE		OXAMYL	
MOLLCIDE		NONE	METHIOCA	NONE	METHIOCA
CROP SEQ	SD TREAT				
PD B PP	NONE	60.9	56.0	53.4	72.0
	TOL+IMAZ	64.4	61.2	65.2	67.4
B B PD	NONE	65.4	64.4	77.0	73.7
	TOL+IMAZ	71.3	64.6	78.6	77.8
PD B PD	NONE	45.8	39.7	63.0	66.5
	TOL+IMAZ	52.4	42.7	75.6	76.0

SUB PLOT AREA HARVESTED 0.00075

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84/R/CS/279

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	Vertus, untreated
V A1	Vertus, aldicarb at 1.5 kg in seed furrows in 1982
E 0	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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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 *****

TREATMNT	
V 0	6.45
V A1	6.63
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
E T2 T2	6.86
MEAN	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

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84/R/CS/279 LONG HOOS V 5 (HEALTHY SITE)

2ND CUT (17/7/84) DRY MATTER TONNES/HECTARE

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

TREATMNT	
V 0	4.27
V A1	4.23
E 0	5.17
E A1	5.05
E A2	5.35
E A1 A1	4.73
E A1 T1	4.95
E A2 T2	4.75
E C1	4.91
E C2	4.84
E C1 T1	5.32
E C2 T2	4.79
E T1 T1	5.05
E T2 T2	4.52
MEAN	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

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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

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84/R/CS/279 LONG HOOS V 5 (HEALTHY SITE)

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

TREATMNT	
V 0	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

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84/R/CS/279 LONG HOOS IV 2 (INFESTED SITE)

1ST CUT (14/6/84) DRY MATTER TONNES/HECTARE

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

TREATMNT	
V 0	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

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84/R/CS/279 LONG HOOS IV 2 (INFESTED SITE)

2ND CUT (6/8/84) DRY MATTER TONNES/HECTARE

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

TREATMNT	
V 0	7.39
V A1	5.59
E 0	6.41
E A1	4.64
E A2	5.95
E A1 A1	5.97
E A1 T1	5.50
E A2 T2	5.27
E C1	6.33
E C2	6.29
E C1 T1	5.16
E C2 T2	5.91
E T1 T1	5.64
E T2 T2	5.24
MEAN	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

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84/R/CS/279 LONG HOOS IV 2 (INFESTED SITE)

3RD CUT (26/9/84) DRY MATTER TONNES/HECTARE

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

TREATMNT	
V 0	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	2.46
E C2	2.34
E C1 T1	2.48
E C2 T2	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

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84/R/CS/279 LONG HOOS IV 2 (INFESTED SITE)

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

TREATMNT	
V 0	15.68
V A1	12.69
E 0	14.34
E A1	10.73
E A2	12.54
E A1 A1	13.06
E A1 T1	11.04
E A2 T2	11.31
E C1	13.70
E C2	14.14
E C1 T1	12.36
E C2 T2	12.22
E T1 T1	12.86
E T2 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

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84/W/CS/284

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:-

1. 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

2. 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.

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84/W/CS/284

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 *****

VARIETY(84) / VARIETY(82)	CROWN	DELL	DESIREE	PIPER	MEAN
CARA	43.3	25.6	28.3	35.7	33.2
CROWN	33.7	19.4	20.1	31.9	26.3
CA CR	36.9	17.7	21.4	33.2	27.3
CA CA CR	37.1	18.9	25.9	35.0	29.3
MEAN	37.7	20.4	23.9	34.0	29.0

NEMACIDE(84) / VARIETY(82)	NONE	OXAMYL	MEAN
CARA	26.0	40.5	33.2
CROWN	16.3	36.3	26.3
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) / VARIETY(84)	NONE	OXAMYL	MEAN
CROWN	24.6	50.9	37.7
DELL	10.3	30.5	20.4
DESIREE	15.2	32.6	23.9
PIPER	31.6	36.3	34.0
MEAN	20.4	37.6	29.0

VARIETY(82)	NEMACIDE(84) / VARIETY(84)	NONE	OXAMYL
CARA	CROWN	31.5	55.0
	DELL	17.6	33.5
	DESIREE	21.4	35.2
	PIPER	33.3	38.1
CROWN	CROWN	17.7	49.6
	DELL	5.6	33.2
	DESIREE	11.1	29.1
	PIPER	30.7	33.1
CA CR	CROWN	20.7	53.1
	DELL	9.8	25.6
	DESIREE	11.5	31.4
	PIPER	27.8	38.6
CA CA CR	CROWN	28.4	45.8
	DELL	8.2	29.7
	DESIREE	16.9	34.9
	PIPER	34.7	35.4

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84/W/CS/284

TOTAL TUBERS TONNES/HECTARE

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

TABLE	VARIETY(82)	VARIETY(84)	NEMACIDE(84)	VARIETY(82) VARIETY(84)
SED	1.54	1.54	1.09	3.07

TABLE	VARIETY(82) NEMACIDE(84)	VARIETY(84) NEMACIDE(84)	VARIETY(82) 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) VARIETY(82)	CROWN	DELL	DESIREE	PIPER	MEAN
CARA	94.2	82.5	86.8	84.1	86.9
CROWN	95.5	75.7	86.1	92.4	87.4
CA CR	94.4	85.6	83.3	89.7	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) VARIETY(82)	NONE	OXAMYL	MEAN
CARA	83.8	90.0	86.9
CROWN	81.8	93.0	87.4
CA CR	85.1	91.4	88.2
CA CA CR	82.6	89.9	86.2
MEAN	83.3	91.1	87.2

NEMACIDE(84) VARIETY(84)	NONE	OXAMYL	MEAN
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
MEAN	83.3	91.1	87.2

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84/W/CS/284

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

VARIETY(82)	NEMACIDE(84) VARIETY(84)	NONE	OXAMYL
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
	DESIREE	81.5	90.7
	PIPER	93.3	91.5
CA CR	CROWN	92.1	96.7
	DELL	81.6	89.6
	DESIREE	72.5	94.2
	PIPER	94.1	85.3
CA CA CR	CROWN	94.8	95.4
	DELL	55.6	90.8
	DESIREE	87.9	89.6
	PIPER	91.9	83.9

PLOT AREA HARVESTED 0.00087

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84/W/CS/293

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 x 12.0.

Treatments, applied cumulatively to 1982 and 1983: All combinations of:-

1. 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 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.

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84/W/CS/293

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	MEAN
0	8.19	7.66	8.16	8.00
35	9.97	8.81	9.13	9.30
70	9.08	8.95	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	9.30
70	9.27	8.88	9.07
MEAN	9.03	8.55	8.79

I RATE / I FORM	SINGLE	DOUBLE	MEAN
DICYANDI	9.08	9.07	9.08
ETRIDIAZ	8.87	8.08	8.47
NITRAPYR	9.15	8.51	8.83
MEAN	9.03	8.55	8.79

I FORM	DICYANDI		ETRIDIAZ		NITRAPYR	
I RATE / N RATE	SINGLE	DOUBLE	SINGLE	DOUBLE	SINGLE	DOUBLE
0	8.43	7.94	8.00	7.33	8.16	8.16
35	10.15	9.79	9.23	8.38	9.52	8.74
70	8.67	9.49	9.37	8.53	9.76	8.63

N RATE X	0	35	70	MEAN
	8.09	8.86	8.29	8.41

GRAND MEAN 8.74

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84/W/CS/293

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 / N RATE	SINGLE	DOUBLE	MEAN
0	5.06	4.59	4.83
35	5.14	5.05	5.10
70	5.54	5.29	5.42
MEAN	5.25	4.98	5.11

I RATE / I FORM	SINGLE	DOUBLE	MEAN
DICYANDI	5.08	5.35	5.22
ETRIDIAZ	5.68	4.88	5.28
NITRAPYR	4.98	4.70	4.84
MEAN	5.25	4.98	5.11

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84/W/CS/293

STRAW TONNES/HECTARE

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

I FORM	DICYANDI		ETRIDIAZ		NITRAPYR	
I RATE	SINGLE	DOUBLE	SINGLE	DOUBLE	SINGLE	DOUBLE
N RATE						
0	5.79	4.82	4.82	5.20	4.58	3.74
35	4.28	5.45	6.04	4.47	5.10	5.23
70	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

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84/R/CS/298

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 x 3.7.

Treatments:

TREATMNT	Varieties and chemicals (all applied at 1.5 kg):
EV 0	Euver, untreated
EV C	Euver, carbofuran to seed furrow
ER 0	Europe, untreated (duplicated)
ER C	Europe, carbofuran to seed furrow
	To variety Europe, all given carbofuran to seed furrow
ER C AW	Aldicarb watered on
ER C CE	Carbendazim, applied by electrostatic sprayer
ER C CH	Carbendazim, applied by hydraulic sprayer
ER C DE	Dimethoate, applied by electrostatic sprayer
ER C DH	Dimethoate, applied by hydraulic sprayer
ER C PE	Pirimiphos methyl, applied by electrostatic sprayer
ER C PH	Pirimiphos methyl, applied by hydraulic sprayer
ER C TCE	Thiodicarb, applied by electrostatic sprayer
ER C TCH	Thiodicarb, applied by hydraulic sprayer
ER C TBE	Thiabendazole, applied by electrostatic sprayer
ER C TBH	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.

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84/R/CS/298

1ST CUT (14/6/84) DRY MATTER TONNES/HECTARE

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

TREATMNT	
EV 0	3.97
EV C	5.64
ER 0	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 0 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

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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	4.70
ER C CH	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

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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	1.26
ER C TBH	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 *****

STRATUM	DF	SE	CV%
BLOCK.WP	16	0.371	28.5

3RD CUT MEAN DM% 22.8

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84/R/CS/298

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

TREATMNT	
EV 0	9.14
EV C	13.33
ER 0	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	1.306	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

PLOT AREA HARVESTED 0.00045

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84/R/CS/299

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

2. 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.

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84/R/CS/299

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) / CROP(83)	NONE	RHIZ C W	RHIZ S B	RHIZ S P	MEAN
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

SUB PLOT AREA HARVESTED 0.00234

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84/R/CS/299

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

SUB PLOT AREA HARVESTED 0.00234

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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:-

1. 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:-

1. 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

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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 l) 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 INHIB I	WINTER	SPRING	MEAN
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 INHIB B	DIVIDED	SINGLE	MEAN
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 INHIB B
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

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84/W/CS/304

2ND CUT (9/8/84) DRY MATTER TONNES/HECTARE

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

APP TIME INHIB I	WINTER	SPRING	MEAN
0 AQU3	1.85	2.22	2.03
NIT AQU3	2.03	1.97	2.00
C+P AQU3	1.91	2.16	2.04
MEAN	1.93	2.12	2.02

APP DIV INHIB B	DIVIDED	SINGLE	MEAN
0 PU3	1.72	1.31	1.52
DIC PU3	1.86	1.16	1.51
PHEN PU3	2.21	1.99	2.10
MEAN	1.93	1.49	1.71

EXTRA	0	NC1 D	NC2 D	NC3 D	NC4 D	NC3 S	MEAN
	0.31	1.54	2.52	2.39	2.55	1.99	1.89

GRAND MEAN 1.87

TABLE	EXTRA	APP TIME	APP DIV	INHIB I
SED	0.254	0.147	0.147	0.180

TABLE	INHIB B	APP TIME INHIB I	APP DIV INHIB B
SED	0.180	0.254	0.254

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.311	16.6

2ND CUT MEAN DM% 33.6

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84/W/CS/304

3RD CUT (20/11/84) DRY MATTER TONNES/HECTARE

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

APP TIME INHIB I	WINTER	SPRING	MEAN
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 INHIB B	DIVIDED	SINGLE	MEAN
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	NC3 D	NC4 D	NC3 S	MEAN
	0.09	0.54	0.94	1.45	1.41	0.59	0.84

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 INHIB B
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

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84/W/CS/304

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

APP TIME INHIB I	WINTER	SPRING	MEAN
0 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

APP DIV INHIB B	DIVIDED	SINGLE	MEAN
0 PU3	8.50	7.96	8.23
DIC PU3	8.03	7.27	7.65
PHEN PU3	8.58	8.97	8.77
MEAN	8.37	8.07	8.22

EXTRA	0	NC1 D	NC2 D	NC3 D	NC4 D	NC3 S	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 INHIB B
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

PLOT AREA HARVESTED 0.00084

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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

1. 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:

   0
   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':

After beans	After wheat
0	0
120	150
150	180
180	210
210	240

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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 m^2.

