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ROTHAMSTED RESEARCH

Yields of the Field Experiments 1985



Full Table of Content

Yields of the Field Experiments 1985

Rothamsted Research

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Rothamsted Experimental Station

Harpenden

Lawes Agricultural Trust

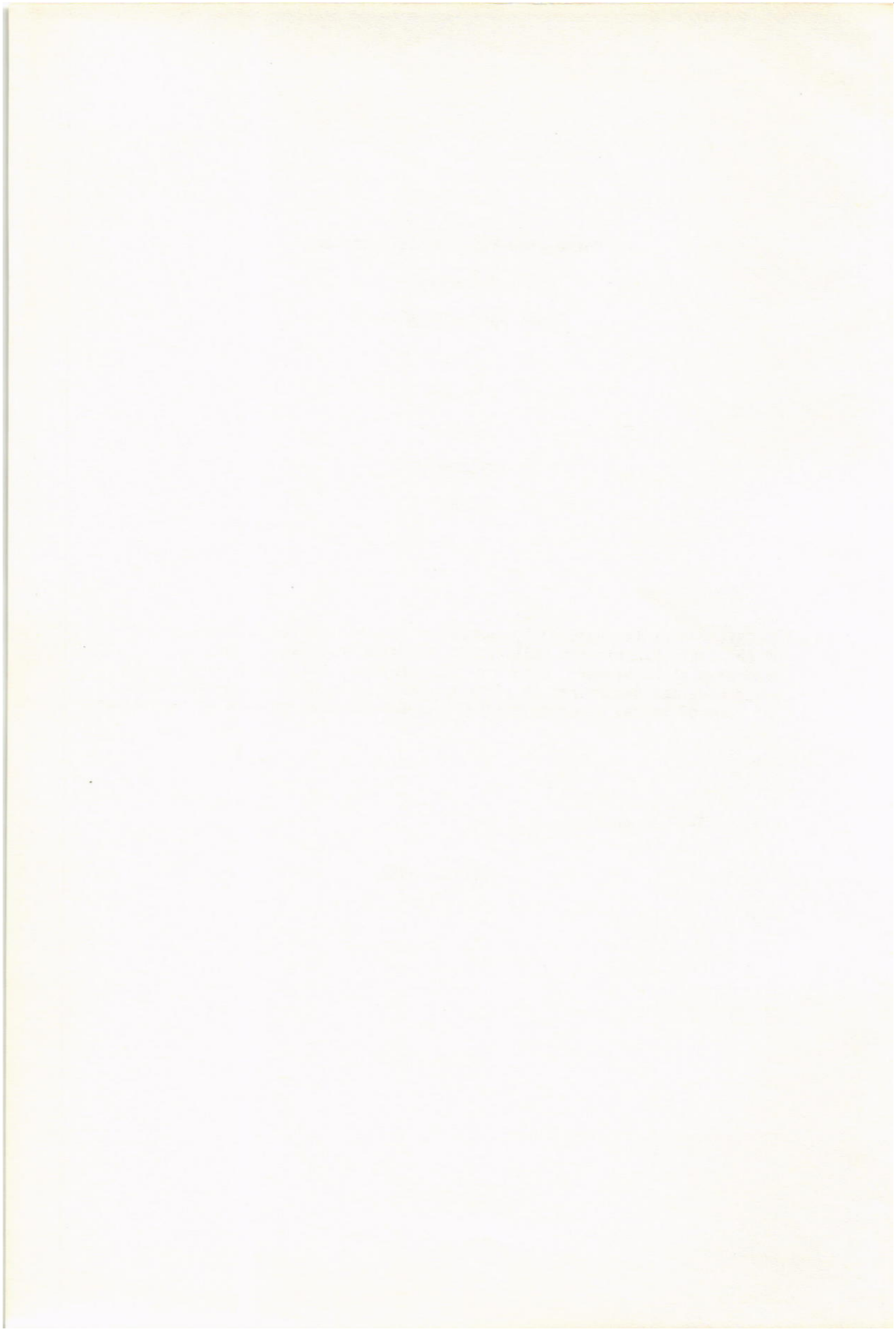
YIELDS of the FIELD EXPERIMENTS 1985

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

Price: Twelve pounds.

Published 1986

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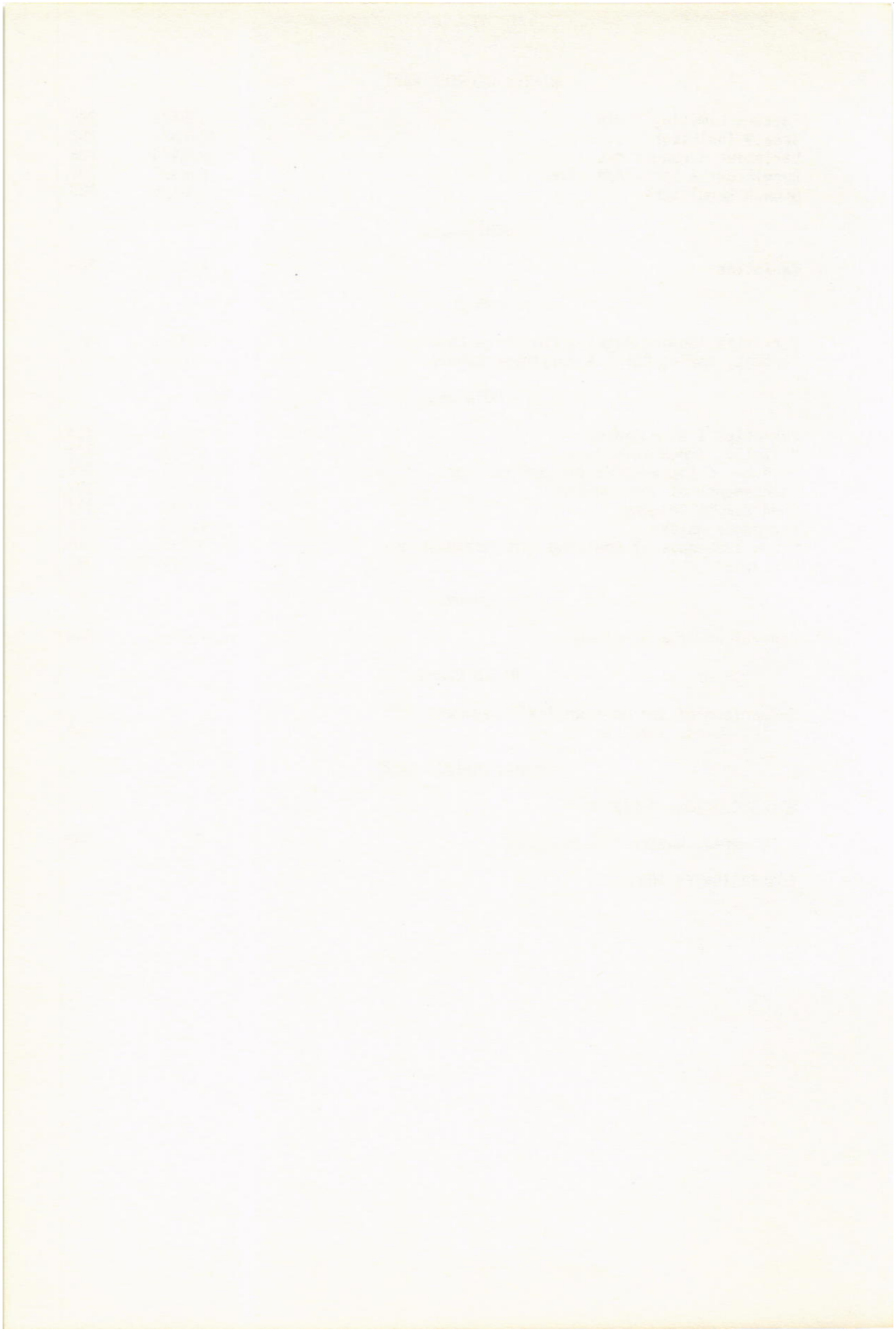
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CONVERSION FACTORS

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CONVENTIONS 1985

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.

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

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

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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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85/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. In 1985 part of the second rotation was added to the first to extend the rotation to fallow, potatoes, w. wheat, w. wheat, w. wheat.

The 142nd 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, 74-84/R/BK/1.

Areas harvested:

	Section	
Wheat:	0	0.00434
	1	0.00798
	2,3,6,and 7	0.00659
	8 and 9	0.00694
Potatoes:	4	0.00659

Treatments:

Whole plots

PLOT	Plot	Fertilizers and organic manures:- Treatments until 1967	Treatments from 1968	Treatments from 1985
01DN4PK	01	-	D N2 P K	D N4 P K
21DN2	21	D	D N2	D N2
22D	22	D	D	D
030	03	None	None	None
05F	05	P K Na Mg	P K (Na) Mg	PK Mg
06N1F	06	N1 P K Na Mg	N1 P K (Na) Mg	N1 P K Mg
07N2F	07	N2 P K Na Mg	N2 P K (Na) Mg	N2 P K Mg
08N3F	08	N3 P K Na Mg	N3 P K (Na) Mg	N3 P K Mg
09N4F	09	N*1 P K Na Mg	N4 P K (Na) Mg	N4 P K Mg
10N2	10	N2	N2	N2
11N2P	11	N2 P	N2 P	N2 P
12N2PNA	12	N2 P Na	N2 P Na	N2 P Na
13N2PK	13	N2 P K	N2 P K	N2 P K
14N2PKMG	14	N2 P Mg	N2 P K Mg	N2 P K Mg
15N5F	15	N2 P K Na Mg	N3 P K (Na) Mg	N5 P K Mg
16N6F	16	N*2 P K Na Mg	N2 P K (Na) Mg	N6 P K Mg
17NO+3FH	17	N2(A)	N2 1/2(P K (Na) Mg)	NO+3 1/2(PK Mg)+
18N1+3FH	18	P K Na Mg(A)	N2 1/2(P K (Na) Mg)	N1+3 1/2(PK Mg)+
19C	19	C	C	C
20NKMG	20	N2 K Na Mg	N2 K (Na) Mg	N2 K Mg

(A) Alternating

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

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85/R/BK/1

N1,N2,N3,N4,N5,N6: 48, 96, 144, 192, 240, 288 kg N (as sulphate of ammonia until 1967, except N* which was nitrate of soda. All as 'Nitro-Chalk' in spring from 1968)
N0+3; N1+3: None in autumn + 144 kg N in spring; 48 kg N in autumn + 144 kg N in spring
P: 35 kg P as single superphosphate (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	77	78	79	80	81	82	83	84	85
SC0/W34	0	W	W	W	W	W	W	W	W	W	W	W	W
SC1/W19	1	W	W	W	W	W	W	W	W	W	W	W	W
SC2/W2P	2	BE	W	P	BE	W	F	P	W	F	P	W	W
SC3/W6	3	W	W	F	W	W	F	W	W	W	W	W	W
POTATOES	4	W	P	BE	W	P	P	W	F	P	W	F	P
-	5	W	F	W	W	F	W	W	W	W	W	W	F
SC6/W8	6+	F	W	W	F	W	W	W	W	W	W	W	W
SC7/W1P	7	P	BE	W	P	BE	W	F	P	W	F	P	W
SC8/W4	8*	W	W	W	W	W	W	W	F	W	W	W	W
SC9/W27	9	W	W	W	W	W	W	W	W	W	W	W	W

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

\+ No sprays, except weedkillers, since 1985 * 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.
(3) 'Nitro-Chalk' (26% N) was used for Plot 18 in autumn 1984; 'Nitro-Chalk' (27.5% N) for all spring applications.

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85/R/BK/1

Standard applications:
W. wheat: Manures: Sections 1, 2 and 3 only: Chalk at 2.9 t. Weedkillers (not applied to section 8): Isoproturon at 2.0 kg with mecoprop at 1.6 kg, bromoxynil at 0.20 kg and ioxynil at 0.20 kg in 200 l. Fungicides (not applied to section 6): Prochloraz at 0.40 kg and carbendazim at 0.15 kg in 200 l applied with the growth regulator. Fenpropimorph at 0.75 kg with captafol at 1.3 kg in 200 l. Propiconazole at 0.12 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 200 l. Insecticide (not applied to section 6): Pirimicarb at 0.14 kg in 200 l. Growth regulator (not applied to section 6): Chlormequat at 1.3 kg.
Potatoes: Weedkillers: Linuron at 1.3 kg with paraquat at 0.50 kg ion in 500 l. Fungicides: Mancozeb at 1.4 kg in 200 l on four occasions, with the insecticide on the second and third occasions. Fentin hydroxide at 0.28 kg in 200 l. Insecticide: Pirimicarb at 0.14 kg on two occasions. Haulm desiccant: Diquat at 0.80 kg ion in 500 l.

Seed: W. wheat: Brimstone, sown at 190 kg.
Potatoes: Pentland Crown.

Cultivations, etc.:-
All sections: Sulphate of soda, kieserite and castor meal applied: 18 Sept, 1984. Sulphate of potash, superphosphate applied: 28 Sept. FYM applied, ploughed: 1 Oct. Spring-tine cultivated: 16 Oct.
Cropped Sections:
W. wheat: Chalk to sections 1, 2 and 3: 8 Sept, 1984. Autumn N treatment applied: 28 Sept. Rotary harrowed, seed sown: 31 Oct. Weedkillers applied (except section 8): 10 Apr, 1985. Spring N treatments applied: 18 Apr. Prochloraz, carbendazim and the growth regulator applied (except section 6): 19 Apr. Fenpropimorph and captafol applied (except section 6): 14 June. Propiconazole and 'Septal' applied (except section 6): 2 July. Insecticide applied (except section 6): 17 July. Combine harvested: 6 Sept.
Potatoes: N treatments applied: 19 Apr, 1985. Rotary harrowed, potatoes planted: 24 Apr. Weedkillers applied: 17 May. Mancozeb applied: 20 June, 6 Aug. Mancozeb with the insecticide applied: 3 July, 23 July. Fentin hydroxide applied: 21 Aug. Haulm mechanically destroyed: 3 Sept. Haulm desiccant applied: 5 Sept. Lifted: 17 Sept.
Fallow: Ploughed: 2 May, 15 July, 1985. Spring-tine cultivated: 16 May, 2 Aug.

NOTE: The percentage weights of weed seeds in the recorded grain yields of plots in section 8 were measured. On five plots these exceeded 3% (Plot 22 6%; Plot 03 5%; Plots 05 and 06 20% and Plot 9 16%). No adjustments to yields have been made.

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85/R/BK/1 W.WHEAT

GRAIN TONNES/HECTARE

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

SECTION PLOT	SC7/W1P	SC2/W2P	SC8/W4	SC3/W6	SC6/W8	SC1/W19	SC9/W27	SC0/W34	MEAN
01DN4PK	9.28	8.86	*	8.22	7.20	*	*	*	8.39
21DN2	9.83	9.91	8.88	9.12	8.43	8.64	9.37	9.48	9.21
22D	8.27	7.42	7.10	7.37	6.91	7.58	7.98	7.66	7.54
030	2.99	1.95	1.93	1.80	1.47	1.77	1.78	2.41	2.01
05F	3.57	2.00	3.69	1.88	1.58	1.54	1.67	1.62	2.19
06N1F	5.82	4.93	4.44	4.99	4.14	4.57	4.97	5.02	4.86
07N2F	7.30	6.97	5.60	6.56	6.24	7.54	6.92	7.52	6.83
08N3F	7.69	8.58	6.53	8.06	6.40	8.12	8.19	7.79	7.67
09N4F	8.51	8.41	7.46	8.04	6.56	8.21	7.89	7.09	7.77
10N2	3.19	6.10	4.73	4.40	4.19	3.46	3.58	4.06	4.21
11N2P	4.36	6.62	3.73	4.33	3.84	5.76	3.55	5.62	4.73
12N2PNA	4.77	6.59	4.55	5.60	4.98	5.65	3.75	6.06	5.24
13N2PK	6.51	6.65	5.06	6.29	5.68	6.81	6.79	6.38	6.27
14N2PKMG	7.24	6.87	5.33	6.71	6.18	6.87	6.90	7.08	6.65
15N5F	7.92	8.87	6.46	7.74	6.48	8.34	7.42	7.85	7.64
16N6F	8.44	8.72	7.15	8.58	6.64	8.23	7.45	7.53	7.84
17NO+3FH	8.85	8.10	6.49	7.66	7.26	8.06	7.40	7.68	7.69
18N1+3FH	9.47	8.65	7.68	7.95	7.31	8.10	7.21	7.54	7.99
19C	4.95	3.14	4.39	3.32	2.54	3.50	3.93	2.74	3.57
20NKMG	*	*	*	*	*	3.05	*	3.31	3.18

GRAIN MEAN DM% 77.7

STRAW TONNES/HECTARE

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

SECTION PLOT	SC7/W1P	SC1/W19	MEAN
01DN4PK	6.91	*	6.91
21DN2	6.49	6.25	6.37
22D	4.83	4.79	4.81
030	1.24	0.84	1.04
05F	1.37	0.84	1.10
06N1F	2.78	3.15	2.97
07N2F	3.89	3.57	3.73
08N3F	4.44	4.27	4.35
09N4F	5.46	4.78	5.12
10N2	0.99	2.98	1.98
11N2P	1.88	2.25	2.06
12N2PNA	2.14	2.31	2.23
13N2PK	3.42	3.39	3.41
14N2PKMG	4.01	3.42	3.71
15N5F	5.61	5.41	5.51
16N6F	6.56	5.59	6.07
17NO+3FH	5.39	4.45	4.92
18N1+3FH	6.39	4.60	5.50
19C	2.06	2.10	2.08
20NKMG	*	1.60	1.60

STRAW MEAN DM% 74.3

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85/R/BK/1 POTATOES

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

PLOT	TOTAL TUBERS TONNES/ HECTARE	% WARE 3.81 CM(1.5 INCH) RIDDLE
01DN2PK	44.6	96.7
21DN2	48.8	93.7
22D	41.1	95.3
030	6.4	71.3
05F	12.4	80.0
06N1F	21.0	78.0
07N2F	19.7	82.7
08N3F	37.8	94.7
09N4F	43.4	95.7
10N2	10.4	89.7
11N2P	13.0	75.2
12N2PNA	14.1	77.0
13N2PK	19.8	79.6
14N2PKMG	37.5	93.6
15N5F	43.2	95.7
16N6F	48.5	96.2
17N3FH	24.1	91.5
18N3FH	29.5	94.9
19C	14.2	86.1

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85/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 134th year, s. barley.

For previous years see 'Details' 1967 and 1973, Station Report for 1966 and 74-84/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

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Mg: 35 kg Mg, as kieserite every third year since 1974 (sulphate of magnesia annually until 1973)
Si: Silicate of soda at 450 kg
D: Farmyard manure at 35 tonnes. (D): until 1871 only
(Ashes): Weed ash 1852-1916, furnace ash 1917-1932, none since

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

0
48
96
144

Plus extra plots testing all combinations of:-

1. MANURE Fertilizers other than magnesium:

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

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

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

0
35

NOTES: (1) 'Nitro-Chalk' (27.5% N) was used in 1985. Smaller N analyses were used in earlier years.
(2) For a fuller record see 'Details' etc.

Basal applications: Manures: Chalk at 2.9 t. Weedkillers: Clopyralid at 0.05 kg and bromoxynil octanoate at 0.24 kg with mecoprop at 1.7 kg and the fungicide in 500 l. Fungicide: Tridemorph at 0.52 kg.

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

Cultivations, etc.:- Chalk applied: 1 Oct, 1984. Silicate of soda applied: 30 Oct. P applied: 21 Nov. K applied: 26 Nov. FYM applied, ploughed: 27 Nov. Spring-tine cultivated: 12 Mar, 1985. Spring-tine cultivated, seed sown: 13 Mar. N applied: 22 Apr. Weedkillers and fungicide applied: 9 May. Combine harvested: 23 Aug.

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85/R/HB/2

BARLEY

GRAIN TONNES/HECTARE

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

N / MANURE	0	48	96	144	MEAN
---	1.15	1.79	1.77	2.02	1.68
-P-	2.46	4.13	3.20	3.39	3.29
--K	1.88	3.29	4.88	4.13	3.55
-PK	2.29	5.31	6.55	6.28	5.11
A--	1.04	1.91	1.58	1.89	1.61
AP-	2.39	2.95	2.00	2.80	2.54
A-K	1.83	2.94	3.52	3.11	2.85
APK	2.69	5.10	6.60	6.58	5.24
N----	1.53	1.67	2.10	2.08	1.84
NP---	2.96	3.31	3.10	3.31	3.17
N-K--	1.72	2.93	3.08	3.30	2.76
NPK--	2.47	5.54	7.09	6.51	5.40
N--S-	1.67	3.15	3.94	4.24	3.25
NP-S-	3.04	5.01	4.58	4.07	4.18
N-KS-	2.54	5.01	4.69	4.70	4.23
NPKS-	2.96	5.27	6.76	6.51	5.38
N---S	1.50	3.34	2.70	2.70	2.56
NP--S	2.86	5.09	5.17	5.36	4.62
N-K-S	2.37	3.46	3.72	4.09	3.41
NPK-S	2.36	5.60	6.92	7.25	5.53
N--SS	1.79	2.66	2.76	2.67	2.47
NP-SS	2.91	5.28	5.17	5.40	4.69
N-KSS	2.08	3.78	4.74	4.35	3.74
NPKSS	2.86	5.40	7.23	6.70	5.55
C(--)	2.24	3.85	3.95	3.60	3.41
C(P-)	2.56	4.24	4.09	4.60	3.87
C(-K)	2.05	4.60	5.54	6.07	4.56
C(PK)	2.64	4.43	5.64	6.28	4.75
D	7.59	7.46	7.40	7.05	7.38
(D)	2.92	4.48	4.37	6.67	4.61
(A)	2.36	3.79	4.34	3.92	3.60
-	2.00	2.44	3.01	3.16	2.65
MEAN	2.43	4.04	4.44	4.52	3.86

GRAIN MEAN DM% 80.7

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85/R/HB/2

BARLEY

STRAW TONNES/HECTARE

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

N / MANURE	0	48	96	144	MEAN
---	0.34	0.52	0.87	0.85	0.64
-P-	0.74	2.02	2.23	2.40	1.85
--K	0.67	1.85	2.75	2.43	1.93
-PK	0.69	2.52	3.89	3.99	2.77
A--	0.34	0.54	0.36	0.72	0.49
AP-	0.91	1.83	1.29	1.81	1.46
A-K	0.52	1.23	1.52	1.75	1.25
APK	0.87	2.28	3.75	3.94	2.71
D	4.06	4.97	5.62	5.31	4.99
(D)	0.71	2.07	2.40	4.37	2.39
(A)	0.69	1.67	2.41	2.66	1.86
-	0.71	1.80	1.65	1.76	1.48
MEAN	0.94	1.94	2.39	2.67	1.98

STRAW MEAN DM% 82.6

PLOT AREA HARVESTED 0.00007

BARLEY

GRAIN TONNES/HECTARE

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

MANURE / MGNESIUM	551AN2PK	561--PK	571NN2--	581NN2--	MEAN
0	5.03	1.32	4.12	2.33	3.20
35	6.04	1.52	3.72	2.83	3.53
MEAN	5.54	1.42	3.92	2.58	3.36

GRAIN MEAN DM% 82.0

PLOT AREA HARVESTED 0.00327

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85/R/WF/3

WHEAT AND FALLOW

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

The 130th year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-84/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.

Standard applications:
Wheat plot: Weedkillers: Clopyralid at 0.10 kg with bromoxynil and ioxynil (as 'Deloxil' at 0.70 l) in 500 l.

Seed: Brimstone, sown at 190 kg.

Cultivations, etc.:-
Wheat plot: Ploughed: 1 Oct, 1984. Rotary harrowed, seed sown: 1 Nov. Weedkillers applied: 10 June, 1985. Combine harvested: 6 Sept.
Fallow plot: Ploughed: 1 Oct, 1984 and 2 May, 1985. Rolled: 7 May. Spring-tine cultivated: 16 May, 14 June. Ploughed: 15 July. Spring-tine cultivated: 2 Aug.

GRAIN AND STRAW TONNES/HECTARE

	GRAIN	STRAW
YIELD	0.27	0.23
MEAN DM%	67.2	77.1
PLOT AREA HARVESTED	0.06009	

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85/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 130th year, s. barley.

For previous years see 'Details' 1967, 1973 and 74-84/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' (27.5% N) (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: Clopyralid at 0.10 kg with bromoxynil and ioxynil (as 'Deloxil' at 0.70 l) in 500 l. Fungicide: Tridemorph at 0.52 kg in 200 l.

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85/R/EX/4

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

Cultivations, etc.:- Ploughed: 1 Oct, 1984. Spring-tine cultivated, seed sown: 18 Mar, 1985. N applied: 18 Apr. Weedkillers applied: 10 June. Fungicide applied: 28 June. Combine harvested: 23 Aug.

GRAIN TONNES/HECTARE

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

N	0	48	96	144	MEAN
PLOTFERT(01)					
1-	1.57	1.99	2.11	2.31	2.00
2-	1.38	2.35	2.31	2.42	2.12
3D	2.98	3.75	4.05	3.55	3.58
4D	2.95	3.63	3.86	4.24	3.67
5N	1.90	2.38	2.34	2.09	2.18
6N*	1.18	2.16	2.30	2.28	1.98
7NMIN	2.99	3.21	3.66	3.49	3.34
8N*MIN	2.23	3.00	3.58	3.93	3.18
9P	2.65	2.82	3.67	3.17	3.08
10MIN	1.73	3.41	3.73	3.28	3.04
MEAN	2.16	2.87	3.16	3.08	2.82

GRAIN MEAN DM% 77.2

STRAW TONNES/HECTARE

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

N	0	48	96	144	MEAN
PLOTFERT(01)					
1-	0.46	0.73	0.83	0.82	0.71
2-	0.39	0.81	0.85	0.91	0.74
3D	0.97	1.88	2.49	2.50	1.96
4D	0.95	1.79	2.78	2.65	2.04
5N	0.65	0.91	0.91	0.86	0.83
6N*	0.52	0.83	0.92	0.77	0.76
7NMIN	0.92	1.68	2.09	2.15	1.71
8N*MIN	1.03	1.82	3.07	2.12	2.01
9P	0.92	1.40	1.99	2.14	1.61
10MIN	1.15	2.24	2.55	2.81	2.19
MEAN	0.80	1.41	1.85	1.77	1.46

STRAW MEAN DM% 80.2

SUB PLOT AREA HARVESTED 0.00728

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85/R/PG/5

PARK GRASS

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

The 130th year, hay.

For previous years see 'Details' 1967 and 1973 and 74-84/R/PG/5.

Treatments: Combinations of:-

Whole plots

1. MANURE — Fertilizers and organic manures:

N1	Plot 1	N1
O(D)	Plot 2	None (D until 1863)
O/PLOT3	Plot 3	None
P	Plot 4-1	P
N2P	Plot 4-2	N2 P
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
O/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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85/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 CaCO3 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: 10 Dec, 1984. Superphosphate applied: 11 Dec. FYM applied: 8 Jan, 1985. N applied: 18 Apr. Cut: 1 July, 7 Nov.

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85/R/PG/5

1ST CUT (1/7/85) DRY MATTER TONNES/HECTARE

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

LIME MANURE	A	B	C	D	MEAN
N1	2.87	2.98	1.97	1.20	2.26
O(D)	2.62	3.27	2.06	1.70	2.41
O/PLOT3	2.26	3.13	1.44	1.58	2.10
P	3.53	3.70	3.59	3.26	3.52
N2P	3.89	3.79	4.21	2.86	3.69
N1MIN	6.10	5.77			5.94
MIN	5.28	5.20	4.77	3.75	4.75
PNAMG	3.30	3.47	3.88	3.89	3.64
N2MIN	5.48	5.94	4.86	5.08	5.34
N2PNAMG	4.04	4.56	5.14	3.45	4.30
N3MIN	5.95	6.09	7.08	3.58	5.67
N3MINSI	6.11	5.50	4.87	3.77	5.06
O/PLOT12	2.58	1.98	1.68	1.65	1.97
D/F	4.70	4.73	4.73	4.22	4.59
N2*MIN	5.77	5.49	5.32	5.32	5.47
MIN(N2*)	5.62	4.90	4.72	4.03	4.82
N1*MIN	5.18	5.42	4.84	4.00	4.86
N1*	3.10	3.52	3.45	2.98	3.26
N2KNAMG0			1.00	0.94	0.97
N2KNAMG2	2.83				2.83
N2KNAMG1	2.19	2.43			2.31
D0	5.01				5.01
D2	5.83				5.83
D1	5.56				5.56
D/N*PK0	5.45				5.45
D/N*PK2	5.57				5.57
D/N*PK1	4.59				4.59

1ST CUT MEAN DM% 22.1

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85/R/PG/5

2ND CUT (7/11/85) DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	2.54	3.05	2.02	1.79	2.35
0(D)	2.21	3.02	2.51	2.67	2.60
0/PLOT3	2.14	3.09	2.10	2.96	2.57
P	2.69	2.76	3.28	3.30	3.01
N2P	2.27	2.54	2.37	1.95	2.28
N1MIN	3.96	3.73			3.84
MIN	4.26	4.62	3.34	3.23	3.86
PNAMG	4.50	3.69	4.15	4.35	4.17
N2MIN	3.66	3.18	2.89	2.73	3.11
N2PNAMG	2.46	2.43	2.33	1.90	2.28
N3MIN	4.26	3.66	3.47	6.29	4.42
N3MINSI	5.26	4.09	3.49	5.69	4.63
0/PLOT12	3.27	2.89	2.66	2.43	2.81
D/F	6.29	5.68	4.64	4.09	5.18
N2*MIN	3.27	3.58	3.32	2.61	3.20
MIN(N2*)	2.85	2.98	4.34	3.65	3.46
N1*MIN	3.08	3.16	3.24	2.49	2.99
N1*	2.55	2.92	3.22	2.46	2.78
N2KNAMG0			2.68	2.66	2.67
N2KNAMG2	3.23				3.23
N2KNAMG1	3.06	3.35			3.21
D0	4.34				4.34
D2	5.35				5.35
D1	4.61				4.61
D/N*PK0	4.59				4.59
D/N*PK2	4.79				4.79
D/N*PK1	3.87				3.87

2ND CUT MEAN DM% 39.8

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85/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

LIME / MANURE	A	B	C	D	MEAN
N1	5.41	6.04	3.99	2.99	4.61
0(D)	4.83	6.29	4.57	4.37	5.01
0/PLOT3	4.40	6.23	3.54	4.54	4.68
P	6.21	6.46	6.87	6.57	6.53
N2P	6.15	6.33	6.59	4.81	5.97
N1MIN	10.06	9.50			9.78
MIN	9.53	9.82	8.12	6.98	8.61
PNAMG	7.80	7.16	8.04	8.24	7.81
N2MIN	9.14	9.12	7.75	7.81	8.46
N2PNAMG	6.50	6.99	7.47	5.36	6.58
N3MIN	10.21	9.75	10.54	9.87	10.09
N3MINSI	11.37	9.59	8.37	9.46	9.70
0/PLOT12	5.86	4.88	4.33	4.08	4.79
D/F	10.99	10.41	9.37	8.31	9.77
N2*MIN	9.04	9.07	8.64	7.93	8.67
MIN(N2*)	8.47	7.88	9.06	7.68	8.27
N1*MIN	8.26	8.57	8.08	6.49	7.85
N1*	5.65	6.44	6.67	5.43	6.05
N2KNAMG0			3.68	3.60	3.64
N2KNAMG2	6.06				6.06
N2KNAMG1	5.24	5.78			5.51
D0	9.35				9.35
D2	11.17				11.17
D1	10.17				10.17
D/N*PK0	10.04				10.04
D/N*PK2	10.36				10.36
D/N*PK1	8.46				8.46

TOTAL OF 2 CUTS MEAN DM% 30.9

PLOT AREA HARVESTED 0.00002

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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 16th year of revised scheme, w. wheat.