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

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

WINTER N	0	60	MEAN
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

PATHCONT	NONE	FULL	MEAN
WINTER N			
0	10.95	11.71	11.33
60	11.45	11.92	11.69
MEAN	11.20	11.82	11.51

N RATE	0	120	150	180	210	MEAN
VARIETY						
GALAHAD	9.29	12.50	12.76	12.82	12.80	12.03
MOULIN	8.32	11.72	12.00	11.48	11.41	10.99
MEAN	8.81	12.11	12.38	12.15	12.10	11.51

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84/S/CS/1 WHEAT AFTER BEANS

GRAIN TONNES/HECTARE

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

N RATE	0	120	150	180	210	MEAN
WINTER N						
0	7.83	11.85	12.17	12.36	12.45	11.33
60	9.78	12.37	12.58	11.94	11.75	11.69
MEAN	8.81	12.11	12.38	12.15	12.10	11.51

N RATE	0	120	150	180	210	MEAN
PATHCONT						
NONE	8.51	11.68	11.96	11.90	11.95	11.20
FULL	9.11	12.54	12.79	12.40	12.25	11.82
MEAN	8.81	12.11	12.38	12.15	12.10	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

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84/S/CS/1 WHEAT AFTER WHEAT

GRAIN TONNES/HECTARE

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

WINTER N	0	60	MEAN
VARIETY			
GALAHAD	8.49	10.08	9.29
MOULIN	6.95	9.70	8.33
MEAN	7.72	9.89	8.81

PATHCONT	NONE	FULL	MEAN
VARIETY			
GALAHAD	8.85	9.72	9.29
MOULIN	7.44	9.21	8.33
MEAN	8.15	9.47	8.81

PATHCONT	NONE	FULL	MEAN
WINTER N			
0	7.01	8.43	7.72
60	9.28	10.50	9.89
MEAN	8.15	9.47	8.81

N RATE	0	150	180	210	240	MEAN
VARIETY						
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
MEAN	4.72	9.26	9.67	10.02	10.35	8.81

N RATE	0	150	180	210	240	MEAN
WINTER N						
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

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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

SUB PLOT AREA HARVESTED 0.00189

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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 x 12.0 , (RD) 3.0 x 10.0, (WH) 4.0 x 12.0.

Treatments: All combinations of:-

Whole plots

1.	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.

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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.

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84/R/WW/1

HEALTHY SITE

GRAIN TONNES/HECTARE

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

GROWREG VARIETY	NONE	CHLORMEQ	MEAN
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

SUB PLOT AREA HARVESTED 0.00245

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84/R/WW/1

DISEASED SITE

GRAIN TONNES/HECTARE

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

GROWREG VARIETY	NONE	CHLORMEQ	MEAN
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	GROWREG* 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

SUB PLOT AREA HARVESTED 0.00203

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84/W/WW/1

GRAIN TONNES/HECTARE

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

GROWREG VARIETY	NONE	CHLORMEQ	MEAN
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

SUB PLOT AREA HARVESTED 0.00330

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84/R/WW/3

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 2^8 + 54 extra plots, arranged in 4 blocks with PREVCROP on blocks.

Whole plot dimensions: 3.0 x 15.2.

Treatments: Combinations of:-

Blocks

1.	PREVCROP	Previous cropping:
	BARLEY	Potatoes 1981, w. wheat 1982, s. barley 1983
	OATS	Potatoes 1981, w. wheat 1982, s. oats 1983

Whole plots

2.	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

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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 l 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 l in 220 l on 10 Feb + pirimicarb at 0.14 kg in 220 l 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

1. PRECROPX — Previous cropping:

BARLEY	Potatoes 1981, w. wheat 1982, s. barley 1983
OATS	Potatoes 1981, w. wheat 1982, s. oats 1983

Whole plots

2. SOWDATEX — Dates of sowing:

20 SEPT	20 September, 1983
18 OCT	18 October

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

1. PRECROPI — Previous cropping:

BARLEY	Potatoes 1981, w. wheat 1982, s. barley 1983
OATS	Potatoes 1981, w. wheat 1982, s. oats 1983

Whole plots

2. SOWDATEI — Dates of sowing:

20 SEPT	20 September, 1983
18 OCT	18 October

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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).

1. 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 — Benomyl at 0.28 kg in 220 l on 10 Apr

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84/R/WW/3

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 l) at Zadoks GS 13/21 on 10 Nov, 1983, and 230 kg N at N TIME EARLY (duplicated)
SL GREGX	Sown 18 Oct, after oats given additional chlormequat chloride + choline chloride (as 'New 5 C Cycocel' at 1.0 l) 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)
SE NONE F	Sown 20 Sept after fallow
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.

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GRAIN TONNES/HECTARE

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

SOWDATE	20 SEPT	18 OCT	MEAN
PREVCROP			
BARLEY	7.52	8.88	8.20
OATS	10.43	10.43	10.43
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
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
MEAN	8.94	9.69	9.32

N TIME	EARLY	LATE	MEAN
PREVCROP			
BARLEY	8.12	8.28	8.20
OATS	10.36	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
MEAN	9.24	9.39	9.32

N TIME	EARLY	LATE	MEAN
TOTAL N			
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	8.20
OATS	10.34	10.52	10.43
MEAN	9.19	9.44	9.32

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GRAIN TONNES/HECTARE

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

GROWREG SOWDATE	NONE	CHLORMEQ	MEAN
20 SEPT	8.79	9.17	8.98
18 OCT	9.59	9.72	9.65
MEAN	9.19	9.44	9.32

GROWREG TOTAL N	NONE	CHLORMEQ	MEAN
160	8.71	9.17	8.94
230	9.67	9.71	9.69
MEAN	9.19	9.44	9.32

GROWREG N TIME	NONE	CHLORMEQ	MEAN
EARLY	9.16	9.33	9.24
LATE	9.22	9.56	9.39
MEAN	9.19	9.44	9.32

SPR FUNG PREVCROP	NONE	BENOMYL	MEAN
BARLEY	7.90	8.50	8.20
OATS	10.33	10.53	10.43
MEAN	9.12	9.51	9.32

SPR FUNG SOWDATE	NONE	BENOMYL	MEAN
20 SEPT	8.72	9.24	8.98
18 OCT	9.52	9.79	9.65
MEAN	9.12	9.51	9.32

SPR FUNG TOTAL N	NONE	BENOMYL	MEAN
160	8.69	9.19	8.94
230	9.54	9.84	9.69
MEAN	9.12	9.51	9.32

SPR FUNG N TIME	NONE	BENOMYL	MEAN
EARLY	9.03	9.46	9.24
LATE	9.21	9.57	9.39
MEAN	9.12	9.51	9.32

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GRAIN TONNES/HECTARE

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

SPR FUNG GROWREG	NONE	BENOMYL	MEAN
NONE	8.98	9.40	9.19
CHLORMEQ	9.26	9.63	9.44
MEAN	9.12	9.51	9.32

SUM FUNG PREVCROP	NONE	PR+CA+MA	MEAN
BARLEY	8.20	8.21	8.20
OATS	10.39	10.47	10.43
MEAN	9.29	9.34	9.32

SUM FUNG SOWDATE	NONE	PR+CA+MA	MEAN
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 TOTAL N	NONE	PR+CA+MA	MEAN
160	8.94	8.94	8.94
230	9.65	9.73	9.69
MEAN	9.29	9.34	9.32

SUM FUNG N TIME	NONE	PR+CA+MA	MEAN
EARLY	9.26	9.23	9.24
LATE	9.33	9.45	9.39
MEAN	9.29	9.34	9.32

SUM FUNG GROWREG	NONE	PR+CA+MA	MEAN
NONE	9.18	9.20	9.19
CHLORMEQ	9.41	9.47	9.44
MEAN	9.29	9.34	9.32

SUM FUNG SPR FUNG	NONE	PR+CA+MA	MEAN
NONE	9.06	9.18	9.12
BENOMYL	9.53	9.50	9.51
MEAN	9.29	9.34	9.32

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GRAIN TONNES/HECTARE

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

PESTCIDE PREVCROP	NONE	AL+OM+PI	MEAN
BARLEY	8.29	8.11	8.20
OATS	10.12	10.74	10.43
MEAN	9.21	9.43	9.32

PESTCIDE SOWDATE	NONE	AL+OM+PI	MEAN
20 SEPT	8.87	9.08	8.98
18 OCT	9.54	9.77	9.65
MEAN	9.21	9.43	9.32

PESTCIDE TOTAL N	NONE	AL+OM+PI	MEAN
160	8.88	9.00	8.94
230	9.53	9.85	9.69
MEAN	9.21	9.43	9.32

PESTCIDE N TIME	NONE	AL+OM+PI	MEAN
EARLY	9.17	9.32	9.24
LATE	9.24	9.53	9.39
MEAN	9.21	9.43	9.32

PESTCIDE GROWREG	NONE	AL+OM+PI	MEAN
NONE	9.10	9.28	9.19
CHLORMEQ	9.32	9.57	9.44
MEAN	9.21	9.43	9.32

PESTCIDE SPR FUNG	NONE	AL+OM+PI	MEAN
NONE	8.92	9.31	9.12
BENOMYL	9.49	9.54	9.51
MEAN	9.21	9.43	9.32

PESTCIDE SUM FUNG	NONE	AL+OM+PI	MEAN
NONE	9.21	9.38	9.29
PR+CA+MA	9.20	9.47	9.34
MEAN	9.21	9.43	9.32

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GRAIN TONNES/HECTARE

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

SOWDATE	20 SEPT		18 OCT	
TOTAL N	160	230	160	230
PREVCROP				
BARLEY	7.09	7.96	8.51	9.25
OATS	10.15	10.72	10.01	10.84

SOWDATE	20 SEPT		18 OCT	
N TIME	EARLY	LATE	EARLY	LATE
PREVCROP				
BARLEY	7.40	7.65	8.85	8.91
OATS	10.28	10.58	10.44	10.41