For previous years see 'Details' 1967 and 1973, and 74-84/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 (all w. wheat 1985):

F/WHEAT	With fallow: Roots (turnips or swedes), s. barley, fallow, w. wheat 1848-1951. Wheat in 1984.
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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85/R/AG/6

Sixteenth plots

5. P205 64 K20 64 — Rates of 1964 treatments(kg):

P205 to P-test half plots	K20 to K-test half plots
0	0
500	315
1000	630
2000	1260

Thirty second plots

6. To RN CROP F/WHEAT. Residues of P205 applied 1970-72 (kg) and in 1979, 1981 and 1984 (kg):

P205 724

(0)0	None
(375)450	375 total in 1970-72, 150 in 1980, 1981 and 1984

To RN CROP F/WHEAT. Residues of K20 applied 1973-76 (kg) and in 1979, 1981 and 1984 (kg):

K20 764

(0)0	None
(870)900	870 total in 1973-76, 300 in 1980, 1982 and 1984

To RN CROP L/FALLOW. Residues of P205 applied 1970-72 (kg) and in 1980, 1982 and 1985 (kg):

P205 725

(0)0	None
(375)450	375 total in 1970-72, 150 in 1980, 1982 and 1985

To RN CROP L/FALLOW. Residues of K20 applied 1973-76 (kg) and in 1980, 1982 and 1985 (kg):

K20 765

(0)0	None
(870)900	870 total in 1973-76, 300 in 1980, 1982 and 1985

Standard applications: To P-test half plots: K20 at 300 kg. To K-test half plots: P205 at 150 kg.

Basal applications: Manures: 'Nitro-Chalk' (27.5% N) at 870 kg. Weedkillers: Paraquat at 0.60 kg ion in 250 l. Cyanazine at 0.24 kg with mecoprop at 1.6 kg in 200 l. Fungicides: Propiconazole at 0.25 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 200 l.

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

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Cultivations, etc.:- Test and standard P and K applied: 25 July, 1984.
Paraquat applied: 11 Oct. Cultivated by rotary digger: 15 Oct.
Rotary harrowed, seed sown: 6 Feb, 1985. N applied: 15 Apr.
Cyanazine and mecoprop applied: 16 May. Fungicides applied: 3 July.
Combine harvested: 7 Sept.

WHEAT AFTER WHEAT P PLOTS

GRAIN TONNES/HECTARE

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

	OLDRESD	NONE		PKNAMG		NPKNAMGC	
	P205 724	(0)0	(375)450	(0)0	(375)450	(0)0	(375)450
PREVCROP	P205 64						
ARABLE	0	4.31	5.43	6.08	6.32	4.11	4.83
	500	5.23	6.46	6.46	6.87	5.24	6.04
	1000	6.55	7.24	6.35	6.33	3.91	5.58
	2000	5.11	6.43	6.53	6.39	5.77	5.47
GRASS	0	4.25	6.29	2.46	4.78	4.23	4.99
	500	5.66	5.93	4.72	6.23	3.53	5.84
	1000	5.11	6.62	4.47	6.02	5.84	6.30
	2000	6.13	7.14	6.78	7.10	6.70	5.71

GRAIN MEAN DM% 78.4

PLOT AREA HARVESTED (OLDRESD NONE) 0.00113
PLOT AREA HARVESTED (REMAINDER) 0.00127

WHEAT AFTER WHEAT K PLOTS

GRAIN TONNES/HECTARE

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

	OLDRESD	NONE		PKNAMG		NPKNAMGC	
	K20 764	(0)0	(870)900	(0)0	(870)900	(0)0	(870)900
PREVCROP	K20 64						
ARABLE	0	6.51	6.64	5.83	7.50	6.92	6.27
	315	6.05	7.02	6.91	6.49	5.94	5.87
	630	6.74	6.69	7.05	6.76	6.58	6.36
	1260	7.02	6.46	7.38	5.87	6.47	6.30
GRASS	0	5.58	7.06	6.23	6.58	6.11	6.64
	315	6.88	7.22	7.21	7.16	5.84	7.16
	630	6.82	6.73	5.99	6.60	6.23	6.49
	1260	6.73	7.18	7.72	6.83	6.43	6.41

GRAIN MEAN DM% 78.4

PLOT AREA HARVESTED (OLDRESD NONE) 0.00113
PLOT AREA HARVESTED (REMAINDER) 0.00127

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WHEAT AFTER FALLOW P PLOTS

GRAIN TONNES/HECTARE

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

	OLDRESD	NONE		PKNAMG		NPKNAMGC	
	P205 725	(0)0	(375)450	(0)0	(375)450	(0)0	(375)450
PREVCROP	P205 64						
ARABLE	0	6.39	6.89	7.67	7.12	6.80	6.60
	500	6.86	7.18	7.61	7.32	6.06	7.29
	1000	7.48	7.29	7.23	7.45	8.10	7.21
	2000	7.11	7.18	7.76	7.32	6.97	6.88
GRASS	0	7.36	6.75	7.58	7.23	5.20	7.63
	500	7.22	6.40	6.48	7.34	7.03	7.51
	1000	6.68	6.73	6.94	7.62	7.47	7.74
	2000	7.02	6.78	7.01	7.21	7.81	7.39

GRAIN MEAN DM% 78.6

PLOT AREA HARVESTED (OLDRESD NONE) 0.00113
PLOT AREA HARVESTED (REMAINDER) 0.00127

WHEAT AFTER FALLOW K PLOTS

GRAIN TONNES/HECTARE

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

	OLDRESD	NONE		PKNAMG		NPKNAMGC	
	K20 765	(0)0	(870)900	(0)0	(870)900	(0)0	(870)900
PREVCROP	K20 64						
ARABLE	0	5.09	6.48	8.16	6.23	7.60	7.81
	315	5.54	7.20	7.31	7.15	7.21	7.07
	630	6.84	6.82	7.33	6.50	7.77	7.34
	1260	7.08	7.13	7.05	7.93	7.49	7.12
GRASS	0	7.00	6.43	3.53	6.54	7.21	7.54
	315	6.70	5.11	5.69	6.36	7.31	7.60
	630	6.84	6.87	7.46	5.05	6.97	7.88
	1260	6.88	3.79	7.20	7.27	6.82	7.86

GRAIN MEAN DM% 77.4

PLOT AREA HARVESTED (OLDRESD NONE) 0.00113
PLOT AREA HARVESTED (REMAINDER) 0.00127

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85/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 second year of grass/clover. The eleventh year of grass on the rest of the experiment.

For previous years see 'Details' 1967 and 1973 and 74-84/R/BN/7.

Plot dimensions: 10.7 x 55.9.

Treatments to grass: All combinations of:-

Whole plots

1. MANURE	Fertilizers and organic manures:
D	D
DPK	D P K
PKMG	P K (Na) Mg
P	P
PK	P K
PMG	P (Na) Mg
0	0

P: 35 kg P as single superphosphate (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 1985 (kg N per cut) as 'Nitro-Chalk' (27.5% N) 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

Treatments to grass/clover (not given nitrogen fertilizer):

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

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

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85/R/BN/7

Cultivations, etc.:-
All sections: P applied: 13 Dec, 1984. K applied: 3 Jan, 1985. Cut: 29 May, 6 Nov.
Grass (Sections 3, 4, 5 and 6) only: N applied: 28 Mar, 31 May.

GRASS/CLOVER

1ST CUT (29/5/85) DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	MEAN
	3.46	2.99	3.77	3.29	3.31	2.62	1.63	3.01

1ST CUT MEAN DM% 13.7

2ND CUT (6/11/85) DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	MEAN
	5.14	5.18	4.32	3.92	4.47	4.46	2.45	4.28

2ND CUT MEAN DM% 33.2

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

MANURE	D	DPK	PKMG	P	PK	PMG	0	MEAN
	8.60	8.17	8.09	7.21	7.78	7.08	4.08	7.29

TOTAL OF 2 CUTS MEAN DM% 23.5

GRASS

1ST CUT (29/5/85) DRY MATTER TONNES/HECTARE

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

N PERCUT / MANURE	75	100	125	150	MEAN
D	5.00	6.25	6.04	5.65	5.74
DPK	5.79	5.94	5.73	5.78	5.81
PKMG	5.40	5.84	5.95	5.52	5.68
P	4.63	3.65	3.31	3.32	3.73
PK	5.12	5.63	5.59	5.30	5.41
PMG	4.58	3.98	3.61	3.57	3.94
0	3.97	3.75	3.18	3.56	3.61
MEAN	4.93	5.01	4.77	4.67	4.85

MANURE KMG 100 5.79

GRAND MEAN 4.88

1ST CUT MEAN DM% 19.3

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85/R/BN/7

2ND CUT (6/11/85) DRY MATTER TONNES/HECTARE

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

N PERCUT MANURE	75	100	125	150	MEAN
D	3.32	6.10	6.49	6.88	5.70
DPK	4.04	6.14	6.36	6.97	5.88
PKMG	3.50	5.39	5.92	6.13	5.24
P	2.95	3.46	4.08	4.41	3.73
PK	3.68	5.74	6.58	6.02	5.50
PMG	3.19	3.50	4.55	4.15	3.85
0	2.39	3.47	4.64	4.34	3.71
MEAN	3.30	4.83	5.52	5.56	4.80

MANURE KMG 100 4.77

GRAND MEAN 4.80

2ND CUT MEAN DM% 51.5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

N PERCUT MANURE	75	100	125	150	MEAN
D	8.31	12.35	12.53	12.53	11.43
DPK	9.83	12.08	12.09	12.75	11.69
PKMG	8.91	11.23	11.87	11.65	10.91
P	7.58	7.11	7.39	7.73	7.46
PK	8.80	11.37	12.16	11.32	10.91
PMG	7.78	7.48	8.16	7.72	7.79
0	6.36	7.22	7.82	7.90	7.32
MEAN	8.22	9.83	10.29	10.23	9.64

MANURE KMG 100 10.56

GRAND MEAN 9.68

TOTAL OF 2 CUTS MEAN DM% 35.4

SUB PLOT AREA HARVESTED 0.00568

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85/R/GC/8

GARDEN CLOVER

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

Sponsor: J. McEwen.

The 132nd year, red clover.

For previous years see 'Details' 1967 and 1973, and 74-84/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 30 Oct, 1984; 30 Nov, 21 Dec, and 27 Feb, 1985.

NOTE: An additional planned treatment application of benomyl in January was omitted because of snow.

Basal applications: Manures: Chalk at 1.25 t. (0:18:36) at 420 kg. Mg at 50 kg, as Epsom Salts. Nematicide: Aldicarb at 10 kg.

NOTE: Additional K was applied to replace that removed by the crop in 1984. FUNGCIDE NONE required 250 and 289 kg K20 to the first and second blocks respectively, FUNGCIDE BENOMYL 410 and 400 kg K20. This was applied as muriate of potash, one third in spring 1985 and one third after the first and second cuts.

Seed: Hungaropoly, sown at 34 kg in April 1983, gaps, 85% FUNGCIDE NONE, 8% FUNGCIDE BENOMYL, resown at 34 kg in April, 1984.

Cultivations, etc.:- Chalk, PK and Mg applied: 2 Nov, 1984. K and aldicarb applied: 2 Apr, 1985. Cut and K applied: 27 June, 6 Aug. Cut: 25 Sept.

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85/R/GC/8

1ST CUT (27/6/85) DRY MATTER TONNES/HECTARE

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

FUNGCIDE	NONE	BENOMYL	MEAN
	6.77	6.25	6.51

1ST CUT MEAN DM% 16.8

2ND CUT (6/8/85) DRY MATTER TONNES/HECTARE

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

FUNGCIDE	NONE	BENOMYL	MEAN
	4.65	5.02	4.84

2ND CUT MEAN DM% 16.2

3RD CUT (25/9/85) DRY MATTER TONNES/HECTARE

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

FUNGCIDE	NONE	BENOMYL	MEAN
	1.69	1.70	1.70

3RD CUT MEAN DM% 15.7

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

FUNGCIDE	NONE	BENOMYL	MEAN
	13.12	12.97	13.05

TOTAL OF 3 CUTS MEAN DM% 16.2

PLOT AREA HARVESTED 0.00010

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85/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 86th year, grass, w. wheat, w. beans.

For previous years see 'Details' 1967 and 1973, and 74-84/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	1985
(a)	G	W	BE	W	W	W
(b)	G	G	G	BE	W	W
(c)	G	G	G	G	BE	W
(d)	G	G	G	G	G	BE

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

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85/S/RN/1

Treatments to crops in these sections were:

TREATMENT 1899-1965	NEWTREAT Grass 1966-1984	W. wheat and w. beans until 1984	W. wheat and w. beans 1985
	MANURE	MANURE	MANURE
D	(D)N	(D)P2	(D)P2
B	BN	B	BP2
N	(N)P2N	(N)P2	(N)P2
P	(P)P1N	(P)P1	(P1)P2
K	(K)P2KN	(K)P2K	(K)P2K
-	(-)P2N	(-)P2	(-)P2
PK	(PK)P1KN	(PK)P1K	(P1K)P2K
NK	(NK)P2KN	(NK)P2K	(NP2K)P2K
NP	(NP)P1N	(NP)P1	(NP1)P2
NPK	(NPK)P1KN	(NPK)P1K	(NP1K)P2K

D: Farmyard manure at 15 tonnes
(D): Farmyard manure at 30 tonnes, 60 tonnes in autumn 1969, none since
B: Bonemeal 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 P2O5 as single superphosphate. 1966-79, 50 kg P2O5 as triple superphosphate
P1, P2: 50, 100 kg P2O5 as triple superphosphate
K: 1899-1965, 63 kg K2O as muriate of potash. Since 1966, 126 kg K2O

W. wheat in Sections (a), (b) and (c) tested in addition to MANURE all the combinations with the following nitrogen rates (kg N) applied in spring as 'Nitro-Chalk' (26% N) on 17 Apr, 1985:

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), (b) and (c) was given 45 kg N to the seedbed, as prilled urea, in addition to the spring nitrogen rates. On S/RN/1-2 and S/RN/1-3 w. beans were grown, yields not taken.

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85/S/RN/1

Standard applications:

W. wheat, on S/RN/1-1. Manures: P205 at 100 kg (as triple superphosphate). N at 45 kg (as prilled urea). Weedkillers: Mecoprop at 1.2 kg, bromoxynil at 0.26 kg and ioxynil at 0.26 kg in 220 l (to Section (c) only). Mecoprop at 1.2 kg, bromoxynil at 0.26 kg and ioxynil at 0.26 kg with isoproturon at 2.1 kg applied with the prochloraz in 220 l. (To Sections (a), (b) and (c) but on Section (c) the isoproturon was applied separately and earlier). Fungicides: Prochloraz at 0.42 kg. Maneb at 1.6 kg, carbendazim at 0.15 kg and tridemorph at 0.37 kg with captafol at 1.0 kg applied with the insecticide in 220 l. Insecticide: Pirimicarb at 0.14 kg.

W. beans, on S/RN/1-1, S/RN/1-2 and S/RN/1-3: Manures: P205 at 100 kg (as triple superphosphate). Weedkillers: Simazine at 1.1 kg in 220 l (except to S/RN/1-3). Fungicide: Benomyl at 0.56 kg in 220 l.

Seed: W. wheat: Galahad, sown at 400 seeds per square metre.
W. beans: Banner, sown at 250 kg.

Cultivations, etc.:-

W. wheat: S/RN/1-1 (Sections (a) and (b) only). K and bonemeal treatments applied: 6 Sept, 1984. P applied: 13 Sept. Ploughed: 15 Sept. Power harrowed, seed sown, seedbed N applied: 17 Oct. N treatments applied: 17 Apr, 1985. Mecoprop, bromoxynil and ioxynil with isoproturon and prochloraz applied: 23 Apr. Remaining fungicides and insecticide applied: 26 June. Combine harvested: 28 Aug (Section (a)), 29 Aug (Section (b)).

W. wheat: S/RN/1-1 (Section (c)): P applied: 9 Oct, 1984. Ploughed, K and bonemeal treatments applied: 11 Oct. Power harrowed, seed sown, seedbed N applied: 30 Oct. Isoproturon applied: 31 Oct. Mecoprop, bromoxynil and ioxynil applied: 4 Dec. N treatments applied: 17 Apr, 1985. Mecoprop, bromoxynil and ioxynil with prochloraz applied: 23 Apr. Remaining fungicides and insecticide applied: 26 June. Combine harvested: 28 Aug.

W. beans: S/RN/1-1 (Section (d)): P applied: 9 Oct, 1984. Ploughed, K and bonemeal treatments applied: 11 Oct. Seed sown: 17 Oct. Weedkiller applied: 31 Oct. Fungicide applied: 22 Apr, 1985. Combine harvested: 16 Sept.

W. beans: S/RN/1-2 and S/RN/1-3: K and bonemeal treatments applied: 6 Sept, 1984. P applied: 13 Sept. Ploughed: 15 Sept (S/RN/1-2), 11 Oct (S/RN/1-3). Power harrowed, seed sown, weedkiller applied (S/RN/1-2 only): 17 Oct. Power harrowed, seed sown (S/RN/1-3 only): 31 Oct. Fungicide applied: 22 Apr, 1985. Combine harvested (yields not recorded): 19 Sept.

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85/S/RN/1

3RD W.WHEAT AFTER W.BEANS SECTION (a)

GRAIN TONNES/HECTARE

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

N(NC) MANURE	120	160	200	240	MEAN
(D)P2	7.38	6.51	6.18	7.09	6.79
BP2	4.62	5.43	4.62	4.39	4.77
(N)P2	5.63	6.25	5.94	4.36	5.54
(P1)P2	6.00	5.14	6.15	6.28	5.89
(K)P2K	7.02	7.00	7.37	6.67	7.01
(-)P2	6.40	4.93	5.90	6.77	6.00
(P1K)P2K	6.62	6.39	6.67	7.20	6.72
(NP2K)P2K	6.84	7.38	6.76	7.50	7.12
(NP1)P2	6.14	6.44	6.12	6.57	6.32
(NP1K)P2K	7.38	5.74	6.65	7.31	6.77
MEAN	6.40	6.12	6.24	6.41	6.29

GRAIN MEAN DM% 85.6

PLOT AREA HARVESTED 0.00073

2ND W. WHEAT AFTER W.BEANS SECTION (b)

GRAIN TONNES/HECTARE

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

N(NC) MANURE	120	160	200	240	MEAN
(D)P2	6.65	6.43	7.46	6.09	6.66
BP2	6.57	8.14	6.64	5.70	6.76
(N)P2	8.28	7.06	5.88	6.26	6.87
(P1)P2	7.77	7.22	6.74	7.40	7.28
(K)P2K	7.59	8.18	6.94	6.53	7.31
(-)P2	6.88	7.90	7.96	7.35	7.52
(P1K)P2K	7.70	8.86	7.30	7.24	7.78
(NP2K)P2K	8.25	7.22	8.50	8.63	8.15
(NP1)P2	7.42	8.21	7.96	7.01	7.65
(NP1K)P2K	7.48	7.96	6.91	7.88	7.56
MEAN	7.46	7.72	7.23	7.01	7.35

GRAIN MEAN DM% 82.4

PLOT AREA HARVESTED 0.00073

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85/S/RN/1

2ND W. WHEAT AFTER W.BEANS SECTION (b)

GRAIN TONNES/HECTARE

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

N(PU) MANURE	0	160	220	MEAN
(D)P2	3.64	6.89	6.37	5.13
BP2	2.18	4.79	6.41	3.89
(N)P2	1.71	3.77	6.56	3.44
(P1)P2	1.52	7.40	4.49	3.73
(K)P2K	2.01	7.63	7.46	4.78
(-)P2	1.95	7.75	6.57	4.56
(P1K)P2K	1.92	8.41	7.01	4.81
(NP2K)P2K	1.71	8.69	7.34	4.86
(NP1)P2	1.17	6.22	6.89	3.86
(NP1K)P2K	2.04	7.93	7.29	4.82
MEAN	1.98	6.95	6.64	4.39

GRAIN MEAN DM% 81.7

PLOT AREA HARVESTED 0.00073

1ST W.WHEAT AFTER W.BEANS SECTION (c)

GRAIN TONNES/HECTARE

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

N(NC) MANURE	120	160	200	240	MEAN
(D)P2	7.04	8.28	8.17	7.07	7.64
BP2	6.96	7.33	6.09	7.88	7.06
(N)P2	6.96	7.62	8.05	7.51	7.54
(P1)P2	7.85	7.76	7.19	6.96	7.44
(K)P2K	8.26	8.63	8.98	9.74	8.90
(-)P2	8.21	8.00	7.64	8.25	8.03
(P1K)P2K	8.72	9.27	8.99	7.88	8.72
(NP2K)P2K	8.32	10.57	8.87	6.93	8.67
(NP1)P2	7.74	7.75	7.52	7.90	7.73
(NP1K)P2K	7.05	8.60	8.67	6.05	7.59
MEAN	7.71	8.38	8.02	7.62	7.93

GRAIN MEAN DM% 85.3

PLOT AREA HARVESTED 0.00073

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85/S/RN/1

W. BEANS SECTION (d)

GRAIN TONNES/HECTARE

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

MANURE	
(D)P2	1.07
BP2	1.01
(N)P2	0.93
(P1)P2	0.93
(K)P2K	2.15
(-)P2	1.19
(P1K)P2K	2.28
(NP2K)P2K	2.14
(NP1)P2	0.95
(NP1K)P2K	1.98
MEAN	1.46

GRAIN MEAN DM% 80.7

PLOT AREA HARVESTED 0.00229

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85/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 16th year of revised scheme, w. wheat, w. beans.

For previous years see 'Details' 1967 and 1973, and 74-84/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 first wheat after beans in 1984:

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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85/S/RN/2

Sub plots

2. P Phosphate (total P2O5 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 wheat in 1985. Years of application for beans in 1985 were 1979, 1981, 1983 and 1985.

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

3. N Nitrogen fertilizer in spring (kg N) as 'Nitro-Chalk' (26% N) in addition to 45 kg N at sowing:

120
160
200
240

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:

W. wheat: Manures: N at 45 kg as prilled urea. Weedkillers: Isoproturon at 2.5 kg in 220 l. Mecoprop at 1.2 kg, bromoxynil at 0.26 kg and ioxynil at 0.26 kg applied with the prochloraz in 220 l. Fungicides: Prochloraz at 0.42 kg. Maneb at 1.6 kg, carbendazim at 0.15 kg and tridemorph at 0.37 kg with captafol at 1.0 kg applied with the insecticide in 220 l. Insecticide: 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: Galahad, sown at 400 seeds per square metre.
W. beans: Banner, sown at 250 kg.

Cultivations, etc.:-

W. wheat: Ploughed: 12 Oct, 1984. Power harrowed, seed sown, N applied: 30 Oct. Isoproturon applied: 31 Oct. N treatments applied: 17 Apr, 1985. Mecoprop, bromoxynil, ioxynil and prochloraz applied: 23 Apr. Remaining fungicides and insecticide applied: 26 June. Combine harvested: 29 Aug.

W. beans: P and chalk treatments applied: 6 Sept, 1984. Ploughed: 12 Oct. Power harrowed, seed sown, weedkiller applied: 31 Oct. Fungicide applied: 22 Apr, 1985. Combine harvested (yields not recorded): 19 Sept.

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85/S/RN/2

W.WHEAT AFTER BEANS

GRAIN TONNES/HECTARE

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

RESIDUE	N P	120	160	200	240
(0)0	(0)(0)0			4.97	6.95
(0)0	(0)(3)0	7.39	5.33		
(0)0	(1)(3)1	8.46		8.61	
(0)0	(2)(3)1		8.51		8.95
(0)0	(3)(3)0		8.89		8.19
(D)0	(0)(0)0	6.19	7.75		
(D)0	(0)(3)0			7.89	7.56
(D)0	(1)(3)1		8.34		8.30
(D)0	(2)(3)1	8.72		7.97	
(D)0	(3)(3)0	7.44		7.52	
(DP)0	(0)(0)0			8.88	8.94
(DP)0	(0)(3)0	7.65	8.54		
(DP)0	(1)(3)1	8.80		8.26	
(DP)0	(2)(3)1		8.88		8.45
(DP)0	(3)(3)0		8.45		8.96
(DP)D2	(0)(0)0	8.34	8.51		
(DP)D2	(0)(3)0			8.36	8.40
(DP)D2	(1)(3)1	9.45		9.05	
(DP)D2	(2)(3)1		9.13		9.49
(DP)D2	(3)(3)0		9.47		9.28
(DP)D2P1	(0)(0)0			7.98	8.79
(DP)D2P1	(0)(3)0	8.49	8.76		
(DP)D2P1	(1)(3)1	9.24		8.07	
(DP)D2P1	(2)(3)1		9.67		9.12
(DP)D2P1	(3)(3)0		10.15		7.97
(DP)P1	(0)(0)0			8.45	8.36
(DP)P1	(0)(3)0	8.22	9.48		
(DP)P1	(1)(3)1		9.41		8.03
(DP)P1	(2)(3)1	8.46		8.16	
(DP)P1	(3)(3)0	8.87		9.56	
(DP)P2	(0)(0)0	9.11	8.95		
(DP)P2	(0)(3)0			9.19	8.15
(DP)P2	(1)(3)1		9.92		8.47
(DP)P2	(2)(3)1	8.59		9.68	
(DP)P2	(3)(3)0	8.85		9.07	
(DP52)0	(0)(0)0	7.68	7.74		
(DP52)0	(0)(3)0			8.61	8.17
(DP52)0	(1)(3)1		8.92		8.84
(DP52)0	(2)(3)1	8.30		8.09	
(DP52)0	(3)(3)0	9.50		8.66	

GRAIN MEAN DM% 83.5

PLOT AREA HARVESTED 0.00073

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85/R/RN/1 and 85/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 37th year, old grass, leys, w. wheat.

For previous years see 'Details' 1967 and 1973 and 74-84/R/RN/1 and 2.

The experiment is duplicated on:-

HIGHFIELD — A site with much organic matter initially (ploughed out from permanent grass) (85/R/RN/1)

FOSTERS — A site with little organic matter initially (85/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. Potatoes were not grown after 1982; the test crops were W, W, W thereafter.

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

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

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

C	Clover-grass ley
N	All-grass ley

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85/R/RN/1 and 85/R/RN/2

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.

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 1985 yields were taken from 4th test crops only.

Additional treatments to 1st test crop w. wheat in the museum blocks:-

Sub plots

FYMRES68 Farmyard manure residues, last applied 1968:

NONE None
FYM 30 tonnes on each occasion

Sub plots

N Nitrogen fertilizer in 1985 (kg N) as 'Nitro-Chalk' (27.5% N):

0
50
100
150

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

Sub plots

N Nitrogen fertilizer in 1985 (kg N) as 'Nitro-Chalk' (27.5% N):

0
50
100
150

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85/R/RN/1 and 85/R/RN/2

Standard applications:
1st Treatment crops in museum blocks:
Lucerne: Manures: (0:20:20) at 380 kg. Weedkillers: Glyphosate at 1.4 kg in 250 l. Dinoseb at 1.0 kg in 500 l.
All-grass ley and 1-year hay: Manures: (0:14:28) at 540 kg. 'Nitro-Chalk' (27.5% N) at 270 kg. (25:0:16) at 300 kg. Weedkillers: Glyphosate at 1.4 kg in 250 l. 2, 4-DB, MCPA and benazolin (as 'Legumex Extra' at 7.0 l) in 500 l.
Clover-grass ley: Manures: (0:14:28) at 540 kg. Weedkillers: Glyphosate at 1.4 kg in 250 l. 2, 4-DB, MCPA and benazolin (as 'Legumex Extra' at 7.0 l) in 500 l.
1st Test crop wheat in museum blocks and 4th test crop wheat in new sequence blocks:
W. wheat: Manures: (0:24:24) at 210 kg. Weedkillers: Glyphosate at 1.4 kg in 500 l (after leys in museum blocks only). Isoproturon at 1.5 kg with mecoprop at 1.6 kg, bromoxynil at 0.20 kg and ioxynil at 0.20 kg in 500 l.
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: Lucerne: Vertus, sown at 31 kg.
All-grass ley: Meadow Fescue S.215 (17 kg), and Timothy Climax (17 kg), mixture sown at 34 kg.
Clover-grass ley: Meadow Fescue S.215 (15 kg), Timothy Climax (18 kg) and white clover Huia (4 kg), mixture sown at 37 kg.
1-year hay: RVP Italian Ryegrass, sown at 25 kg.
W. wheat: Flanders, sown at 190 kg.