TOTAL N	160		230	
N TIME	EARLY	LATE	EARLY	LATE
PREVCROP				
BARLEY	7.90	7.70	8.35	8.86
OATS	10.10	10.06	10.62	10.93

TOTAL N	160		230	
N TIME	EARLY	LATE	EARLY	LATE
SOWDATE				
20 SEPT	8.62	8.62	9.07	9.61
18 OCT	9.39	9.14	9.90	10.19

SOWDATE	20 SEPT		18 OCT	
GROWREG	NONE	CHLORMEQ	NONE	CHLORMEQ
PREVCROP				
BARLEY	7.29	7.76	8.80	8.97
OATS	10.29	10.57	10.38	10.47

TOTAL N	160		230	
GROWREG	NONE	CHLORMEQ	NONE	CHLORMEQ
PREVCROP				
BARLEY	7.44	8.16	8.64	8.57
OATS	9.97	10.19	10.70	10.85

TOTAL N	160		230	
GROWREG	NONE	CHLORMEQ	NONE	CHLORMEQ
SOWDATE				
20 SEPT	8.37	8.86	9.21	9.47
18 OCT	9.04	9.49	10.14	9.95

N TIME	EARLY		LATE	
GROWREG	NONE	CHLORMEQ	NONE	CHLORMEQ
PREVCROP				
BARLEY	8.05	8.20	8.04	8.53
OATS	10.27	10.45	10.40	10.59

N TIME	EARLY		LATE	
GROWREG	NONE	CHLORMEQ	NONE	CHLORMEQ
SOWDATE				
20 SEPT	8.83	8.85	8.75	9.48
18 OCT	9.49	9.80	9.69	9.63

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GRAIN TONNES/HECTARE

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

N TIME	EARLY		LATE	
GROWREG	NONE	CHLORMEQ	NONE	CHLORMEQ
TOTAL N				
160	8.83	9.17	8.58	9.18
230	9.49	9.48	9.86	9.94

SOWDATE	20 SEPT		18 OCT	
SPR FUNG	NONE	BENOMYL	NONE	BENOMYL
PREVCROP				
BARLEY	7.16	7.89	8.64	9.12
OATS	10.27	10.59	10.39	10.46

TOTAL N	160		230	
SPR FUNG	NONE	BENOMYL	NONE	BENOMYL
PREVCROP				
BARLEY	7.40	8.20	8.41	8.80
OATS	9.99	10.17	10.67	10.88

TOTAL N	160		230	
SPR FUNG	NONE	BENOMYL	NONE	BENOMYL
SOWDATE				
20 SEPT	8.32	8.92	9.12	9.56
18 OCT	9.06	9.46	9.97	10.12

N TIME	EARLY		LATE	
SPR FUNG	NONE	BENOMYL	NONE	BENOMYL
PREVCROP				
BARLEY	7.80	8.45	8.01	8.55
OATS	10.26	10.47	10.40	10.59

N TIME	EARLY		LATE	
SPR FUNG	NONE	BENOMYL	NONE	BENOMYL
SOWDATE				
20 SEPT	8.59	9.10	8.85	9.38
18 OCT	9.47	9.82	9.57	9.76

N TIME	EARLY		LATE	
SPR FUNG	NONE	BENOMYL	NONE	BENOMYL
TOTAL N				
160	8.74	9.27	8.65	9.11
230	9.32	9.65	9.77	10.03

GROWREG	NONE		CHLORMEQ	
SPR FUNG	NONE	BENOMYL	NONE	BENOMYL
PREVCROP				
BARLEY	7.75	8.34	8.06	8.67
OATS	10.21	10.46	10.45	10.59

GROWREG	NONE		CHLORMEQ	
SPR FUNG	NONE	BENOMYL	NONE	BENOMYL
SOWDATE				
20 SEPT	8.48	9.09	8.95	9.38
18 OCT	9.48	9.71	9.56	9.88

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GRAIN TONNES/HECTARE

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

GROWREG	NONE		CHLORMEQ	
SPR FUNG	NONE	BENOMYL	NONE	BENOMYL
TOTAL N				
160	8.46	8.95	8.92	9.43
230	9.50	9.85	9.59	9.83

GROWREG	NONE		CHLORMEQ	
SPR FUNG	NONE	BENOMYL	NONE	BENOMYL
N TIME				
EARLY	8.93	9.39	9.12	9.53
LATE	9.03	9.41	9.39	9.73

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	10.47	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	9.28	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	8.16	8.08	8.24	8.33
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	8.77	9.05	9.18
18 OCT	9.61	9.69	9.61	9.71

N TIME	EARLY		LATE	
SUM FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
TOTAL N				
160	9.07	8.94	8.81	8.95
230	9.45	9.52	9.85	9.94

GROWREG	NONE		CHLORMEQ	
SUM FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
PREVCROP				
BARLEY	8.09	8.00	8.31	8.41
OATS	10.27	10.40	10.50	10.53

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GRAIN TONNES/HECTARE

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

GROWREG	NONE		CHLORMEQ	
SUM FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
SOWDATE				
20 SEPT	8.81	8.77	9.15	9.18
18 OCT	9.55	9.63	9.67	9.77

GROWREG	NONE		CHLORMEQ	
SUM FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
TOTAL N				
160	8.82	8.59	9.05	9.29
230	9.54	9.81	9.76	9.65

GROWREG	NONE		CHLORMEQ	
SUM FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
N TIME				
EARLY	9.16	9.16	9.35	9.30
LATE	9.19	9.24	9.47	9.65

SPR FUNG	NONE		BENOMYL	
SUM FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
PREVCROP				
BARLEY	7.87	7.94	8.53	8.47
OATS	10.24	10.42	10.54	10.52

SPR FUNG	NONE		BENOMYL	
SUM FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
SOWDATE				
20 SEPT	8.59	8.84	9.36	9.11
18 OCT	9.52	9.52	9.70	9.88

SPR FUNG	NONE		BENOMYL	
SUM FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
TOTAL N				
160	8.55	8.83	9.32	9.05
230	9.56	9.53	9.74	9.94

SPR FUNG	NONE		BENOMYL	
SUM FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
N TIME				
EARLY	8.98	9.07	9.53	9.39
LATE	9.13	9.29	9.53	9.60

SPR FUNG	NONE		BENOMYL	
SUM FUNG	NONE	PR+CA+MA	NONE	PR+CA+MA
GROWREG				
NONE	8.86	9.09	9.49	9.31
CHLORMEQ	9.25	9.26	9.57	9.69

SOWDATE	20 SEPT		18 OCT	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
PREVCROP				
BARLEY	7.69	7.36	8.89	8.87
OATS	10.06	10.81	10.18	10.67

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GRAIN TONNES/HECTARE

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

TOTAL N	160		230	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
PREVCROP				
BARLEY	8.00	7.60	8.59	8.63
OATS	9.76	10.40	10.48	11.08

TOTAL N	160		230	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
SOWDATE				
20 SEPT	8.61	8.62	9.14	9.54
18 OCT	9.15	9.37	9.92	10.17

N TIME	EARLY		LATE	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
PREVCROP				
BARLEY	8.23	8.02	8.35	8.21
OATS	10.11	10.62	10.13	10.86

N TIME	EARLY		LATE	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
SOWDATE				
20 SEPT	8.80	8.88	8.95	9.28
18 OCT	9.54	9.75	9.53	9.79

N TIME	EARLY		LATE	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
TOTAL N				
160	8.93	9.07	8.83	8.93
230	9.41	9.56	9.66	10.14

GROWREG	NONE		CHLORMEQ	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
PREVCROP				
BARLEY	8.18	7.90	8.41	8.32
OATS	10.01	10.66	10.23	10.81

GROWREG	NONE		CHLORMEQ	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
SOWDATE				
20 SEPT	8.67	8.91	9.08	9.25
18 OCT	9.52	9.66	9.55	9.88

GROWREG	NONE		CHLORMEQ	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
TOTAL N				
160	8.70	8.71	9.06	9.29
230	9.49	9.86	9.58	9.84

GROWREG	NONE		CHLORMEQ	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
N TIME				
EARLY	9.13	9.19	9.21	9.45
LATE	9.06	9.38	9.43	9.69

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GRAIN TONNES/HECTARE

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

SPR FUNG	NONE		BENOMYL	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
PREVCROP				
BARLEY	7.86	7.95	8.73	8.28
OATS	9.99	10.67	10.25	10.81

SPR FUNG	NONE		BENOMYL	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
SOWDATE				
20 SEPT	8.45	8.98	9.30	9.18
18 OCT	9.39	9.64	9.68	9.90

SPR FUNG	NONE		BENOMYL	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
TOTAL N				
160	8.67	8.72	9.09	9.28
230	9.18	9.91	9.88	9.80

SPR FUNG	NONE		BENOMYL	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
N TIME				
EARLY	8.84	9.21	9.50	9.42
LATE	9.00	9.41	9.48	9.66

SPR FUNG	NONE		BENOMYL	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
GROWREG				
NONE	8.80	9.16	9.39	9.41
CHLORMEQ	9.05	9.47	9.59	9.67

SUM FUNG	NONE		PR+CA+MA	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
PREVCROP				
BARLEY	8.40	8.00	8.19	8.22
OATS	10.02	10.76	10.22	10.72

SUM FUNG	NONE		PR+CA+MA	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
SOWDATE				
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	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
TOTAL N				
160	8.90	8.98	8.87	9.02
230	9.52	9.78	9.54	9.92

SUM FUNG	NONE		PR+CA+MA	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
N TIME				
EARLY	9.18	9.34	9.16	9.30
LATE	9.23	9.42	9.25	9.65

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GRAIN TONNES/HECTARE

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

SUM FUNG	NONE		PR+CA+MA	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
GROWREG				
NONE	9.16	9.19	9.03	9.37
CHLORMEQ	9.25	9.57	9.38	9.57

SUM FUNG	NONE		PR+CA+MA	
PESTCIDE	NONE	AL+OM+PI	NONE	AL+OM+PI
SPR FUNG				
NONE	8.86	9.25	8.98	9.37
BENOMYL	9.55	9.51	9.42	9.57

SOWDATEX	20 SEPT	18 OCT	MEAN
PRECROPX			
BARLEY	6.13	7.71	6.92
OATS	8.76	9.20	8.98
MEAN	7.45	8.46	7.95

TOTAL NX	0	125	195	265	MEAN
PRECROPX					
BARLEY	2.63	7.73	7.61	9.73	6.92
OATS	4.33	9.25	10.77	11.59	8.98
MEAN	3.48	8.49	9.19	10.66	7.95

TOTAL NX	0	125	195	265	MEAN
SOWDATEX					
20 SEPT	3.32	7.58	8.85	10.04	7.45
18 OCT	3.64	9.39	9.52	11.27	8.46
MEAN	3.48	8.49	9.19	10.66	7.95

SOWDATEI	20 SEPT	18 OCT	MEAN
PRECROPI			
BARLEY	8.11	9.62	8.87
OATS	10.62	11.20	10.91
MEAN	9.37	10.41	9.89

TOTAL NI	160	230	MEAN
PRECROPI			
BARLEY	8.28	9.45	8.87
OATS	10.84	10.98	10.91
MEAN	9.56	10.22	9.89

TOTAL NI	160	230	MEAN
SOWDATEI			
20 SEPT	8.93	9.80	9.37
18 OCT	10.18	10.64	10.41
MEAN	9.56	10.22	9.89

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GRAIN TONNES/HECTARE

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

N TIMEI	EARLY	LATE	MEAN
PRECROPI			
BARLEY	9.04	8.69	8.87
OATS	10.89	10.93	10.91
MEAN	9.97	9.81	9.89

N TIMEI	EARLY	LATE	MEAN
SOWDATEI			
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			
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	NONE	AUT N	MEAN
SOWDATEI			
20 SEPT	9.42	9.31	9.37
18 OCT	9.94	10.89	10.41
MEAN	9.68	10.10	9.89

AUT NI	NONE	AUT N	MEAN
TOTAL NI			
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

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GRAIN TONNES/HECTARE

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

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			
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
MEAN	10.58	10.17	10.38

SPR FUNP	NONE	BENOMYL	MEAN
GROWREGP			
NONE	10.70	10.29	10.50
CHLORMEQ	10.46	10.05	10.25
MEAN	10.58	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
MEAN	10.50

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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

PLOT AREA HARVESTED 0.00214

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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

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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		
		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.