Cultivations, etc.:-
1st Treatment crops in museum blocks:
Lucerne, all-grass ley, clover-grass ley and 1-year hay: Glyphosate applied: 11 Oct, 1984. Ploughed: 21 Nov. Spring-tine cultivated: 4 Apr, 1985.
Lucerne: PK applied: 29 Apr, 1985. Rotary harrowed, rolled: 30 Apr. Seed sown: 7 May. Dinoseb applied: 20 June. Cut: 5 Sept, 4 Nov.
All-grass ley, 1-year hay and clover-grass ley: PK applied: 29 Apr, 1985. N applied (except to clover-grass ley): 29 Apr. Rotary harrowed, seed broadcast and harrowed in: 30 Apr. 'Legumex Extra' applied: 17 June. Cut: 25 July. NK applied (except to clover-grass ley): 29 July. Cut: 4 Nov.
1st Test crop wheat in museum blocks and 4th test crop wheat in new sequence blocks: Glyphosate applied (to 1st Test crop only): 13 Aug, 1984. Ploughed: 25 Sept (4th Test crop on Fosters only), 2 Oct (1st Test crop on Highfield and Fosters), 3 Oct (4th Test crop on Highfield only). Spring-tine cultivated: 5 Oct, (Fosters), 17 Oct (Highfield). PK applied: 1 Nov (Fosters), 2 Nov (Highfield). Rotary harrowed, seed sown: 2 Nov. Isoproturon, mecoprop, bromoxynil and ioxynil applied: 17 Apr, 1985. N treatments applied: 18 Apr. Combine harvested: 28 Aug.
Reseeded grass and old grass: PK applied: 11 Dec, 1984. NK applied to all-grass half plots: 29 Mar, 1985, 31 May, 29 July. Cut: 29 May (Fosters), 30 May (Highfield), 25 July, 4 Nov (Highfield), 5 Nov (Fosters).

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85/R/RN/1 AND 85/R/RN/2 MUSEUM BLOCKS

DRY MATTER: TONNES/HECTARE

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

	HIGHFIELD	FOSTERS
CLOVER-GRASS LEY		
TOTAL OF 2 CUTS	5.61	4.50
MEAN DM%	27.0	29.1
ALL-GRASS LEY		
TOTAL OF 2 CUTS	8.60	6.29
MEAN DM%	29.2	32.2
HAY		
TOTAL OF 2 CUTS	7.60	7.25
MEAN DM%	28.1	32.0
LUCERNE		
TOTAL OF 2 CUTS	4.31	4.62
MEAN DM%	22.0	22.8

OLD GRASS

	HIGHFIELD	
TOTAL OF 3 CUTS	C	N
37TH EXPTL YEAR		
BLOCKS 1 & 4	7.59	11.53
BLOCK 2	6.81	10.30
MEAN DM%	25.2	26.7

RESEEDED GRASS

TOTAL OF 3 CUTS

	HIGHFIELD			FOSTERS		
	BLOCKS	C	N	BLOCKS	C	N
37TH EXPTL YEAR	1 & 4	7.20	11.65	1 & 3	7.30	11.29
37TH EXPTL YEAR (SEEDED 1949 RESEEDED 1973)	2 & 3	6.52	13.79	2 & 4	7.58	10.40
MEAN DM%		24.4	27.0		21.5	25.1

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85/R/RN/1 HIGHFIELD

W.WHEAT 1ST TEST CROP

GRAIN TONNES/HECTARE

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

FYMRES68 SEQUENCE	NONE	FYM	MEAN
LUCERNE	6.27	6.49	6.38
CLOGRA	6.19	5.96	6.08
GRASS	5.16	5.49	5.33
ARABLE	5.45	5.69	5.57
MEAN	5.77	5.91	5.84

N SEQUENCE	0	50	100	150	MEAN
LUCERNE	6.29	6.76	6.43	6.04	6.38
CLOGRA	5.92	6.38	6.23	5.78	6.08
GRASS	4.17	5.82	5.44	5.89	5.33
ARABLE	3.81	5.68	6.67	6.11	5.57
MEAN	5.05	6.16	6.19	5.95	5.84

N FYMRES68	0	50	100	150	MEAN
NONE	4.89	6.02	6.09	6.08	5.77
FYM	5.21	6.30	6.29	5.83	5.91
MEAN	5.05	6.16	6.19	5.95	5.84

N	0	50	100	150
SEQUENCE FYMRES68				
LUCERNE NONE	5.78	6.62	6.29	6.40
FYM	6.81	6.90	6.56	5.69
CLOGRA NONE	6.04	6.31	6.34	6.08
FYM	5.79	6.46	6.11	5.47
GRASS NONE	4.03	5.42	5.21	6.00
FYM	4.31	6.22	5.67	5.77
ARABLE NONE	3.69	5.74	6.53	5.84
FYM	3.93	5.62	6.82	6.39

GRAIN MEAN DM% 82.9

PLOT AREA HARVESTED 0.00663

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85/R/RN/2 FOSTERS

W.WHEAT 1ST TEST CROP

GRAIN TONNES/HECTARE

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

FYMRES68	NONE	FYM	MEAN
SEQUENCE			
LUCERNE	6.78	7.07	6.93
CLOGRA	6.60	6.62	6.61
GRASS	5.76	5.89	5.83
ARABLE	5.72	6.03	5.88
MEAN	6.21	6.40	6.31

N	0	50	100	150	MEAN
SEQUENCE					
LUCERNE	6.60	7.21	6.94	6.96	6.93
CLOGRA	6.08	6.81	6.98	6.56	6.61
GRASS	4.58	5.80	6.56	6.37	5.83
ARABLE	4.01	5.94	6.61	6.95	5.88
MEAN	5.32	6.44	6.77	6.71	6.31

N	0	50	100	150	MEAN
FYMRES68					
NONE	4.98	6.66	6.57	6.64	6.21
FYM	5.65	6.22	6.97	6.78	6.40
MEAN	5.32	6.44	6.77	6.71	6.31

N		0	50	100	150
SEQUENCE	FYMRES68				
LUCERNE	NONE	6.13	7.28	7.08	6.63
	FYM	7.07	7.14	6.80	7.28
CLOGRA	NONE	5.93	7.16	6.38	6.92
	FYM	6.23	6.47	7.58	6.20
GRASS	NONE	4.10	6.29	6.61	6.04
	FYM	5.05	5.30	6.51	6.70
ARABLE	NONE	3.77	5.91	6.23	6.97
	FYM	4.24	5.97	6.99	6.93

GRAIN MEAN DM% 81.9

PLOT AREA HARVESTED 0.00663

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85/R/RN/1 HIGHFIELD

W.WHEAT 4TH TEST CROP

GRAIN TONNES/HECTARE

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

N	0	50	100	150	MEAN
SEQUENCE					
LUCERNE	3.72	5.92	6.72	6.59	5.74
CLOGRA	3.75	6.34	7.21	6.90	6.05
GRASS/G	3.86	5.82	7.05	6.53	5.82
ARABLE/A	2.99	5.29	6.09	6.33	5.18
ARABLE/R	4.33	5.88	6.99	6.92	6.03
GRASS/OG	4.44	5.93	6.55	6.93	5.96
MEAN	3.85	5.86	6.77	6.70	5.80

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

TABLE	SEQUENCE	N	SEQUENCE N
SED	0.231	0.110	0.327
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
SEQUENCE			0.268

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

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.231	4.0
BLOCK.WP.SP	18	0.268	4.6

GRAIN MEAN DM% 83.4

SUB PLOT AREA HARVESTED 0.00325

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85/R/RN/2 FOSTERS

W.WHEAT 4TH TEST CROP

GRAIN TONNES/HECTARE

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

N	0	50	100	150	MEAN
SEQUENCE					
LUCERNE	3.55	5.24	6.13	6.66	5.39
CLOGRA	3.01	5.40	6.58	6.45	5.36
GRASS/G	3.56	5.10	6.52	6.60	5.44
ARABLE/A	2.78	4.63	5.70	6.04	4.79
ARABLE/R	3.77	5.61	6.25	6.16	5.45
MEAN	3.33	5.19	6.23	6.38	5.29

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

TABLE	SEQUENCE	N	SEQUENCE N
SED	0.117	0.128	0.274
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
SEQUENCE			0.287

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	15	0.287	5.4

GRAIN MEAN DM% 82.2

SUB PLOT AREA HARVESTED 0.00325

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85/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 48th year, leys, s. barley, s. beans, w. wheat.

For previous years see 'Details' 1967 & 1973 and 74-84/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

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85/W/RN/3

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

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. FYMRES64 — Farmyard manure residues, last applied 1964:

NONE	None
FYM	38 tonnes on each occasion

1/8 plots

3. N — Nitrogen fertilizer (kg N) as 'Nitro-Chalk' (27.5% N):

   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

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85/W/RN/3

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' (27.5% N):

0
60
120
180

Treatments to leys:

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

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

Continuous rotations	No FYM half plots	FYM half plots
LN	326	364
LC	151	176
AF	653	628
AB	678	740
Ex-alternating rotations		
LN 8 ploughed for w. wheat	188	213
LN 8 not ploughed	301	289
LC 8 ploughed for w. wheat	264	0
LC 8 not ploughed	176	138

Standard applications:-

Grass ley and clover/grass ley, 1st year: Manures: (0:18:36) at 410 kg. N at 50 kg as 'Nitro-Chalk' (27.5% N) to grass ley only.

Grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Manures: Magnesian limestone at 7.5 t to 5th year only. (0:18:36) at 410 kg. (25:0:16) at 300 kg in spring and after the first cut.

Clover/grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Manures: Magnesian limestone at 7.5 t to 5th year only. (0:18:36) at 410 kg. K20 at 48 kg as muriate of potash in spring and after the first cut.

S. barley, 1st and 2nd treatment crops: Manures: (20:10:10) at 400 kg. Weedkillers: Mecoprop at 1.2 kg with bromoxynil at 0.3 kg and ioxynil at 0.3 kg in 250 l.

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Standard applications:

S. beans: 3rd treatment crop: Manures: (0:24:24) at 170 kg.
W. wheat: 1st test crop: Manures: (0:20:20) at 310 kg. Weedkillers: Glyphosate at 1.5 kg in 280 l. Mecoprop at 1.2 kg with bromoxynil at 0.3 kg and ioxynil at 0.3 kg in 250 l. Nematicide: Aldicarb at 10 kg. Fungicides: Propiconazole on two occasions, at 0.25 kg in 250 l on the first occasion, at 0.12 kg on the second with 'Septal'. Carbendazim with maneb (as 'Septal' at 2.5 kg) in 250 l with propiconazole.
S. barley, 2nd test crop: Manures: Magnesian limestone at 7.5 t. (0:24:24) at 260 kg. Weedkillers: Mecoprop at 1.2 kg with bromoxynil at 0.3 kg and ioxynil at 0.3 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 17 kg, Huia white clover at 4 kg, mixture sown at 39 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 190 kg.

NOTE: S. beans failed and were resown at the same rate but again failed because of bird damage.

Cultivations, etc.:- Treatment crops:
Grass ley and clover/grass ley, 1st year: Ploughed: 13 Dec, 1984. Spring-tine cultivated with crumbler attached: 18 Mar, 1985. PK applied, N applied to grass ley only: 24 Apr. Spring-tine cultivated, seeds sown: 1 May. Hand hoed: 17 June. Cut: 12 Nov.
Grass ley and clover/grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Corrective K applied to 4th year only: 19 Oct, 1984. Magnesian limestone applied to 5th year only: 23 Oct. PK applied: 6 Feb, 1985. NK applied to grass ley: 12 Mar, 22 July. K applied to clover/grass ley: 12 Mar, 24 July. Chain harrowed: 12 Apr. 1st cut, all plots: 8 July. 2nd cut (3rd and 8th years): 26 Sept. 2nd cut (2nd, 4th, 5th, 6th and 7th years): 11 Nov.
S. barley, 1st and 2nd treatment crops: Ploughed: 13 Dec, 1984. Spring-tine cultivated with crumbler attached, NPK applied, rotary harrowed, seed sown: 18 Mar, 1985. Mecoprop with bromoxynil and ioxynil applied: 16 May. Combine harvested: 27 Aug.
Fallow, 1st and 2nd treatment years: Ploughed: 13 Dec, 1984. Spring-tine cultivated with crumbler attached: 18 Mar, 1985. Spring-tine cultivated: 1 May. Cultivated with thistlebar: 1 May, 26 July. Deep-tine cultivated: 17 June. Rotary cultivated: 30 Sept.
S. beans, 3rd treatment crop: Ploughed: 13 Dec, 1984. PK applied: 12 Mar, 1985. Spring-tine cultivated with crumbler attached: 18 Mar. Seed sown with rotary cultivator and drill combination: 3 Apr. Seed resown with rotary cultivator and drill combination: 29 Apr. Rotary cultivated: 17 June.

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Test crops:

W. wheat, 1st test crop: Glyphosate applied to leys: 1 Oct, 1984. Ploughed: 18 Oct. Corrective K applied: 19 Oct. PK applied: 22 Oct. Power harrowed: 24 Oct. Aldicarb applied, power harrowed, seed sown: 30 Oct. N applied: 19 Apr, 1985. Mecoprop with bromoxynil and ioxynil applied: 16 May. Propiconazole applied: 17 June. Propiconazole with 'Septal' applied: 2 July. Combine harvested: 2 Sept.

S. barley, 2nd test crop: Magnesian limestone applied: 23 Oct, 1984. Ploughed: 13 Dec. PK applied: 12 Mar, 1985. Spring-tine cultivated with crumbler attached, aldicarb applied, rotary harrowed, seed sown: 18 Mar. N applied: 28 Mar. Mecoprop with bromoxynil and ioxynil applied: 16 May. Combine harvested: 27 Aug.

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85/W/RN/3

LEYS

1ST CUTTING OCCASION DRY MATTER TONNES/HECTARE

FYM RES / LEY	NONE	FYM	MEAN
LC1	0.00	0.00	0.00
LC2	6.20	5.94	6.07
LC3	6.60	6.43	6.52
LN1	0.00	0.00	0.00
LN2	7.92	6.81	7.36
LN3	7.61	7.09	7.35
LLC1	0.00	0.00	0.00
LLC2	6.55	5.82	6.19
LLC3	5.55	5.46	5.50
LLC4	5.78	6.14	5.96
LLC5	7.21	6.79	7.00
LLC6	6.76	8.37	7.57
LLC7	6.74	7.47	7.11
LLC8	6.40	7.30	6.85
LLN1	0.00	0.00	0.00
LLN2	7.17	7.84	7.51
LLN3	6.64	7.74	7.19
LLN4	6.05	6.57	6.31
LLN5	7.43	7.62	7.53
LLN6	7.72	8.16	7.94
LLN7	7.53	8.82	8.17
LLN8	6.73	6.61	6.67
MEAN	6.81	7.06	6.93

1ST CUT MEAN DM% 30.6

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2ND CUTTING OCCASION DRY MATTER TONNES/HECTARE

FYM RES LEY	NONE	FYM	MEAN
LC1	4.63	4.08	4.36
LC2	3.16	2.91	3.04
LC3	2.82	3.02	2.92
LN1	4.05	3.43	3.74
LN2	3.80	5.01	4.40
LN3	2.69	3.35	3.02
LLC1	4.00	5.13	4.56
LLC2	3.83	3.77	3.80
LLC3	2.70	3.40	3.05
LLC4	5.53	4.28	4.91
LLC5	4.74	3.13	3.93
LLC6	4.32	3.24	3.78
LLC7	2.81	2.34	2.57
LLC8	2.79	3.27	3.03
LLN1	3.90	4.09	3.99
LLN2	4.83	5.18	5.00
LLN3	2.81	3.16	2.98
LLN4	3.12	3.95	3.53
LLN5	5.30	4.72	5.01
LLN6	4.70	4.72	4.71
LLN7	3.02	3.32	3.17
LLN8	2.48	2.71	2.60
MEAN	3.73	3.74	3.73

2ND CUT MEAN DM% 30.1

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TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

FYM RES LEY	NONE	FYM	MEAN
LC1	4.63	4.08	4.36
LC2	9.36	8.85	9.11
LC3	9.42	9.45	9.44
LN1	4.05	3.43	3.74
LN2	11.72	11.82	11.77
LN3	10.30	10.45	10.38
LLC1	4.00	5.13	4.56
LLC2	10.38	9.59	9.98
LLC3	8.25	8.86	8.56
LLC4	11.31	10.42	10.87
LLC5	11.95	9.91	10.93
LLC6	11.08	11.61	11.35
LLC7	9.55	9.81	9.68
LLC8	9.19	10.57	9.88
LLN1	3.90	4.09	3.99
LLN2	12.01	13.02	12.51
LLN3	9.45	10.90	10.18
LLN4	9.17	10.52	9.84
LLN5	12.74	12.33	12.53
LLN6	12.42	12.89	12.65
LLN7	10.55	12.14	11.34
LLN8	9.21	9.32	9.27
MEAN	9.30	9.51	9.41

TOTAL OF 2 CUTS MEAN DM% 30.4

PLOT AREA HARVESTED 0.00204

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85/W/RN/3

S.BARLEY 2ND TEST CROP

GRAIN TONNES/HECTARE

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

FYMRES63	NONE	FYM	MEAN
ROTATION			
LN 8	5.73	5.56	5.64
LN 3	4.82	5.60	5.21
LC 8	5.54	5.60	5.57
LC 3	5.08	5.07	5.07
AF	4.81	4.91	4.86
AB	4.00	3.83	3.91
MEAN	4.99	5.10	5.04

N	0	60	120	180	MEAN
ROTATION					
LN 8	5.26	6.47	5.79	5.07	5.64
LN 3	4.88	5.60	6.22	4.15	5.21
LC 8	4.78	6.26	5.84	5.40	5.57
LC 3	4.56	5.75	4.96	5.02	5.07
AF	2.11	5.53	6.25	5.55	4.86
AB	1.21	4.23	4.94	5.27	3.91
MEAN	3.80	5.64	5.67	5.08	5.04

N	0	60	120	180	MEAN
FYMRES63					
NONE	3.68	5.79	5.53	4.98	4.99
FYM	3.91	5.49	5.80	5.18	5.10
MEAN	3.80	5.64	5.67	5.08	5.04

N		0	60	120	180
ROTATION	FYMRES63				
LN 8	NONE	5.65	6.38	5.98	4.90
	FYM	4.86	6.55	5.59	5.24
LN 3	NONE	4.52	5.82	4.92	4.00
	FYM	5.23	5.37	7.52	4.29
LC 8	NONE	4.62	6.26	6.02	5.27
	FYM	4.93	6.26	5.66	5.53
LC 3	NONE	4.35	6.03	5.16	4.76
	FYM	4.77	5.48	4.76	5.28
AF	NONE	2.01	5.71	6.16	5.36
	FYM	2.21	5.34	6.33	5.75
AB	NONE	0.93	4.53	4.95	5.58
	FYM	1.49	3.93	4.94	4.96

GRAIN MEAN DM% 83.4

PLOT AREA HARVESTED 0.00251

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85/W/RN/3

WINTER WHEAT

GRAIN TONNES/HECTARE

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

FYMRES64	NONE	FYM	MEAN
ROTATION			
LN 8	7.14	6.85	7.00
LN 3	7.67	7.06	7.36
LC 8	8.11	7.63	7.87
LC 3	7.65	7.86	7.75
AF	6.17	6.03	6.10
AB	6.39	5.94	6.17
MEAN	7.19	6.89	7.04

N	0	70	140	210	MEAN
ROTATION					
LN 8	4.07	6.98	8.39	8.55	7.00
LN 3	4.24	7.26	8.26	9.69	7.36
LC 8	4.44	8.08	8.76	10.19	7.87
LC 3	4.97	7.64	9.57	8.84	7.75
AF	2.03	5.46	7.72	9.20	6.10
AB	2.39	5.90	7.76	8.62	6.17
MEAN	3.69	6.89	8.41	9.18	7.04

N	0	70	140	210	MEAN
FYMRES64					
NONE	3.78	7.03	8.52	9.43	7.19
FYM	3.60	6.75	8.30	8.93	6.89
MEAN	3.69	6.89	8.41	9.18	7.04

N	FYMRES64	0	70	140	210
ROTATION					
LN 8	NONE	4.10	7.14	8.56	8.76
	FYM	4.05	6.81	8.21	8.33
LN 3	NONE	4.33	7.02	8.33	10.99
	FYM	4.15	7.50	8.19	8.38
LC 8	NONE	4.48	8.56	8.68	10.70
	FYM	4.39	7.61	8.83	9.67
LC 3	NONE	5.25	7.37	9.39	8.58
	FYM	4.68	7.92	9.74	9.09
AF	NONE	1.89	5.68	7.80	9.30
	FYM	2.16	5.24	7.63	9.09
AB	NONE	2.60	6.39	8.35	8.23
	FYM	2.17	5.41	7.17	9.00

GRAIN MEAN DM% 83.2

PLOT AREA HARVESTED 0.00251

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85/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 44th year, red beet, carrots, clover.

For previous years see 'Details' 1967 & 1973, 74-80/W/RN/4 and 83-84/W/RN/4.

Design: 2 series each of 4 blocks of 10 plots split, systematically, into 2.

Whole plot dimensions: 8.15 x 5.18.

Treatments:

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

1. OM RESID		Residues of organic manures:
	FYM	Farmyard manure until 1967
	SEWAGE	Sewage sludge until 1961
	SEW COM	Sewage sludge, composted with straw, until 1961
	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:-

Whole plots

1. OM RESID		Residues of organic manures:
	FYM	Farmyard manure to whole plots until 1964, to half plots until 1967. Untreated half plots received a balancing dressing in 1974
	SEWAGE	Sewage sludge until 1961
	SEW COM	Sewage sludge, composted with straw, until 1961
	VEG COM	Vegetable compost until 1962, then farmyard manure until 1965

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85/W/RN/4

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.

Sub plots

3. NPERCUT — Nitrogen (kg N) per cut, as 'Nitro-Chalk' (27.5% N):

0
100

NOTE: On series A red beet in 1985 followed carrots in 1984 and vice versa.

Basal applications:
Series A:
Red Beet: Manures: (0:24:24) at 620 kg. N at 210 kg as 'Nitro-Chalk' (27.5% N). Weedkiller: Phenmedipham (as 'Betanal E' at 8.4 l) in 220 l.
Carrots: Manures: (0:24:24) at 620 kg. N at 70 kg as 'Nitro-Chalk' (27.5% N). Insecticide: Carbofuran (as 'Yaltox' granules at 94 kg). Weedkiller: Linuron at 0.52 kg in 280 l.
Series B:
Clover: Manures: (0:18:36) at 380 kg.

Seed: Red beet: Asmer Detroit, sown by precision drill.
Carrots: Chantenay Red-cored Supreme, sown by precision drill.

Cultivations, etc.:-
Series A:
Red beet: Ploughed: 4 Feb, 1985. PK and N applied, power harrowed: 19 Apr. Spike rotary cultivated with crumbler attached, seed sown: 22 Apr. Weedkiller applied: 14 June. Singled, hand hoed: 24-28 June. Hand harvested: 12 Aug.
Carrots: Ploughed: 4 Feb, 1985. PK and N applied, power harrowed: 19 Apr. Insecticide applied, spike rotary cultivated, seed sown: 22 Apr. Weedkiller applied: 5 June. Hand harvested: 14 Aug.
Series B:
Clover: PK applied: 13 Mar, 1985. N applied: 13 Mar, 22 July. Cut: 3 July, 13 Nov.

NOTE: Crop samples were taken at maturity and soil samples after harvest for chemical analyses.

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85/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	21.0	24.8	23.2	22.6	22.9
50	24.6	24.1	22.3	24.8	23.9
MEAN	22.8	24.5	22.7	23.7	23.4

NONE 20.7

GRAND MEAN 22.9

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

TABLE	OM RESID	OM RATE	OM RESID OM RATE
SED	1.85	1.31	2.62

SED FOR COMPARING EXTRA NONE WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 2.27

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

STRATUM	DF	SE	CV%
BLOCK.WP	28	3.70	16.2

TOPS FRESH WEIGHT TONNES/HECTARE

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

OM RESID OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25	15.8	19.1	16.9	15.6	16.9
50	18.3	18.5	18.7	18.7	18.6
MEAN	17.1	18.8	17.8	17.2	17.7

NONE 14.4

GRAND MEAN 17.0

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

TABLE	OM RESID	OM RATE	OM RESID OM RATE
SED	1.59	1.12	2.24

SED FOR COMPARING EXTRA NONE WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 1.94

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

STRATUM	DF	SE	CV%
BLOCK.WP	28	3.17	18.6

PLOT AREA HARVESTED 0.00022

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85/W/RN/4 CARROTS

ROOTS FRESH WEIGHT TONNES/HECTARE

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

OM RESID / OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25	9.3	8.0	6.2	9.7	8.3
50	7.7	8.7	7.9	7.3	7.9
MEAN	8.5	8.3	7.1	8.5	8.1

NONE 8.0

GRAND MEAN 8.1

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

TABLE	OM RESID	OM RATE	OM RESID OM RATE
SED	1.09	0.77	1.54

SED FOR COMPARING EXTRA NONE WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 1.34

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

STRATUM	DF	SE	CV%
BLOCK.WP	28	2.18	27.0

TOPS FRESH WEIGHT TONNES/HECTARE

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

OM RESID / OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25	4.7	4.1	3.0	4.8	4.2
50	3.8	4.7	3.8	3.7	4.0
MEAN	4.3	4.4	3.4	4.2	4.1

NONE 3.9

GRAND MEAN 4.0

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

TABLE	OM RESID	OM RATE	OM RESID OM RATE
SED	0.54	0.38	0.76

SED FOR COMPARING EXTRA NONE WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 0.66

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

STRATUM	DF	SE	CV%
BLOCK.WP	28	1.08	26.7

PLOT AREA HARVESTED 0.00022

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85/W/RN/4 WHITE CLOVER

1ST CUT (3/7/85) DRY MATTER TONNES/HECTARE

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

OM RESID / OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25	4.94	4.89	4.76	5.34	4.98
50	4.76	4.78	4.98	5.24	4.94
MEAN	4.85	4.83	4.87	5.29	4.96

NPERCUT / OM RATE	0	100	MEAN
25	4.79	5.18	4.98
50	4.78	5.09	4.94
MEAN	4.79	5.13	4.96

NPERCUT / OM RESID	0	100	MEAN
FYM	4.57	5.13	4.85
SEWAGE	4.78	4.88	4.83
SEW COM	4.71	5.03	4.87
VEG COM	5.08	5.50	5.29
MEAN	4.79	5.13	4.96

NPERCUT		0	100
OM RATE	OM RESID		
25	FYM	4.60	5.29
	SEWAGE	4.96	4.82
	SEW COM	4.53	4.99
	VEG COM	5.07	5.62
50	FYM	4.54	4.97
	SEWAGE	4.61	4.95
	SEW COM	4.88	5.07
	VEG COM	5.10	5.37

PEAT	NPERCUT	0	100	MEAN
		4.87	5.03	4.95

GRAND MEAN 4.96

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

TABLE	OM RESID	OM RATE	NPERCUT	OM RESID OM RATE
SED	0.180	0.127	0.147	0.255

TABLE	OM RESID NPERCUT	OM RATE NPERCUT	OM RESID OM RATE NPERCUT	PEATNPER
SED	0.276	0.195	0.390	0.295

EXCEPT WHEN COMPARING MEANS WITH THE SAME LEVEL(S) OF:

OM RESID	0.295		
OM RATE		0.209	
OM RESID.OM RATE			0.417

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85/W/RN/4 WHITE CLOVER

1ST CUT (3/7/85) DRY MATTER TONNES/HECTARE

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

STRATUM	DF	SE	CV%
BLOCK.WP	28	0.360	7.3
BLOCK.WP.SP	31	0.590	11.9

1ST CUT MEAN DM% 14.3

1ST CUT PLOT AREA HARVESTED 0.00047

2ND CUT (13/11/85) DRY MATTER TONNES/HECTARE

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

OM RESID	FYM	SEWAGE	SEW COM	VEG COM	MEAN
OM RATE					
25	2.97	3.07	3.24	3.36	3.16
50	3.31	3.07	2.96	3.05	3.10
MEAN	3.14	3.07	3.10	3.20	3.13

NPERCUT	0	100	MEAN
OM RATE			
25	3.07	3.25	3.16
50	3.07	3.13	3.10
MEAN	3.07	3.19	3.13

NPERCUT	0	100	MEAN
OM RESID			
FYM	3.06	3.22	3.14
SEWAGE	3.00	3.14	3.07
SEW COM	2.96	3.24	3.10
VEG COM	3.26	3.15	3.20
MEAN	3.07	3.19	3.13

	NPERCUT	0	100
OM RATE	OM RESID		
25	FYM	3.13	2.82
	SEWAGE	2.85	3.29
	SEW COM	2.94	3.54
	VEG COM	3.36	3.35
50	FYM	3.00	3.63
	SEWAGE	3.14	3.00
	SEW COM	2.98	2.94
	VEG COM	3.15	2.95

PEAT	NPERCUT	0	100	MEAN
		2.90	3.36	3.13

GRAND MEAN 3.13

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85/W/RN/4 WHITE CLOVER

2ND CUT (13/11/85) DRY MATTER TONNES/HECTARE

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

TABLE	OM RESID	OM RATE	NPERCUT	OM RESID OM RATE
SED	0.139	0.098	0.105	0.197

TABLE	OM RESID NPERCUT	OM RATE NPERCUT	OM RESID OM RATE NPERCUT	PEATNPER
SED	0.204	0.144	0.288	0.211

EXCEPT WHEN COMPARING MEANS WITH THE SAME LEVEL(S) OF:

OM RESID	0.211		
OM RATE		0.149	
OM RESID.OM RATE			0.298

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

STRATUM	DF	SE	CV%
BLOCK.WP	28	0.278	8.9
BLOCK.WP.SP	31	0.422	13.5

2ND CUT MEAN DM% 14.3

2ND CUT PLOT AREA HARVESTED 0.00053

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

OM RESID / OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25	7.91	7.95	8.00	8.70	8.14
50	8.07	7.85	7.94	8.28	8.04
MEAN	7.99	7.90	7.97	8.49	8.09

NPERCUT / OM RATE	0	100	MEAN
25	7.86	8.43	8.14
50	7.85	8.22	8.04
MEAN	7.86	8.32	8.09

NPERCUT / OM RESID	0	100	MEAN
FYM	7.63	8.35	7.99
SEWAGE	7.78	8.03	7.90
SEW COM	7.67	8.27	7.97
VEG COM	8.34	8.64	8.49
MEAN	7.86	8.32	8.09

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85/W/RN/4 WHITE CLOVER

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

	NPERCUT	0	100
OM RATE	OM RESID		
25	FYM	7.73	8.10
	SEWAGE	7.81	8.10
	SEW COM	7.47	8.54
	VEG COM	8.43	8.97
50	FYM	7.54	8.59
	SEWAGE	7.75	7.95
	SEW COM	7.86	8.01
	VEG COM	8.25	8.32

PEAT	NPERCUT	0	100	MEAN
		7.78	8.40	8.09

GRAND MEAN 8.09

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

TABLE	OM RESID	OM RATE	NPERCUT	OM RESID OM RATE
SED	0.250	0.177	0.214	0.354

TABLE	OM RESID NPERCUT	OM RATE NPERCUT	OM RESID OM RATE NPERCUT	PEATNPER
SED	0.393	0.278	0.556	0.428

EXCEPT WHEN COMPARING MEANS WITH THE SAME LEVEL(S) OF:

OM RESID	0.428		
OM RATE		0.303	
OM RESID.OM RATE			0.605

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

STRATUM	DF	SE	CV%
BLOCK.WP	28	0.501	6.2
BLOCK.WP.SP	31	0.856	10.6

TOTAL OF 2 CUTS MEAN DM% 14.3

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85/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 30th year of a rotation, s. barley, ley, potatoes, w. wheat, kale until 1980, w. barley, ley, potatoes, w. wheat, w. oats since 1981. The 25th 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 29th 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 69-84/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' (26% N)
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 February or March, remainder in April.