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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

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

IRRIGATN	NONE	FULL	MEAN
CULTIVTN			
WYE DIG	9.63	9.51	9.57
PLOUGH	8.68	9.48	9.08
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

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GRAIN TONNES/HECTARE

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

SPRING N	115	185	MEAN
WINTER N			
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			
NONE	8.64	9.67	9.15
FULL	9.35	9.64	9.49
MEAN	8.99	9.65	9.32

N TIME	EARLY	LATE	MEAN
WINTER N			
0	8.94	9.67	9.31
35+35	9.04	9.64	9.34
MEAN	8.99	9.65	9.32

N TIME	EARLY	LATE	MEAN
SPRING N			
115	8.76	9.20	8.98
185	9.23	10.11	9.67
MEAN	8.99	9.65	9.32

IRRIGATN	NONE		FULL	
WINTER N	0	35+35	0	35+35
CULTIVTN				
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

WINTER N	0		35+35	
SPRING N	115	185	115	185
CULTIVTN				
WYE DIG	9.20	10.09	9.48	9.51
PLOUGH	8.48	9.46	8.76	9.61

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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

EXTRA	WY N0 I	PL N0 I	RWY N5 I	RWY N5 0	RPL N5 I	RPL N5 0	MEAN
	2.99	7.69	10.54	*	12.11	*	8.33

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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

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STRAW TONNES/HECTARE

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

IRRIGATN	NONE	FULL	MEAN
CULTIVTN			
WYE DIG	11.95	12.66	12.30
PLOUGH	9.63	10.44	10.03
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

WINTER N	0	35+35	MEAN
IRRIGATN			
NONE	10.50	11.09	10.79
FULL	10.68	12.42	11.55
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
MEAN	10.69	11.65	11.17

SPRING N	115	185	MEAN
IRRIGATN			
NONE	10.63	10.95	10.79
FULL	10.74	12.35	11.55
MEAN	10.69	11.65	11.17

SPRING N	115	185	MEAN
WINTER N			
0	10.20	10.98	10.59
35+35	11.18	12.33	11.75
MEAN	10.69	11.65	11.17

N TIME	EARLY	LATE	MEAN
CULTIVTN			
WYE DIG	12.73	11.87	12.30
PLOUGH	9.81	10.26	10.03
MEAN	11.27	11.07	11.17

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STRAW TONNES/HECTARE

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

N TIME IRRIGATN	EARLY	LATE	MEAN
NONE	10.17	11.41	10.79
FULL	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
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		FULL	
WINTER N	0	35+35	0	35+35
CULTIVTN				
WYE DIG	11.64	12.26	11.73	13.58
PLOUGH	9.35	9.92	9.62	11.25

IRRIGATN	NONE		FULL	
SPRING N	115	185	115	185
CULTIVTN				
WYE DIG	11.60	12.29	11.57	13.74
PLOUGH	9.66	9.61	9.91	10.96

WINTER N	0		35+35	
SPRING N	115	185	115	185
CULTIVTN				
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				
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				
WYE DIG	11.84	12.05	13.62	11.70
PLOUGH	8.49	10.78	11.13	9.74

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STRAW TONNES/HECTARE

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

WINTER N	0		35+35	
N TIME	EARLY	LATE	EARLY	LATE
CULTIVTN				
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 O	RPL N5 I	RPL N5 O	MEAN
	4.10	8.25	12.63	*	12.63	*	9.40

STRAW MEAN DM% 57.4

PLOT AREA HARVESTED 0.00392 (MEAN)

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84/R/WW/4

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 x 30.0.

Treatments: All combinations of:-

1. SPRAYERS — Spraying machine:

HYDRAUL	Conventional hydraulic sprayer
ELECTRO	Electrostatic sprayer

2. RATES — Rates of isoproturon + mecroprop:

STANDARD	Standard rate mecoprop at 2.0 l, isoproturon at 2.43 l 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.

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GRAIN TONNES/HECTARE

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

RATES / SPRAYERS	STANDARD	HALF	QUARTER	MEAN
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
SED	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

PLOT AREA HARVESTED 0.00828

https://doi.org/10.23637/ERADOC-1-32

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84/R/WW/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 x 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.

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84/R/WW/5

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

PLOT AREA HARVESTED 0.00228

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84/R/WW/6

WINTER WHEAT

SEED DRESSINGS AND TAKE-ALL

Object: To study the effects of seed treatments on the incidence of take-all 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 x 12.0.

Treatments: All combinations of:-

1. 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.

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84/R/WW/6

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

PLOT AREA HARVESTED 0.00329

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84/R/WW/7

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.

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84/R/WW/7

GRAIN TONNES/HECTARE

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

INOCULUM / COVER	NONE	E NEO 1	E NEO 2	MEAN
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	INOCULUM 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

PLOT AREA HARVESTED 0.00010

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84/R/WW/12

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 x 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
GS 65	Flowering, growth stage 65 on 25 June

Plus one extra treatment:

EXTRA NONE	No aphicide (duplicated)

NOTE: Aphicide treatments were applied in 220 l on 4 June and in 200 l 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.

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GRAIN TONNES/HECTARE

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

APHICIDE APH TIME	DELTAMET	DEMETON	PIRIM ST	PIRIM NF	PIRIM EN	MEAN
GS 45	11.41	11.57	10.85	11.32	11.47	11.32
GS 65	11.35	11.33	11.39	11.48	11.51	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

PLOT AREA HARVESTED 0.00359

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84/R/WW/13

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 x 10.0.

Treatments: All combinations of:-

1. 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

2. 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.

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GRAIN TONNES/HECTARE

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

SPRAYER ISOPRATE	HYDRAUL	ELECT J	ELECT M	MEAN
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

PLOT AREA HARVESTED 0.00234

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84/R/WW/15

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 x 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.

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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

PLOT AREA HARVESTED 0.00280

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84/R/B/1

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 m^2):	
	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	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 l 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	None
	CHLORMEQ	Chlormequat applied at GS 13, 24, 30, at 0.52 kg in 220 l on 21 Oct, 1983, 29 Nov, 21 Mar, 1984

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7. INSCTCDE — Insecticide:

NONE	None
CY	Cypermethrin at 0.02 kg in 220 l on 28 Oct, 1983

plus 8 extra treatments with variety Panda sown at 300 seeds per m^2 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	None
TFSD	Triadimenol and fuberidazole seed dressing

plus 8 extra treatments with variety Pirate sown at 300 seeds per m^2 and given cypermethrin, late fungicides, no chlormequat and all combinations of the following:-

1. PRECROPV — 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	150 as 'Nitro-Chalk' on 2 Apr

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	
SD 300	Seed sown at 300 seeds per m^2 (duplicated)
SD 450	Seed sown at 450 seeds per m^2 (duplicated)

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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.
(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

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

WINTER N	0	30+30	MEAN
SEEDRATE			
300	8.92	9.27	9.09
450	9.02	9.13	9.07
MEAN	8.97	9.20	9.08

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			
0	8.85	9.10	8.97
30+30	9.07	9.32	9.20
MEAN	8.96	9.21	9.08

L FUNG	NONE	TR+CA+MA	MEAN
SEEDRATE			
300	8.89	9.29	9.09
450	8.68	9.46	9.07
MEAN	8.79	9.38	9.08

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GRAIN TONNES/HECTARE

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

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	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

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GRAIN TONNES/HECTARE

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

INSCTCDE WINTER N	NONE	CY	MEAN
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	8.96
TFSD	9.18	9.24	9.21
MEAN	9.06	9.11	9.08

INSCTCDE L FUNG	NONE	CY	MEAN
NONE	8.77	8.81	8.79
TR+CA+MA	9.34	9.42	9.38
MEAN	9.06	9.11	9.08

INSCTCDE SPRING N	NONE	CY	MEAN
90	8.83	8.92	8.88
150	9.28	9.30	9.29
MEAN	9.06	9.11	9.08

GRTH REG SEEDRATE	NONE	CHLORMEQ	MEAN
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	9.05	8.97
30+30	9.18	9.21	9.20
MEAN	9.04	9.13	9.08

GRTH REG E FUNG	NONE	CHLORMEQ	MEAN
NONE	8.90	9.01	8.96
TFSD	9.18	9.24	9.21
MEAN	9.04	9.13	9.08

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GRAIN TONNES/HECTARE

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

GRTH REG L FUNG	NONE	CHLORMEQ	MEAN
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 SPRING N	NONE	CHLORMEQ	MEAN
90	8.85	8.90	8.88
150	9.23	9.35	9.29
MEAN	9.04	9.13	9.08

GRTH REG INSCTCDE	NONE	CHLORMEQ	MEAN
NONE	9.06	9.05	9.06
CY	9.02	9.21	9.11
MEAN	9.04	9.13	9.08

N DIVX PRECROPX	30+30+90	150	MEAN
OATS	9.30	9.89	9.59
FALLOW	8.56	8.54	8.55
MEAN	8.93	9.22	9.07

E FUNGX PRECROPX	NONE	TFSD	MEAN
OATS	9.40	9.79	9.59
FALLOW	8.46	8.64	8.55
MEAN	8.93	9.22	9.07

E FUNGX N DIVX	NONE	TFSD	MEAN
30+30+90	8.76	9.10	8.93
150	9.10	9.34	9.22
MEAN	8.93	9.22	9.07

PRECROPX	E FUNGX N DIVX	NONE	TFSD
OATS	30+30+90	9.08	9.52
	150	9.72	10.06
FALLOW	30+30+90	8.45	8.67
	150	8.47	8.61

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GRAIN TONNES/HECTARE

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

N DIVV / PRECROPV	30+30+90	150	MEAN
BARLEY	10.89	10.22	10.56
OATS	11.04	10.60	10.82
MEAN	10.97	10.41	10.69

E FUNGV / PRECROPV	NONE	TFSD	MEAN
BARLEY	10.55	10.57	10.56
OATS	10.63	11.01	10.82
MEAN	10.59	10.79	10.69

E FUNGV / N DIVV	NONE	TFSD	MEAN
30+30+90	10.73	11.20	10.97
150	10.44	10.37	10.41
MEAN	10.59	10.79	10.69

PRECROPV	E FUNGV / N DIVV	NONE	TFSD
BARLEY	30+30+90	10.82	10.97
	150	10.27	10.16
OATS	30+30+90	10.65	11.44
	150	10.61	10.58

EXTRA NO	SD 300	SD 450	MEAN
	6.95	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

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STRAW TONNES/HECTARE

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

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	NONE	TFSD	MEAN
SEEDRATE			
300	5.42	5.38	5.40
450	5.25	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
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	TR+CA+MA	MEAN
WINTER N			
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			
NONE	5.28	5.39	5.33
TFSD	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
MEAN	5.20	5.57	5.38

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STRAW TONNES/HECTARE

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

SPRING N	90	150	MEAN
WINTER N			
0	4.73	5.25	4.99
30+30	5.66	5.89	5.78
MEAN	5.20	5.57	5.38

SPRING N	90	150	MEAN
E FUNG			
NONE	5.09	5.58	5.33
TFSD	5.31	5.56	5.43
MEAN	5.20	5.57	5.38

SPRING N	90	150	MEAN
L FUNG			
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	NONE	CY	MEAN
WINTER N			
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	5.40	5.33
TFSD	5.42	5.45	5.43
MEAN	5.34	5.42	5.38

INSCTCDE	NONE	CY	MEAN
L FUNG			
NONE	5.24	5.38	5.31
TR+CA+MA	5.44	5.47	5.45
MEAN	5.34	5.42	5.38

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STRAW TONNES/HECTARE

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

INSCTCDE	NONE	CY	MEAN
SPRING N			
90	5.20	5.19	5.20
150	5.49	5.65	5.57
MEAN	5.34	5.42	5.38

GRTH REG	NONE	CHLORMEQ	MEAN
SEEDRATE			
300	5.44	5.36	5.40
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	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	5.43
MEAN	5.41	5.35	5.38

GRTH REG	NONE	CHLORMEQ	MEAN
L FUNG			
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	NONE	CHLORMEQ	MEAN
SPRING N			
90	5.24	5.15	5.20
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

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STRAW TONNES/HECTARE

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

N DIVX	30+30+90	150	MEAN
PRECROPX			
OATS	5.69	5.63	5.66
FALLOW	7.44	7.57	7.51
MEAN	6.57	6.60	6.59

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 FUNGX	NONE	TFSD	MEAN
N DIVX			
30+30+90	6.13	7.01	6.57
150	6.73	6.48	6.60
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
MEAN	5.91	5.22	5.57

E FUNGV	NONE	TFSD	MEAN
PRECROPV			
BARLEY	5.76	5.63	5.69
OATS	5.22	5.66	5.44
MEAN	5.49	5.64	5.57

E FUNGV	NONE	TFSD	MEAN
N DIVV			
30+30+90	5.64	6.18	5.91
150	5.34	5.10	5.22
MEAN	5.49	5.64	5.57

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STRAW TONNES/HECTARE

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

PRECROPV	E FUNGV N DIVV	NONE	TFSD
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

PLOT AREA HARVESTED 0.00252

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84/W/B/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 x 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

1. 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

2. VAR SB — 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	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:-

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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

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WINTER BARLEY

GRAIN TONNES/HECTARE

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

VAR SB SD SB	G PROMIS	KEG	MEAN
NONE	7.61	7.44	7.53
TRI+FUB	7.53	7.75	7.64
MEAN	7.57	7.60	7.58

FS SB SD SB	NONE	FENPROP	ETHIRIM	MEAN
NONE	7.20	7.65	7.72	7.53
TRI+FUB	7.74	7.66	7.53	7.64
MEAN	7.47	7.66	7.63	7.58

FS SB VAR SB	NONE	FENPROP	ETHIRIM	MEAN
G PROMIS	7.65	7.52	7.54	7.57
KEG	7.28	7.79	7.72	7.60
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	7.64
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	7.60
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	7.63
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

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WINTER BARLEY

GRAIN TONNES/HECTARE

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

VAR SB	G PROMIS		KEG	
POSITION	N EAST	S WEST	N EAST	S WEST
SD SB				
NONE	7.62	7.59	7.74	7.15
TRI+FUB	7.65	7.42	7.81	7.69

FS SB	NONE		FENPROP		ETHIRIM	
POSITION	N EAST	S WEST	N EAST	S WEST	N EAST	S WEST
SD SB						
NONE	7.38	7.03	7.77	7.54	7.90	7.54
TRI+FUB	7.69	7.78	7.80	7.52	7.70	7.36

FS SB	NONE		FENPROP		ETHIRIM	
POSITION	N EAST	S WEST	N EAST	S WEST	N EAST	S WEST
VAR SB						
G PROMIS	7.78	7.53	7.58	7.46	7.55	7.52
KEG	7.29	7.28	7.98	7.60	8.05	7.38

FS SB		NONE		FENPROP		ETHIRIM	
POSITION		N EAST	S WEST	N EAST	S WEST	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	7.76	7.57	7.64	7.37	7.55	7.32
	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	0.100	0.100	0.123	0.074
TABLE	SD SB	SD SB	VAR SB	SD SB
	VAR SB	FS SB	FS SB	POSITION
SED	0.142	0.173	0.173	0.124
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SD SB				0.104

TABLE	VAR SB	FS SB	SD SB	SD SB
	POSITION	POSITION	VAR SB	VAR SB
			FS SB	POSITION
SED	0.124	0.152	0.245	0.176
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VAR SB	0.104			
FS SB		0.128		
SD SB.VAR SB				0.148

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WINTER BARLEY

GRAIN TONNES/HECTARE

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

TABLE	SD SB FS SB POSITION	VAR SB FS SB POSITION	SD SB VAR SB 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		0.181	
SD SB.VAR SB.FS SB			0.255

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.245	3.2
BLOCK.WP.SP	10	0.255	3.4

GRAIN MEAN DM% 88.7

SUB PLOT AREA HARVESTED 0.00220

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84/W/B/1

SPRING BARLEY

GRAIN TONNES/HECTARE

***** 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	MEAN
NONE	3.93	4.23	4.45	4.20
TRI+FUB	3.76	4.68	3.81	4.08
MEAN	3.84	4.46	4.13	4.14

FS SB VAR SB	NONE	FENPROP	ETHIRIM	MEAN
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

VAR SB	G PROMIS			KEG		
FS SB SD SB	NONE	FENPROP	ETHIRIM	NONE	FENPROP	ETHIRIM
NONE	3.62	3.80	3.90	4.23	4.66	5.00
TRI+FUB	3.72	4.60	4.05	3.79	4.76	3.57

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

TABLE	SD SB	VAR SB	FS SB	SD SB VAR SB
SED	0.309	0.309	0.378	0.437

TABLE	SD SB FS SB	VAR SB FS SB	SD SB VAR SB FS SB
SED	0.535	0.535	0.756

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.756	18.3

GRAIN MEAN DM% 85.7

PLOT AREA HARVESTED 0.00220

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84/R/B/2

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 l

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, electrostatically-charged 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. Spring-tine 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.

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84/R/B/2

GRAIN TONNES/HECTARE

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

SPRAYER	NONE	CNVNTL 2	CNVNTL 1	EL APE	EL JUMBO	EL MICRO	MEAN
	5.96	6.65	6.64	6.64	6.53	6.27	6.48

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

TABLE	SPRAYER	
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 *****

STRATUM	DF	SE	CV%
BLOCK.WP	23	0.336	5.2

GRAIN MEAN DM% 78.6

PLOT AREA HARVESTED 0.00306

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84/W/B/2

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:-

1. 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 l in 250 l 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. Spring-tine 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.

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84/W/B/2

GRAIN TONNES/HECTARE

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

INSEARLY	NONE	OMETHO E	MEAN
SOWDATE			
9 MAR	7.13	6.81	6.97
16 APR	5.55	5.99	5.77
MEAN	6.34	6.40	6.37

INS LATE	NONE	OMETHO L	MEAN
SOWDATE			
9 MAR	6.90	7.04	6.97
16 APR	5.58	5.97	5.77
MEAN	6.24	6.51	6.37

INS LATE	NONE	OMETHO L	MEAN
INSEARLY			
NONE	6.20	6.49	6.34
OMETHO E	6.28	6.52	6.40
MEAN	6.24	6.51	6.37

INSEARLY	NONE		OMETHO E	
INS LATE	NONE	OMETHO L	NONE	OMETHO L
SOWDATE				
9 MAR	7.19	7.07	6.61	7.01
16 APR	5.20	5.90	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

PLOT AREA HARVESTED 0.00275

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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 l) applied with the fungicide in 250 l. Fungicide: Tridemorph at 0.52 kg.

Seed: Stubbings (R), and Lansome II (W): Sown at 160 kg.

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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 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

SUB PLOT AREA HARVESTED 0.00204

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84/W/B/7

GRAIN TONNES/HECTARE

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

N VARIETY	75	113	150	MEAN
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

SUB PLOT AREA HARVESTED 0.00275

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84/R/B/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.

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84/R/B/8

GRAIN TONNES/HECTARE

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

FUNG SD	NONE	ETHIRIMO	TR+FU	MEAN
VARIETY				
CARNIVAL	6.92	7.23	7.13	7.10
TRIUMPH	6.43	7.08	6.38	6.57
MEAN	6.67	7.16	6.75	6.83

FUNG SP	NONE	TRIADIME	MEAN
VARIETY			
CARNIVAL	6.88	7.33	7.10
TRIUMPH	5.94	7.19	6.57
MEAN	6.41	7.26	6.83

FUNG SP	NONE	TRIADIME	MEAN
FUNG SD			
NONE	6.42	6.93	6.67
ETHIRIMO	6.88	7.43	7.16
TR+FU	6.17	7.33	6.75
MEAN	6.41	7.26	6.83

FUNG SD	NONE		ETHIRIMO		TR+FU	
FUNG SP	NONE	TRIADIME	NONE	TRIADIME	NONE	TRIADIME
VARIETY						
CARNIVAL	6.88	6.95	7.18	7.29	6.73	7.53
TRIUMPH	5.95	6.91	6.58	7.58	5.62	7.13

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

TABLE	VARIETY	FUNG SD	FUNG SP	VARIETY FUNG SD	
SED		0.196		0.277	MIN REP
	0.138	0.169	0.138	0.239	MAX-MIN

TABLE	VARIETY FUNG SP	FUNG SD FUNG SP	VARIETY FUNG SD FUNG SP	
SED		0.277	0.391	MIN REP
	0.196	0.239	0.339	MAX-MIN
		0.196	0.277	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	SE	CV%
BLOCK.WP	19	0.391	5.7

GRAIN MEAN DM% 86.7 PLOT AREA HARVESTED 0.00248

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84/R/B/10

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 x 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 l 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 l) 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.

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84/R/B/10

GRAIN TONNES/HECTARE

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

TREATMNT	3M NONE	3M TRID	10M NONE
	6.99	8.60	6.92

LHN TREATMNT	3M NONE	3M TRID	10M NONE
3M NONE		6.87	7.12
3M TRID	8.60		8.60
10M NONE	6.87	6.97	

RHN TREATMNT	3M NONE	3M TRID	10M NONE
3M NONE		7.02	6.97
3M TRID	8.50		8.70
10M NONE	6.79	7.05	

GRAND MEAN 7.50

GRAIN MEAN DM% 85.0

PLOT AREA HARVESTED 0.00204

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84/R/B/11

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	Atem
PATTY	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.