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Additional plots

MANURE	Fertilizers from 1980 to 1985 and in previous years:
1980-85	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 1985: N1: 20 kg (ley), 120 kg (w. wheat, w. barley and w. oats), 160 kg (potatoes). N2: 30 kg (ley), 160 kg (w. wheat, w. barley and w. oats), 240 kg (potatoes). N3: 40 kg (ley), 200 kg (w. wheat, w. barley and w. oats), 320 kg (potatoes). Until 1979 N2 = larger rate on original plots in these years. As urea in all years. Cereals receive 40 kg N in March, remainder in April.
P: 126 kg P205 as potassium dihydrogen phosphate.
K: 251 kg K20 total. As potassium dihydrogen phosphate (83 kg K20) on all PK plots. In addition plots without S receive 168 kg K20 as potassium chloride, plots with S receive 92 kg K20 as potassium sulphate plus 76 kg K20 as potassium chloride. Since 1978 all PK plots receive, in addition to the standard total, 126 kg K20 for potatoes, applied in autumn as potassium chloride.
MG: 126 kg MgO as magnesium chloride.
CA: 126 kg CaO as calcium carbonate until 1979. In 1980 plots not previously given CA received calcium carbonate at 7.5 t, except 0 which was given 5 t.
S: 30 kg S supplied by the potassium sulphate.
TE: Trace element mixture which included Mn, Cu, Zn, B, Mo, Ca and Fe.

Standard applications:

Original and additional plots:

All cereals: Weedkillers: Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 2.8 l) with (except for oats) chlortoluron at 3.5 kg in 220 l. Fungicides: Tridemorph at 0.52 kg in 220 l applied with the dimethoate. Prochloraz at 0.42 kg with benomyl at 0.28 kg in 220 l. Captafol at 1.0 kg with propiconazole at 0.13 kg in 220 l. Insecticide: Dimethoate at 0.67 kg.

W. wheat: Fungicides: Maneb at 1.6 kg, carbendazim at 0.15 kg and tridemorph at 0.37 kg with captafol at 1.0 kg in 220 l applied with the pirimicarb. Insecticide: Pirimicarb at 0.14 kg. Growth regulator: Chlormequat at 1.9 kg in 220 l.

W. barley: Growth regulator: Mepiquat chloride and ethephon (as 'Terpal' at 2.8 l) in 220 l.

W. oats: Growth regulator: Chlormequat at 1.9 kg in 220 l.

Potatoes: Weedkillers: Linuron at 0.93 kg with paraquat at 0.28 kg ion in 220 l. Fungicides: Captafol at 1.0 kg in 220 l applied with the insecticide. Mancozeb at 1.3 kg in 220 l applied with the insecticide (except for plots given neither FYM nor K on the original plots, and the plot given no fertilizers on the additional plots). Insecticide: Pirimicarb at 0.14 kg.

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Seed: W. wheat: Norman, sown at 210 kg.
W. barley: Panda, sown at 200 kg.
W. oats: Peniarth, sown at 210 kg.
Potatoes: Desiree.
Grass-clover ley: RVP Italian ryegrass and Hungaropoly red clover.

Cultivations, etc.:-
W. wheat: Dug by hand: 12 Sept, 1984 (additional plots), 13 Sept (original plots). P, K, Mg and S applied (S to additional plots only): 13 Sept. Raked level, seed sown and raked in: 26 Sept. 'Brittox' and chlortoluron applied: 23 Oct. Tridemorph and dimethoate applied: 16 Nov. First N treatments applied: 26 Feb, 1985. Second N treatments applied: 15 Apr. Prochloraz and benomyl applied: 24 Apr. Growth regulator applied: 2 May. Captafol and propiconazole applied: 22 May. Maneb, carbendazim, tridemorph, captafol and pirimicarb applied: 27 June. Harvested by hand: 16 Aug.
W. barley: Rotary cultivated, P and K applied to original plots: 10 Sept, 1984. P, K, Mg and S applied to additional plots: 11 Sept. Raked level, seed sown and raked in: 18 Sept. 'Brittox' and chlortoluron applied: 23 Oct. Tridemorph and dimethoate applied: 16 Nov. First N treatments applied: 26 Feb, 1985. Second N treatments applied: 15 Apr. Prochloraz and benomyl applied: 24 Apr. Growth regulator applied: 2 May. Captafol and propiconazole applied: 22 May. Harvested by hand: 1 Aug.
W. oats: Rotary cultivated, P and K applied to original plots: 10 Sept, 1984. P, K, Mg and S applied to additional plots: 11 Sept. Raked level, seed sown, raked in: 26 Sept. 'Brittox' applied: 23 Oct. Tridemorph and dimethoate applied: 16 Nov. First N treatments applied: 26 Feb, 1985. Second N treatments applied: 15 Apr. Prochloraz and benomyl applied: 24 Apr. Growth regulator applied: 2 May. Captafol and propiconazole applied: 22 May. Harvested by hand: 8 Aug.
Potatoes: FYM applied, dug by hand (original plots): 10 Dec, 1984. Dug by hand, P, K, Mg and S applied (additional plots), P and K applied (original plots): 11 Dec. N applied, deep rotary cultivated twice: 18 Apr, 1985. Raked level, potatoes planted and ridged by hand: 18 Apr (original plots), 19 Apr (additional plots). Weedkillers applied: 20 May. Captafol with pirimicarb applied: 27 June. Plots given neither FYM nor K on original plots, and plots given no fertilizer on additional plots harvested by hand, remaining plots mancozeb and pirimicarb applied: 24 July. These remaining plots harvested by hand: 11 Sept.
Grass-clover ley: Lightly rotary cultivated, raked level, seed sown and raked in: 6 Aug, 1984. P and K applied (original plots): 6 Dec. P, K, Mg and S applied (additional plots): 7 Dec. N applied: 4 Mar, 1985. Cut: 21 May, 18 July, 24 Sept.
Permanent grass: P and K applied: 6 Dec, 1984. First N applied: 4 Mar, 1985. FYM applied: 11 Mar. Second N applied: 21 May. Final N applied: 18 July. Cut: 20 May, 18 July, 24 Sept.

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85/R/RN/5

ORIGINAL PLOTS

TONNES/HECTARE

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

	W. WHEAT:		W. BARLEY:		LEY : DRY MATTER			
	GRAIN	STRAW	GRAIN	STRAW	1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE								
0	4.49	4.35	3.09	2.22	1.34	1.44	0.95	3.73
N1	6.42	5.91	5.39	4.37	2.26	1.55	0.72	4.53
P	5.95	5.51	1.59	1.85	1.55	2.53	2.48	6.57
N1P	3.17	4.56	2.84	4.79	2.86	1.60	0.44	4.90
K	4.75	4.35	2.41	2.41	1.92	2.07	1.79	5.78
N1K	7.70	6.79	6.37	5.16	2.79	2.08	1.36	6.24
PK	5.65	5.39	3.48	2.41	2.41	4.81	4.14	11.36
N1PK	9.46	8.89	8.26	6.64	2.95	4.40	3.95	11.30
N2PK	10.82	10.85	10.06	9.04	4.24	2.94	3.45	10.63
D	7.63	7.34	5.34	3.92	2.50	3.22	3.30	9.02
N1PKD	11.12	12.34	8.97	7.22	3.94	4.12	4.80	12.85
N2PKD	11.93	12.92	10.01	9.24	4.91	3.44	3.65	12.00
MEAN DM%	77.1	54.4	80.0	56.6	22.4	24.8	22.1	23.1

	W. OATS:		POTATOES:	PERMANENT GRASS : DRY MATTER			
	GRAIN	STRAW	TOTAL TUBERS	1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE							
0	3.35	4.33	9.6	0.60	1.34	0.66	2.59
N1	5.92	8.92	9.6	0.83	2.35	1.62	4.80
P	3.59	4.39	11.1	0.47	1.69	0.70	2.85
N1P	5.92	7.17	9.6	1.53	2.59	2.01	6.13
K	2.88	5.15	17.3	0.66	1.76	0.78	3.20
N1K	5.54	8.85	31.1	1.72	3.14	1.67	6.53
PK	3.27	5.58	38.8	0.67	1.59	0.93	3.19
N1PK	7.27	12.00	56.9	3.09	3.16	2.17	8.42
N2PK	8.48	14.62	58.8	4.00	3.87	2.93	10.79
D	4.13	7.61	62.3	4.24	2.60	1.83	8.66
N1PKD	7.95	12.04	82.8	5.59	3.87	2.77	12.23
N2PKD	7.79	17.27	87.3	6.10	4.91	3.59	14.60
MEAN DM%	75.9	41.3	22.1	25.9	20.3	23.6	23.3

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ADDITIONAL PLOTS

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

	W. WHEAT: GRAIN	W. WHEAT: STRAW	W. BARLEY: GRAIN	W. BARLEY: STRAW	W. OATS: GRAIN	W. OATS: STRAW	POTATOES: TOTAL TUBERS
MANURES							
0	5.06	4.53	3.05	2.61	3.68	5.08	8.6
N2PK	10.67	11.10	10.04	8.19	7.17	12.93	61.3
N2PKMG	9.87	9.47	9.17	8.12	7.48	13.03	68.0
N2PKS	10.38	10.05	9.36	8.27	7.02	11.09	63.0
N2PKMGS	10.59	11.32	9.61	7.91	6.78	11.43	59.8
N1PKMGS	9.53	9.12	9.01	8.29	7.23	12.47	60.5
N3PKMGS	10.29	10.84	10.05	7.56	7.16	7.68	61.9
MEAN DM%	77.9	55.1	80.5	62.4	75.4	44.0	23.9

	LEY : DRY MATTER 1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURES				
0	1.92	1.55	0.94	4.41
N2PK	4.00	3.10	3.63	10.72
N2PKMG	3.75	3.63	3.72	11.10
N2PKS	3.00	3.37	3.72	10.10
N2PKMGS	3.72	3.48	3.70	10.90
N1PKMGS	2.81	4.07	3.65	10.54
N3PKMGS	4.07	3.36	3.57	10.99
MEAN DM%	22.2	22.6	23.0	22.6

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85/R/RN/8

CULTIVATION/WEEDKILLER

Object: To study the long-term effects of different methods of primary cultivation on a sequence of crops; weedkillers were also tested until 1981 - Great Harpenden I.

Sponsor: R. Moffitt.

The 25th year, w. barley.

For previous years see 'Details' 1967 and 1973 and 74-84/R/RN/8.

Design: 2 randomised blocks of 12 plots.

Whole plot dimensions: 12.8 x 12.2.

Treatments: All combinations of:-

Whole plots

1. CLT CHOP — Primary cultivations annually; straw chopped since 1985:

PLOUGH	Ploughed: 19 Sept, 1984
ROTA DIG	Cultivated by rotary digger: 19 Sept
DEEPTINE	Deep-tine cultivated: 17 Sept

2. SUBSOIL(82) — Subsoiling in September 1982:

NONE	None
CNVNTIAL	Conventional vertical tine
PARAPLOW	'Paraplow'

XTR BURN — plus three extra plots with straw burnt since 1985 direct drilled until 1984, spring-tine cultivated twice, on 19 September, 1984, in addition to basal cultivating, differing in subsoiling in September 1982:

NONE	None
CNVNTIAL	Conventional vertical tine
PARAPLOW	'Paraplow'

NOTES: (1) Straw was chopped on 27 July, 1984 and was burnt on XTR BURN on 14 August. All plots were disc cultivated on 15 August, sprayed paraquat at 0.60 kg ion in 250 l on 8 September, rotary harrowed and drilled on 28 September.
(2) The conventional vertical tine sub soiler had tines 76 cm apart and worked at a depth of about 50 cm.
(3) The 'Paraplow' had rigid tines set at a 45 degree 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.

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Basal applications: Manures: (5:14:30) at 340 kg, combine drilled. 'Nitro-Chalk' (26% N) at 620 kg. Weedkillers: Isoproturon at 2.4 kg with mecoprop (as 'CMPP' at 4.2 l) and the insecticide in 250 l. Cyanazine at 0.30 kg with mecoprop at 2.0 kg and the fungicides in 200 l. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg. Insecticide: Cypermethrin at 0.025 kg.

Seed: Panda, dressed triadimenol and fuberidazole sown at 140 kg.

Cultivations, etc.:- Isoproturon, mecoprop and the insecticide applied: 31 Oct, 1984. N applied: 9 Apr, 1985. Cyanazine, mecoprop and the fungicides applied: 10 Apr. Combine harvested: 8 Aug.

GRAIN TONNES/HECTARE

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

SUBSOIL(82) CLT CHOP	NONE	CNVNTIAL	PARAPLOW	MEAN
PLOUGH	8.13	7.67	7.97	7.92
ROTA DIG	7.88	7.63	7.97	7.83
DEEPTINE	7.79	7.72	8.00	7.83
MEAN	7.93	7.67	7.98	7.86

XTR BURN	NONE	CNVNTIAL	PARAPLOW	MEAN
	8.24	8.37	8.17	8.26

GRAND MEAN 7.96

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

TABLE	CLT CHOP	SUBSOIL(82)	XTRA BURN	CLT CHOP SUBSOIL(82)
SED	0.157	0.157	0.273	0.273

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.273	3.4

GRAIN MEAN DM% 76.0

PLOT AREA HARVESTED 0.00285

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85/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 21st year, s. oats, w. rye, ley.

For previous years see 'Details' 1973 and 74-84/W/RN/12.

Design for s. oats and w. rye: 2 blocks of 4 plots
4th, 5th, 6th and 7th 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. rye in 1985 and the second pair s. oats.

S. oats and w. rye tested:

MANURE	Organic manures and fertilizers in 1985, cumulative to 1984, 1983 and 1982 (both crops) and to 1981 (w. rye 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. 4th and 5th year leys tested:

PREV LEY	Previous ley:
LC(LC)	Clover/grass ley in preliminary period
LC(LN)	Grass ley with N in preliminary period

6th and 7th year leys tested:

PREV MAN	Previous manure:
LC(GM)	Green manures in preliminary period
LC(PT)	Peat in preliminary period

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85/W/RN/12

Standard applications:
W. oats/s. oats: Manures: N at 50 kg as 'Nitro-Chalk' (27.5% N). Weedkillers: Mecoprop at 1.2 kg with bromoxynil at 0.3 kg and ioxynil at 0.3 kg in 250 l.
W. rye: Manures: N at 30 kg as 'Nitro-Chalk' (27.5% N). Weedkillers: Mecoprop at 1.2 kg with bromoxynil at 0.3 kg and ioxynil at 0.3 kg in 250 l.
Leys, 4th, 5th, 6th and 7th years: Manures: P2O5 at 140 kg, K2O at 280 kg as (0:18:36). MgO at 50 kg as kieserite.