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84/R/B/11

GRAIN TONNES/HECTARE

SERIALLY BALANCED DESIGN

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

VARIETY	ATEM	PATTY	TRIUMPH	MIXTURE
	9.30	8.74	7.64	8.80

LHN VARIETY	ATEM	PATTY	TRIUMPH	MIXTURE
ATEM		9.31	9.26	9.33
PATTY	8.66		8.96	8.59
TRIUMPH	7.36	7.89		7.68
MIXTURE	8.87	8.62	8.92	

RHN VARIETY	ATEM	PATTY	TRIUMPH	MIXTURE
ATEM		9.21	9.15	9.53
PATTY	8.68		8.97	8.56
TRIUMPH	7.38	7.85		7.70
MIXTURE	8.82	8.66	8.93	

GRAND MEAN 8.62

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

TABLE	VARIETY	VARIETY LHN	VARIETY RHN
SED	0.063	0.109	0.109

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	0.133	1.5

GRAIN MEAN DM% 87.0

RANDOMISED BLOCK DESIGN

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

VARIETY	ATEM	PATTY	TRIUMPH	MIXTURE	MEAN
	9.39	8.66	7.45	8.97	8.62

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

TABLE	VARIETY
SED	0.119

***** 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

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84/R/B/12

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

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84/R/B/12

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

PLOT AREA HARVESTED 0.00204

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84/R/B/13

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 x 15.0.

Treatments: All combinations of:-

1. 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:
	1	Propiconazole at 0.03 kg, tridemorph at 0.06 kg
	2	Twice rate 1
	4	Four times rate 1
3. 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 l) in 250 l.

Seed: Georgie, sown at 160 kg.

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84/R/B/13

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 *****

FUNGRATE SPRAYER	1	2	4	MEAN
ELECTRO	6.24	6.54	6.62	6.47
CNVNTL	6.54	6.98	6.79	6.77
MEAN	6.39	6.76	6.71	6.62

SPR TIME SPRAYER	E	L	E+L	MEAN
ELECTRO	6.44	6.14	6.83	6.47
CNVNTL	6.40	6.58	7.33	6.77
MEAN	6.42	6.36	7.08	6.62

SPR TIME FUNGRATE	E	L	E+L	MEAN
1	6.22	6.04	6.90	6.39
2	6.51	6.62	7.15	6.76
4	6.53	6.41	7.18	6.71
MEAN	6.42	6.36	7.08	6.62

SPRAYER	SPR TIME FUNGRATE	E	L	E+L
ELECTRO	1	6.40	5.81	6.51
	2	6.30	6.24	7.09
	4	6.63	6.36	6.89
CNVNTL	1	6.05	6.26	7.30
	2	6.71	7.01	7.21
	4	6.43	6.46	7.47

NONE	6.00
GRAND MEAN	6.56

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84/R/B/13

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

PLOT AREA HARVESTED 0.00306

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84/R/B/14

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 x 15.0.

Treatments:

SPRAYER	Sprayers and rates of application of propiconazole (kg):
CNVNTL 1	Conventional, 0.125 kg
CNVNTL 2	Conventional, 0.250 kg
	Electrostatic sprayers, applying at 0.125 kg:
E NO 1	NIAE, uncharged hydraulic sprayer in 60 l
E NC 1	NIAE, charged hydraulic sprayer in 60 l
E JC 1	'Jumbo', charged in 10.1 l
E AC 1	'APE' charged in 5.6 l
E MMC 1	'Micromax' charged in 9.0 l
E MNC 1	'Micronex' charged in 9.0 l
E JAAC 1	'Jumbo', air assisted, nozzles mounted at 20^0 to vertical, charged, in 10.1 l
E JAVC 1	'Jumbo', air assisted, nozzles mounted vertically, charged, in 10.1 l
E AAAC 1	'APE', air assisted, nozzles mounted at 20^0 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 l) in 250 l.

Seed: Georgie, sown at 160 kg.

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84/R/B/14

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

PLOT AREA HARVESTED 0.00306

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84/R/BE/1

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 l 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.

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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

PLOT AREA HARVESTED 0.00320

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84/R/BE/2

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

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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	23 SEP	19 OCT	18 NOV	MEAN
SOW METH				
DRILL	5.07	5.07	4.49	4.88
PLOUGH	5.21	5.25	4.78	5.08
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				
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

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84/R/BE/2

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

PLOT AREA HARVESTED 0.00305

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84/R/BE/3

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.

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84/R/BE/3

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

PLOT AREA HARVESTED 0.00293

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84/R/BE/7

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	Varieties:
BANNER	Banner
BEAGLE	Maris Beagle
BULLDOG	Bulldog
THROWS	Throws MS

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: 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.

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84/R/BE/7

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

PLOT AREA HARVESTED 0.00015

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84/R/BE/8

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 0 & 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.

Treatments: All combinations of:-

1. 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 0 — Sown by drill, no nematicide (duplicated)
   PLOUGH 0 — 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.

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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	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	4.55	4.26
PLOUGH	3.16	3.15	3.10	3.14
MEAN	3.51	3.76	3.82	3.70

NEM RATE NEMACIDE	1.25	2.50	5.0	MEAN
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

NEMACIDE	ALDICARB			CARBOFUR		
NEM RATE SOW METH	1.25	2.50	5.0	1.25	2.50	5.0
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

EXTRA	DRILL 0	PLOUGH 0	MEAN
	3.74	2.99	3.37

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

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84/R/BE/9

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	25
15 June	25
24 July	25
1 Aug	25
15 Aug	25
Total	150 mm

(3) Treatment sprays were applied in 220 l.

Basal applications: Weedkillers: Simazine at 1.2 kg in 250 l.

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84/R/BE/9

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	3.46	4.13	4.57	4.05
FULL	4.69	5.39	5.59	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

SUB PLOT AREA HARVESTED 0.00293

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84/R/BE/10

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.

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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

PLOT AREA HARVESTED 0.00293

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84/R/BE/11

SPRING BEANS

ERYNIA AND APHID CONTROL

Object: To study the effects of applying two amounts of the aphid-pathogenic 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.

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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	3.81	4.34	4.50	4.82	4.37
HERRA LS	5.08	4.69	3.89	5.75	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
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

SUB PLOT AREA HARVESTED 0.00024

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84/R/BE/12

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:-

1. VARIETY — Varieties:

BEAD	Maris Bead, spring variety
THROWS	Throws M.S., winter variety

2. NEMACIDE — Nematicides:

ALDICARB	Aldicarb
CARBOFUR	Carbofuran

3. NEM RATE — Rates and times of applying nematicides:

1	1 kg to seed furrow at sowing
2	2 kg to seed furrow at sowing
4	4 kg to seed furrow at sowing
2+2	2 kg to seed furrow at sowing plus 2 kg on 30 May, 1984 to foliage

plus two extra treatments:

EXTRA

BEAD 0	Maris Bead given no nematicide
THROWS 0	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.

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84/R/BE/12

GRAIN TONNES/HECTARE

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

NEMACIDE VARIETY	ALDICARB	CARBOFUR	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

VARIETY	NEM RATE NEMACIDE	1	2	4	2+2
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	BEAD 0	THROWS 0	MEAN
	3.45	3.63	3.54

GRAND MEAN 3.80

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

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

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84/R/BE/14

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.

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84/R/BE/14

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

PLOT AREA HARVESTED 0.00015

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84/R/BE/15

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:-

1. POPULATN — Plant populations per hectare:

	Target population	Mean Population achieved
200	200,000	210,000
400	400,000	420,000
600	600,000	560,000

2. PATHCONT — Pest and pathogen control:

STANDARD — Pirimicarb at 0.14 kg in 220 l on 6 July, 1984

ENHANCED — Permethrin at 0.15 kg in 220 l on 1 May
Cypermethrin at 0.025 kg in 220 l on 16 May, 6 June
Pirimicarb at 0.14 kg in 220 l on 4 June, 6 July
Benomyl at 0.56 kg in 220 l on 6 July, 14 Aug
Propiconazole 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.

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84/R/BE/15

GRAIN TONNES/HECTARE

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

PATHCONT POPULATN	STANDARD	ENHANCED	MEAN
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	POPULATN 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

PLOT AREA HARVESTED 0.00015

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84/R/BE/16

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.

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84/R/BE/16

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
IRRIGATN			
0	4.78	4.47	4.63
I	5.37	5.27	5.32
MEAN	5.08	4.87	4.97

RUSTFUNG	MAN+MANC	PROPICON	MEAN
IRRIGATN			
0	4.77	4.48	4.63
I	5.43	5.21	5.32
MEAN	5.10	4.85	4.97

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84/R/BE/16

GRAIN TONNES/HECTARE

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

RUSTFUNG C S FUNG	MAN+MANC	PROPICON	MEAN
NONE	5.35	4.80	5.08
BENOMYL	4.85	4.89	4.87
MEAN	5.10	4.85	4.97

RFNGTIME IRRIGATN	ONCE	TWICE	MEAN
0	4.86	4.40	4.63
I	5.31	5.32	5.32
MEAN	5.09	4.86	4.97

RFNGTIME C S FUNG	ONCE	TWICE	MEAN
NONE	5.22	4.93	5.08
BENOMYL	4.95	4.78	4.87
MEAN	5.09	4.86	4.97

RFNGTIME RUSTFUNG	ONCE	TWICE	MEAN
MAN+MANC	5.26	4.94	5.10
PROPICON	4.91	4.78	4.85
MEAN	5.09	4.86	4.97

C S FUNG	NONE		BENOMYL	
RUSTFUNG IRRIGATN	MAN+MANC	PROPICON	MAN+MANC	PROPICON
0	5.09	4.48	4.45	4.49
I	5.61	5.13	5.24	5.29

C S FUNG	NONE		BENOMYL	
RFNGTIME IRRIGATN	ONCE	TWICE	ONCE	TWICE
0	5.04	4.53	4.68	4.26
I	5.41	5.33	5.22	5.31

RUSTFUNG	MAN+MANC		PROPICON	
RFNGTIME IRRIGATN	ONCE	TWICE	ONCE	TWICE
0	5.06	4.49	4.66	4.31
I	5.46	5.39	5.17	5.25

RUSTFUNG	MAN+MANC		PROPICON	
RFNGTIME C S FUNG	ONCE	TWICE	ONCE	TWICE
NONE	5.42	5.28	5.02	4.59
BENOMYL	5.09	4.60	4.81	4.97

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84/R/BE/16

GRAIN TONNES/HECTARE

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

	RUSTFUNG	MAN+MANC		PROPICON	
	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	NONE	BENOMYL	MEAN
IRRIGATN			
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* RFNGTIME
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

PLOT AREA HARVESTED 0.00015

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84/R/BE/18

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 mancozeb at 0.8 kg
PROPICON	Propiconazole at 0.12 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 l.

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.

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84/R/BE/18

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 RUSTFUNG	ONCE	TWICE	MEAN
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

PLOT AREA HARVESTED 0.00015

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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.

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84/R/PE/1

GRAIN TONNES/HECTARE

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

FUNGCIDE NEMACIDE	NONE	TOL METH	MEAN
NONE	5.77	5.85	5.81
ALDICARB	6.25	6.19	6.22
MEAN	6.01	6.02	6.01

INSCTCDE NEMACIDE	NONE	PERMETH	MEAN
NONE	5.60	6.02	5.81
ALDICARB	6.17	6.27	6.22
MEAN	5.88	6.14	6.01

INSCTCDE FUNGCIDE	NONE	PERMETH	MEAN
NONE	5.94	6.08	6.01
TOL METH	5.83	6.21	6.02
MEAN	5.88	6.14	6.01

FUNGCIDE	NONE		TOL METH	
INSCTCDE	NONE	PERMETH	NONE	PERMETH
NEMACIDE				
NONE	5.54	5.99	5.65	6.05
ALDICARB	6.34	6.16	6.00	6.38

***** 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

PLOT AREA HARVESTED 0.00058

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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:-

1.	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:
	0	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	
0 N30S P	No inoculum
R N30S 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.

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84/R/FE/1

GRAIN TONNES/HECTARE

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

N	0	150 S	150 F	MEAN
INOCULUM				
NONE	0.05	0.11	0.07	0.08
RHIZOBUM	0.09	0.11	0.07	0.09
MEAN	0.07	0.11	0.07	0.08

INSCTCDE	NONE	PERMETH	MEAN
INOCULUM			
NONE	0.06	0.09	0.08
RHIZOBUM	0.09	0.09	0.09
MEAN	0.08	0.09	0.08

INSCTCDE	NONE	PERMETH	MEAN
N			
0	0.06	0.08	0.07
150 S	0.08	0.14	0.11
150 F	0.08	0.05	0.07
MEAN	0.08	0.09	0.08

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

EXTRA	O N3OS P	R N3OS P	MEAN
	0.09	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	INOCULUM 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

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84/R/RA/2

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 0	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
2. SEEDBD N	Nitrogen rates (kg N) to seedbed (on 22 August, 1983):	
	0	
	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. 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.

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84/R/RA/2

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 0	3.10	3.16	3.13
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 0	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	75E+75L	150M	MEAN
SEEDBD N			
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 0	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

NONE	1.33
GRAND MEAN	2.86

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84/R/RA/2

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

PLOT AREA HARVESTED 0.00465

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84/R/RA/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 0	Ammonium nitrate (as 'Nitro-Chalk'), no inhibitor
	PU 0	Prilled urea, no inhibitor
	PU DIC	Prilled urea and dicyandiamide at 33 kg
	PU HYD	Prilled urea and hydroquinone at 13 kg
2. SPRING N		Nitrogen rates (kg N) and times:
	75E+75L	75 on 10 Feb and 75 on 21 Mar, 1984
	150M	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 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.

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84/R/RA/6

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

SPRING N / N INHIB	75E+75L	150M	MEAN
AN 0	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
SED	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

PLOT AREA HARVESTED 0.00465

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84/R/RA/7

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 x 10.0.

Treatments: All combinations of:-

1. 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 l on 19 Mar.

2. RATE — Rates of triapenthenol (kg):

   0.35
   0.70

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.

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84/R/RA/7

GRAIN (90% DM) TONNES/HECTARE

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

RATE / METHOD	0.35	0.70	MEAN
CNVNTIAL	3.47	3.76	3.62
ELECTROS	3.66	3.58	3.62
MEAN	3.57	3.67	3.62

NONE 3.44

GRAND MEAN 3.58

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

TABLE	METHOD	RATE	METHOD RATE & NONE
SED	0.130	0.130	0.183

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

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.259	7.2

GRAIN MEAN DM% 89.5

PLOT AREA HARVESTED 0.00229

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84/R/RA/8

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 x 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 l 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.

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84/R/RA/8

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 *****

STRATUM	DF	SE	CV%
BLOCK.WP	21	0.321	7.0

GRAIN MEAN DM% 83.7

PLOT AREA HARVESTED 0.00120

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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.

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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.

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84/R/MA/1

FORAGE DRY MATTER TONNES/HECTARE

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

SOW DATE	11 APR	10 MAY	MEAN
VARIETY			
BASTILLE	15.79	15.49	15.64
BEAUPRE	13.59	14.38	13.98
FRONICA	14.47	14.08	14.27
MEAN	14.61	14.65	14.63

COVERS	NONE	POLYTHNE	MEAN
VARIETY			
BASTILLE	16.22	15.06	15.64
BEAUPRE	13.75	14.22	13.98
FRONICA	13.79	14.76	14.27
MEAN	14.58	14.68	14.63

COVERS	NONE	POLYTHNE	MEAN
SOW DATE			
11 APR	14.25	14.98	14.61
10 MAY	14.92	14.38	14.65
MEAN	14.58	14.68	14.63

SOW DATE	11 APR		10 MAY	
COVERS	NONE	POLYTHNE	NONE	POLYTHNE
VARIETY				
BASTILLE	15.13	16.45	17.31	13.67
BEAUPRE	14.30	12.88	13.20	15.56
FRONICA	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

PLOT AREA HARVESTED 0.00029

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84/R/MA/1

GRAIN TONNES/HECTARE

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

SOW DATE	11 APR	10 MAY	MEAN
VARIETY			
BASTILLE	7.83	7.38	7.61
BEAUPRE	7.74	6.52	7.13
FRONICA	7.68	7.25	7.47
MEAN	7.75	7.05	7.40

COVERS	NONE	POLYTHNE	MEAN
VARIETY			
BASTILLE	7.54	7.67	7.61
BEAUPRE	6.62	7.63	7.13
FRONICA	6.71	8.23	7.47
MEAN	6.96	7.85	7.40

COVERS	NONE	POLYTHNE	MEAN
SOW DATE			
11 APR	7.06	8.44	7.75
10 MAY	6.85	7.25	7.05
MEAN	6.96	7.85	7.40

SOW DATE	11 APR		10 MAY	
COVERS	NONE	POLYTHNE	NONE	POLYTHNE
VARIETY				
BASTILLE	7.43	8.23	7.64	7.12
BEAUPRE	6.89	8.60	6.36	6.67
FRONICA	6.86	8.51	6.56	7.95

***** 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

PLOT AREA HARVESTED 0.00029

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84/R/P/1

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 x 10.7.

Treatments:

To EARLY varieties, all combinations of:-

1.	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:-

1.	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

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84/R/P/1

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.

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84/R/P/1 EARLY POTATOES

TOTAL TUBERS TONNES/HECTARE

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

INOCULUM	NONE	RHIZOCT	MEAN
VARIETY			
A COMET	24.3	22.5	23.4
ESTIMA	33.3	30.8	32.1
M PEER	20.3	17.2	18.7
U PRINCE	19.8	16.9	18.3
U SCEPTR	22.1	19.3	20.7
MEAN	24.0	21.3	22.7

SD TREAT	NONE	CHITTED	MEAN
VARIETY			
A COMET	23.9	23.0	23.4
ESTIMA	32.4	31.7	32.1
M PEER	17.7	19.8	18.7
U PRINCE	18.0	18.6	18.3
U SCEPTR	20.3	21.2	20.7
MEAN	22.5	22.8	22.7

SD TREAT	NONE	CHITTED	MEAN
INOCULUM			
NONE	23.6	24.3	24.0
RHIZOCT	21.3	21.4	21.3
MEAN	22.5	22.8	22.7

INOCULUM	NONE		RHIZOCT	
SD TREAT	NONE	CHITTED	NONE	CHITTED
VARIETY				
A COMET	24.3	24.4	23.5	21.5
ESTIMA	34.2	32.4	30.7	31.0
M PEER	18.9	21.8	16.5	17.8
U PRINCE	19.3	20.2	16.8	16.9
U SCEPTR	21.5	22.8	19.1	19.5

***** 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

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

STRATUM	DF	SE	CV%
BLOCK.WP	38	3.52	15.5

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84/R/P/1 EARLY POTATOES

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

INOCULUM VARIETY	NONE	RHIZOCT	MEAN
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 VARIETY	NONE	CHITTED	MEAN
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 INOCULUM	NONE	CHITTED	MEAN
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	44.1	56.9
U PRINCE	74.8	55.8	81.4	79.2
U SCEPTR	43.9	41.1	63.1	71.9

PLOT AREA HARVESTED 0.00103

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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	27.4	28.3
K EDWARD	32.1	25.9	29.0
M PIPER	30.1	28.4	29.2
P CROWN	44.4	39.3	41.9
P SQUIRE	40.4	32.9	36.6
RECORD	25.5	22.2	23.9
MEAN	35.6	31.3	33.5

SD TREAT VARIETY	NONE	CHITTED	MEAN
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	42.2	41.9
P SQUIRE	37.6	35.7	36.6
RECORD	24.3	23.5	23.9
MEAN	33.4	33.5	33.5

SD TREAT INOCULUM	NONE	CHITTED	MEAN
NONE	35.7	35.6	35.6
RHIZOCT	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

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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

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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	91.4
P SQUIRE	90.8	89.1	90.0
RECORD	65.0	68.7	66.8
MEAN	76.8	78.2	77.5

SD TREAT VARIETY	NONE	CHITTED	MEAN
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 INOCULUM	NONE	CHITTED	MEAN
NONE	77.0	76.5	76.8
RHIZOCT	77.0	79.4	78.2
MEAN	77.0	77.9	77.5

INOCULUM	NONE		RHIZOCT	
SD TREAT	NONE	CHITTED	NONE	CHITTED
VARIETY				
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

PLOT AREA HARVESTED 0.00103

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84/R/P/2

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 x 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:
	1	5 g imazalil, 12.5 g tolclofos methyl
	2	10 g imazalil, 62.5 g tolclofos methyl
3. FUNGMETH		Methods of applying fungicides:
	CNVNTIAL	Conventional, hydraulic, sprayer in 2.0 l per tonne of tubers
	SP DS	Spinning disc sprayer in 0.8 l per tonne of tubers
	SP DS ES	Spinning disc sprayer with electrostatically charged particles in 0.8 l 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.

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84/R/P/2

TOTAL TUBERS TONNES/HECTARE

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

FUNGRATE	1	2	MEAN
FUNGCIDE			
IMAZALIL	30.5	32.8	31.7
TOLC MET	29.9	29.4	29.7
MEAN	30.2	31.1	30.7

FUNGMETH	CNVNTIAL	SP DS	SP DS ES	MEAN
FUNGCIDE				
IMAZALIL	31.5	30.5	33.0	31.7
TOLC MET	28.9	31.5	28.5	29.7
MEAN	30.2	31.0	30.8	30.7

FUNGMETH	CNVNTIAL	SP DS	SP DS ES	MEAN
FUNGRATE				
1	28.8	31.1	30.9	30.2
2	31.6	30.9	30.7	31.1
MEAN	30.2	31.0	30.8	30.7

FUNGRATE	1			2		
FUNGMETH	CNVNTIAL	SP DS	SP DS ES	CNVNTIAL	SP DS	SP DS ES
FUNGCIDE						
IMAZALIL	29.5	29.6	32.6	33.5	31.4	33.4
TOLC MET	28.0	32.6	29.1	29.8	30.4	28.0

NONE 30.7

GRAND MEAN 30.7

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

TABLE	FUNGCIDE	FUNGRATE	FUNGMETH	FUNGCIDE FUNGRATE
SED	0.98	0.98	1.21	1.39

TABLE	FUNGCIDE FUNGMETH	FUNGRATE FUNGMETH	FUNGCIDE FUNGRATE FUNGMETH
SED	1.70	1.70	2.41

SED FOR COMPARING NONE WITH ANY ITEM IN
FUNGCIDE.FUNGRATE.FUNGMETH TABLE IS 2.09

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

STRATUM	DF	SE	CV%
BLOCK.WP	40	3.41	11.1

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84/R/P/2

PERCENTAGE WARE 4.44 CM (1.75 INCH) RIDDLE

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

FUNGRATE	1	2	MEAN
FUNGCIDE			
IMAZALIL	65.2	65.3	65.3
TOLC MET	65.9	65.3	65.6
MEAN	65.6	65.3	65.4

FUNGMETH	CNVNTIAL	SP DS	SP DS ES	MEAN
FUNGCIDE				
IMAZALIL	64.0	65.2	66.6	65.3
TOLC MET	66.6	66.4	63.8	65.6
MEAN	65.3	65.8	65.2	65.4

FUNGMETH	CNVNTIAL	SP DS	SP DS ES	MEAN
FUNGRATE				
1	66.4	65.2	65.1	65.6
2	64.2	66.4	65.3	65.3
MEAN	65.3	65.8	65.2	65.4

FUNGRATE	1			2		
FUNGMETH	CNVNTIAL	SP DS	SP DS ES	CNVNTIAL	SP DS	SP DS ES
FUNGCIDE						
IMAZALIL	64.3	64.7	66.6	63.7	65.7	66.6
TOLC MET	68.5	65.6	63.7	64.7	67.2	64.0

NONE 66.5

GRAND MEAN 65.6

PLOT AREA HARVESTED 0.00120

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84/R/P/3

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

1. VARIETY	Varieties:
K EDWARD	King Edward
M PIPER	Maris Piper

Sub plots

2. PATHCONT	Pest and pathogen control (in addition to basals):
STANDARD	None
ENHANCED	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 desiccant applied 6 Aug and potatoes lifted 6 Sept.
LATER	Haulm mechanically destroyed 8 Sept. Haulm desiccant applied 22 Sept and potatoes lifted 11 Oct.

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84/R/P/3

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 VARIETY	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 PATHCONT	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

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84/R/P/3

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

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84/R/P/3

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

PATHCONT VARIETY	STANDARD	ENHANCED	FULL	MEAN
K EDWARD	65.8	59.6	57.0	60.8
M PIPER	51.8	48.5	35.9	45.4
MEAN	58.8	54.1	46.4	53.1

HAULM D VARIETY	EARLY	LATER	MEAN
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 PATHCONT	EARLY	LATER	MEAN
STANDARD	49.0	68.6	58.8
ENHANCED	41.3	66.8	54.1
FULL	39.4	53.5	46.4
MEAN	43.2	63.0	53.1

PATHCONT	STANDARD		ENHANCED		FULL	
HAULM D VARIETY	EARLY	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

SUB PLOT AREA HARVESTED 0.00457

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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	Highbury	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

3. S — 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.

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84/W/M/1

S. WHEAT

GRAIN TONNES/HECTARE

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

N	50	200	MEAN
VARIETY			
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	2.65	3.92	3.29

S	0	50+8	MEAN
VARIETY			
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	3.23	3.34	3.29

S	0	50+8	MEAN
N			
50	2.64	2.67	2.65
200	3.83	4.01	3.92
MEAN	3.23	3.34	3.29

N	50		200	
S	0	50+8	0	50+8
VARIETY				
HIGHBURY	2.98	2.66	4.16	4.71
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 ERRORS OF DIFFERENCES OF MEANS *****

TABLE	VARIETY	N	S	VARIETY N
SED	0.202	0.098	0.098	0.245
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY				0.196

TABLE	VARIETY S	N S	VARIETY N S
SED	0.245	0.139	0.314
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
VARIETY	0.196		0.278

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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
VARIETY			
GEORGIE	3.86	5.83	4.85
JUPITER	4.04	5.75	4.89
PORTER	4.03	5.49	4.76
TASMAN	3.82	5.27	4.55
MEAN	3.94	5.59	4.76

S	0	50+8	MEAN
VARIETY			
GEORGIE	4.83	4.86	4.85
JUPITER	4.71	5.08	4.89
PORTER	5.00	4.52	4.76
TASMAN	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
VARIETY				
GEORGIE	3.95	3.78	5.71	5.95
JUPITER	3.77	4.31	5.65	5.86
PORTER	4.15	3.91	5.86	5.13
TASMAN	3.95	3.70	5.25	5.29

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84/W/M/1

S. BARLEY

GRAIN TONNES/HECTARE

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

TABLE	VARIETY	N	S	VARIETY N
SED	0.229	0.174	0.174	0.337
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY				0.349

TABLE	VARIETY S	N S	VARIETY N S
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

SUB PLOT AREA HARVESTED 0.00120

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METEOROLOGICAL RECORDS 1984 - ROTHAMSTED

(Departure from long-period means in brackets)

MONTH	Total sunshine: hours	Mean temperature: C Air(1)	Dew point	In ground under grass 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	201 (+21)	17.6 (+2.0)	13.3	16.9	14.9
SEPT	100 (-44)	13.3 (-0.1)	10.4	14.5	14.5
OCT	93 (-10)	10.9 (+1.3)	9.4	12.1	12.7
NOV	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

MONTH	Ground frosts (2)	Total rainfall:mm 0.000405 ha (1/1000 acre) gauge	Rain days (3)	Drainage through 50.8cm (20 in) soil:mm	Wind km per hour (4)
JAN	28	99 (+35)	21	80	13.2
FEB	22	49 (0)	14	34	10.6
MAR	22	66 (+16)	14	42	9.4
APR	22	8 (-42)	6	1	8.0
MAY	14	82 (+27)	14	22	9.0
JUNE	3	56 (0)	10	17	6.5
JULY	0	14 (-48)	7	0	5.5
AUG	0	49 (-15)	10	0	5.9
SEPT	3	98 (+37)	15	26	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

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METEOROLOGICAL RECORDS 1984 - WOBURN

(Departure from long-period means in brackets)

MONTH	Total sunshine: hours	Mean temperature: C Air(1)	Dew point	In ground under grass 30 cm	100 cm	Ground frosts (2)	rainfall: mm 12.7 cm (5in)	gauge	Rain days (3)	Wind km per hour (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 (+29)	16.6 (+0.6)	11.5	17.3	14.3	1	12	(-41)	7	6.3
AUG	184 (+13)	17.5 (+1.6)	13.8	17.6	15.5	2	69	(+7)	8	5.6
SEPT	93 (-42)	13.7 (+0.0)	9.9	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

MONTH	Mean temperature: C Air(1)	Dew point	In ground under bare soil 30 cm	Ground frosts (2)	Total rainfall :mm 12.7 cm (5 in) gauge	Rain days (3)	Wind km per hour (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.

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CONVERSION FACTORS

Factors for the Conversion of Imperial to Metric Units

1 inch (in.)	= 2·540 centimetres (cm)
1 foot (ft) (=12 in.)	= 30·48 cm
1 yard (yd) (=3 ft)	= 0·9144 metre (m)
1 square yard (yd²)	= 0·8361 m²
1 acre (ac) (=4840 yd²)	= 0·4047 hectare (ha)
1 ounce (oz)	= 28·35 grams (g)
1 pound (lb)	= 0·4536 kilogram (kg)
1 hundredweight (cwt) (=112 lb)	= 50·80 kg
1 ton (=2240 lb)	= 1016 kg = 1·016 metric tons (tonnes) (t)
1 pint	= 0·5682 litre (l)
1 gallon (gal) (=8 pints)	= 4·546 litres
1 fluid ounce = 1/20 pint	= 0·02841 litre = 28·41 ml
1 cubic foot	= 28·32 litres

To convert	*Multiply by*
oz ac^{-1} to g ha^{-1}	70·06
lb ac^{-1} to kg ha^{-1}	1·121
cwt ac^{-1} to kg ha^{-1}	125·5
cwt ac^{-1} to t ha^{-1}	0·1255
ton ac^{-1} to kg ha^{-1}	2511
ton ac^{-1} to t ha^{-1}	2·511
gal ac^{-1} to l ha^{-1}	11·233

The following factors are accurate to about 2 parts in 100:

1 lb ac^{-1} = 1·1 kg ha^{-1}
1 gal ac^{-1} = 11 litres ha^{-1}
1 ton ac^{-1} = 2·5 t ha^{-1}

In general reading of the text there will be no great inaccuracy in regarding:

1 lb = 0·5 kg
1 lb ac^{-1} = 1 kg ha^{-1}

Temperatures

To convert °F into °C subtract 32 and multiply by $\frac{5}{9}$ (0.556)
To convert °C into °F multiply by $\frac{9}{5}$ (1·8) and add 32

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CONVERSION FACTORS

Factors for the Conversion of Metric to Imperial Units

1 centimetre (cm)	=	0·3937 inch (in.) = 0·03281 ft
1 metre (m)	=	1·094 yards (yd)
1 square metre (m^2)	=	1·196 square yards (yd^2)
1 hectare (ha)	=	2·471 acres (ac)
1 gram (g)	=	0·03527 ounce (oz)
1 kilogram (kg)	=	2·205 pounds (lb)
1 kg	=	0·01968 hundredweight (cwt) = 0·0009842 ton
1 metric ton (tonne) (t)	=	0·9842 ton
1 litre	=	1·760 pints = 0·2200 gallon (gal)

1 litre = 1000 millilitres (ml) = 35·20 fluid ounces = 0·03531 cubic foot (ft^3)

To convert	*Multiply by*
g ha^{-1} to oz ac^{-1}	0·01427
kg ha^{-1} to lb ac^{-1}	0·8921
kg ha^{-1} to cwt ac^{-1}	0·007966
t ha^{-1} to cwt ac^{-1}	7·966
kg ha^{-1} to tons ac^{-1}	0·0003983
t ha^{-1} to tons ac^{-1}	0·3983
l ha^{-1} to gal ac^{-1}	0·08902

Plant nutrients

Plant nutrients are best stated in terms of amounts of the elements (P, K, Na, Ca, Mg, S); the old 'oxide' terminology (P_2O_5, K_2O, Na_2O, CaO, MgO, SO_3) is still used in work involving fertilisers and liming since Regulations require statements of P_2O_5, K_2O, etc.

For quick conversions

(accurate to within 2%) the following factors may be used:

$2\frac{1}{3} \times P = P_2O_5$	$\frac{3}{7} \times P_2O_5 = P$
$1\frac{1}{5} \times K = K_2O$	$\frac{5}{6} \times K_2O = K$
$1\frac{2}{5} \times Ca = CaO$	$\frac{7}{10} \times CaO = Ca$
$1\frac{2}{3} \times Mg = MgO$	$\frac{3}{5} \times MgO = Mg$

For accurate conversions:

To convert	*Multiply by*	*To convert*	*Multiply by*
P_2O_5 to P	0·4364	P to P_2O_5	2·2915
K_2O to K	0·8301	K to K_2O	1·2047
CaO to Ca	0·7146	Ca to CaO	1·3994
MgO to Mg	0·6031	Mg to MgO	1·6581

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