Seed: W. oats: Panema, sown at 180 kg.
S. oats: Trafalgar, sown at 200 kg.
W. rye: Animo, sown at 220 kg.

NOTE: S. oats were sown in place of the w. oats that failed because of bird damage.

Cultivations, etc.:-
W. oats/s. oats: Sugar beet tops spread over arable plots, PK and Mg applied to FERT-FYM, treatment FYM and STRAW applied, ploughed, PK and Mg applied to STRAW, Mg applied to FERT-FYM and FERT-STR: 5 Nov, 1984. Rotary harrowed, w. oats sown: 12 Nov. Spring-tine cultivated: 18 Mar, 1985. Power harrowed, s. oats sown: 20 Mar. N applied: 24 Apr. Weedkillers applied: 16 May. Combine harvested: 27 Aug.
W. rye: Half PK and Mg applied to FERT-FYM plots, treatment FYM applied: 20 Sept, 1984. Ploughed FYM plots only: 21 Sept. Treatment STRAW applied, FERT-FYM, FERT-STR and STRAW ploughed: 3 Oct. PK applied to STRAW plots: 15 Oct. PK and Mg applied. FERT-STR and half PK and Mg applied to FERT-FYM, Mg applied to STRAW: 16 Oct. Rotary harrowed, seed sown: 24 Oct. N applied: 24 Apr, 1985. Weedkillers applied: 16 May. Combine harvested: 2 Sept.
4th, 5th, 6th and 7th year leys: PK and Mg applied to 4th and 6th years: 5 Nov, 1984, 5th and 7th years: 9 Nov. Chain harrowed: 12 Apr, 1985. Cut: 2 July, 11 Nov.

SPRING OATS

GRAIN TONNES/HECTARE

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

MANURE	FYM	STRAW	FERT-FYM	FERT-STR	MEAN
	4.96	4.74	4.15	4.65	4.62

GRAIN MEAN DM% 81.7

STRAW TONNES/HECTARE

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

MANURE	FYM	STRAW	FERT-FYM	FERT-STR	MEAN
	4.05	3.80	3.55	3.89	3.82

STRAW MEAN DM% 86.3 PLOT AREA HARVESTED 0.00796

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85/W/RN/12

RYE

GRAIN TONNES/HECTARE

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

MANURE	FYM	STRAW	FERT-FYM	FERT-STR	MEAN
	5.80	4.70	4.64	4.25	4.85

GRAIN MEAN DM% 82.7

STRAW TONNES/HECTARE

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

MANURE	FYM	STRAW	FERT-FYM	FERT-STR	MEAN
	6.13	4.37	4.21	3.97	4.67

STRAW MEAN DM% 89.3

PLOT AREA HARVESTED 0.00796

4TH YEAR LEY

DRY MATTER TONNES/HECTARE

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

	1ST CUT (2/7/85)	2ND CUT (11/11/85)	TOTAL OF 2 CUTS
PREV LEY			
LC(LC)	5.44	2.00	7.44
LC(LN)	6.06	2.00	8.06
MEAN	5.75	2.00	7.75
MEAN DM%	27.6	19.9	23.7

5TH YEAR LEY

DRY MATTER TONNES/HECTARE

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

	1ST CUT (2/7/85)	2ND CUT (11/11/85)	TOTAL OF 2 CUTS
PREV LEY			
LC(LC)	6.33	3.08	9.41
LC(LN)	5.96	3.07	9.03
MEAN	6.14	3.08	9.22
MEAN DM%	24.1	22.6	23.4

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85/W/RN/12

6TH YEAR LEY

DRY MATTER TONNES/HECTARE

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

	1ST CUT (2/7/85)	2ND CUT (11/11/85)	TOTAL OF 2 CUTS
PREV MAN			
LC(GM)	4.30	2.10	6.40
LC(PT)	4.77	2.03	6.80
MEAN	4.54	2.06	6.60
MEAN DM%	26.8	20.7	23.7

7TH YEAR LEY

DRY MATTER TONNES/HECTARE

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

	1ST CUT (2/7/85)	2ND CUT (11/11/85)	TOTAL OF 2 CUTS
PREV MAN			
LC(GM)	6.91	2.34	9.25
LC(PT)	5.39	1.79	7.18
MEAN	6.15	2.07	8.21
MEAN DM%	29.5	25.6	27.6

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85/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 20th year, w. wheat, ley.

For previous years see 'Details' 1973 and 74-84/W/RN/13.

Treatments:-

Until 1977 the experiment tested all phases of the five-course rotation ley, potatoes, cereal, cereal, cereal and continous 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 tests 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 continous cereal

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

Standard applications:

W. wheat: Manures: (5:14:30) at 340 kg. N at 80 kg followed by N at 70 kg, as 'Nitro-Chalk' (27.5% N). Weedkillers: Mecoprop at 1.2 kg with bromoxynil at 0.3 kg and ioxynil at 0.3 kg in 250 l. Fungicides: Propiconazole on two occasions at 0.25 kg in 250 l on the first occasion and at 0.12 kg in 250 l on the second occasion with carbendazim and maneb (as 'Septal' at 2.5 kg).

Ley, 1st year: Manures: (5:14:30) at 340 kg. N at 50 kg as 'Nitro-Chalk' (27.5% N).

Ley, 2nd, 3rd, 4th and 5th years: Manures: (0:18:36) at 380 kg.

Seed: W. wheat: Avalon, sown at 160 kg.
Ley: S23 perennial ryegrass at 27 kg, Blanca white clover at 7 kg, mixture sown at 34 kg.

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85/W/RN/13

Cultivations, etc.:-

W. wheat: Ploughed: 3 Oct, 1984. NPK applied, spring-tine cultivated, seed sown: 9 Oct. N applied: 15 Apr, 1985, 24 Apr. Weedkillers applied: 16 May. Propiconazole applied: 17 June, 2 July. 'Septal' applied: 2 July. Combine harvested: 2 Sept.

Ley, 1st year: Ploughed: 3 Oct, 1984. Spring-tine cultivated: 22 Apr, 1985. N applied: 24 Apr. NPK applied: 25 Apr. Spring-tine cultivated with crumbler attached, seeds sown: 1 May. Cut: 20 Nov.

Ley, 2nd, 3rd, 4th and 5th years: PK applied: 25 Jan, 1985. Chain harrowed: 12 Apr. Cut: 1 July, 20 Nov.

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85/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 11th year, s. barley.

For previous years see 74-84/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: All combinations of:-

Series

1. PREVCROP Previous crop in 1984, all s. barley in 1985:

   FALLOW
   OATS
   BARLEY

Plots

2. 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 P2O5, as superphosphate and 460 kg K2O 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 1985.

Basal applications:
Series I, III and IV: S. barley: Manures: (20:10:10) at 750 kg. Weedkillers: Dicamba with mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 250 l with fungicide: Fungicide: Tridemorph at 0.52 kg.

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

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85/W/RN/16

Cultivations, etc.:-
Series I, III and IV: S. barley: Ploughed: 10 Dec, 1984. Spring-tine cultivated with crumbler attached, NPK applied, seed sown: 14 Mar, 1985. Weedkillers with fungicide applied: 17 May. Combine harvested: 21 Aug.
Series II: Fallow: Ploughed: 10 Dec, 1984. Spring-tine cultivated with crumbler attached: 14 Mar, 1985. Rotary cultivated: 30 May, 26 July.

S.BARLEY

GRAIN TONNES/HECTARE

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

PK SUB / PREVCROP	- - -	- - S	P K T	P K S	MEAN
FALLOW	7.87	7.67	7.78	7.72	7.76
OATS	7.68	7.90	7.65	8.01	7.81
BARLEY	7.02	7.28	7.34	6.78	7.10
MEAN	7.52	7.62	7.59	7.50	7.56

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

TABLE	PK SUB	PREVCROP* PK SUB
SED	0.113	0.196

* WITHIN THE SAME LEVEL OF PREVCROP ONLY

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

STRATUM	DF	SE	CV%
SERIES.BLOCK	6	0.166	2.2
SERIES.BLOCK.WP	18	0.240	3.2

GRAIN MEAN DM% 75.0

SUB PLOT AREA HARVESTED 0.00057

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85/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 fifth year, potatoes, s. barley, s. beans, w. wheat.

For previous years see 81-84/R/RN/17.

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

Whole plot dimensions: 3.0 x 14.0.

Treatments to each series:

TREATMENT Extra P and K and primary cultivation tool in autumn 1980 only, except on A plots, treatments repeated annually, and F plots treatments repeated four yearly:

	P205(kg)	K20(kg)		Tool	
- - -	0	0		Plough	(duplicated)
P6 K6 T	1000	500	to topsoil	"	(")
- - S	0	0		Wye double-digger	(triplicated)
- - SA	0	0		" " "	(duplicated)
- - SF	0	0		" " "	
P2 - SA	63	0	to subsoil	" " "	
P3 - SF	125	0	" "	" " "	
P4 - S	250	0	" "	" " "	
P5 - S	500	0	" "	" " "	
P5 - SF	500	0	" "	" " "	
P6 - S	1000	0	" "	" " "	
- K2 SA	0	31	" "	" " "	
- K3 SF	0	63	" "	" " "	
- K4 S	0	125	" "	" " "	
- K5 S	0	250	" "	" " "	
- K5 SF	0	250	" "	" " "	
- K6 S	0	350	" "	" " "	
P1 K1 SA	31	16	" "	" " "	
P1 K3 SA	31	63	" "	" " "	
P2 K2 SA	63	31	" "	" " "	
P3 K1 SA	125	16	" "	" " "	
P3 K3 SA	125	63	" "	" " "	
P3 K4 SF	125	125	" "	" " "	
P4 K3 SF	250	63	" "	" " "	
P4 K4 S	250	125	" "	" " "	
P4 K5 S	250	250	" "	" " "	
P4 K5 SF	250	250	" "	" " "	
P4 K6 S	250	350	" "	" " "	
P5 K4 S	500	125	" "	" " "	
P5 K4 SF	500	125	" "	" " "	
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 were conventionally ploughed each autumn unless the Wye double-digging treatment was due.
(4) The rate of 350 kg K20 applied was in error for 500 kg K20.

Standard applications:
Potatoes: Manures: Chalk at 5.0 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. Fungicides: Mancozeb at 1.4 kg in 200 l on four occasions, with the insecticide on the second and third. Fentin hydroxide at 0.28 kg in 200 l on two occasions. Insecticide: Pirimicarb at 0.14 kg on two occasions.
S. barley: Manures: Chalk at 5.0 t. (20:10:10) at 630 kg. Weedkillers: Clopyralid at 0.05 kg with bromoxynil octanoate at 0.24 kg, mecoprop (as 'CMPP' at 3.0 l) applied with the fungicide in 200 l. Fungicide: Tridemorph at 0.52 kg.
S. beans: Manures: Chalk at 5.0 t. Weedkiller: Simazine at 1.2 kg in 200 l. Fungicide: Benomyl at 0.50 kg, applied with the pirimicarb and a wetting agent ('Agral' at 0.075 l) in 500 l. Insecticides: Phorate at 5.6 kg. Pirimicarb at 0.14 kg.
W. wheat. Manures: Chalk at 5.0 t. (0:18:36) at 350 kg. 'Nitro-Chalk' (27.5% N) at 540 kg. Weedkillers: Clopyralid at 0.05 kg with bromoxynil octanoate at 0.24 kg and mecoprop (as 'CMPP' at 3.0 l), applied with the tridemorph in 200 l. Fungicides: Tridemorph at 0.52 kg. Propiconazole at 0.25 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 200 l. Insecticide: Pirimicarb at 0.14 kg in 200 l.

Seed: Potatoes: Pentland Crown.
S. barley: Klaxon, sown at 160 kg.
S. beans: Minden, sown at 240 kg.
W. wheat: Avalon, sown at 200 kg.

Cultivations, etc.:-
All crops: Chalk applied: 2 Oct, 1984. Treatments applied by double-digger: 14-19 Nov. Ploughed: 26 Nov. Spring-tine cultivated (twice for w. wheat): 11 Dec.
Potatoes: Spring-tine cultivated: 12 Mar, 1985. NPK Mg applied: 3 Apr. Rotary harrowed, potatoes planted: 9 Apr. Rotary ridged: 30 Apr. Weedkillers applied: 16 May. Mancozeb applied: 20 June, 3 July, 23 July, 6 Aug with pirimicarb on the second and third occasion. Fentin hydroxide applied: 21 Aug, 11 Sept. Haulm mechanically destroyed: 17 Sept. Lifted: 16 Oct.
S. barley: NPK applied: 11 Mar, 1985. Spring-tine cultivated, rotary harrowed, seed sown: 12 Mar. Weedkillers and fungicide applied: 16 May. Combine harvested: 21 Aug.
S. beans: Phorate applied: 11 Mar, 1985. Spring-tine cultivated, rotary harrowed, seed sown: 12 Mar. Weedkiller applied: 13 Mar. Benomyl and pirimicarb applied: 8 July. Combine harvested: 25 Sept.

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Cultivations, etc.:- (continued)
W.wheat: PK applied: 11 Dec, 1984. Seed sown, spring-tine cultivated: 13 Dec. N applied: 16 Apr, 1985. Weedkillers and tridemorph applied: 16 May. Propiconazole, carbendazim and maneb applied: 3 July. Insecticide applied: 10 July. Combine harvested: 6 Sept.

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85/R/RN/17

SERIES I POTATOES

TOTAL TUBERS TONNES/HECTARE

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

TREATMNT	
- - -	57.6
P6 K6 T	61.8
- - S	56.8
- - SA	63.0
- - SF	58.5
P2 - SA	60.0
P3 - SF	76.3
P4 - S	60.5
P5 - S	62.2
P5 - SF	60.2
P6 - S	65.1
- K2 SA	74.1
- K3 SF	66.5
- K4 S	57.1
- K5 S	60.2
- K5 SF	66.5
- K6 S	63.8
P1 K1 SA	63.0
P1 K3 SA	62.1
P2 K2 SA	62.8
P3 K1 SA	55.9
P3 K3 SA	68.2
P3 K4 SF	61.3
P4 K3 SF	66.4
P4 K4 S	63.0
P4 K5 S	61.3
P4 K5 SF	66.1
P4 K6 S	64.2
P5 K4 S	67.0
P5 K4 SF	66.0
P5 K5 S	64.3
P5 K6 S	58.5
P6 K4 S	61.7
P6 K5 S	61.2
P6 K6 S	64.0
MEAN	63.1

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

TABLE	TREATMNT*	
SED	3.07	MIN REP
	2.51	MAX-MIN

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

STRATUM	DF	SE	CV%
WP	5	2.17	3.5

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SERIES I POTATOES

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

TREATMNT	
- - -	96.2
P6 K6 T	95.8
- - S	96.6
- - SA	97.7
- - SF	95.4
P2 - SA	97.9
P3 - SF	96.8
P4 - S	97.1
P5 - S	96.3
P5 - SF	94.6
P6 - S	97.3
- K2 SA	97.4
- K3 SF	96.4
- K4 S	96.9
- K5 S	97.3
- K5 SF	94.9
- K6 S	97.3
P1 K1 SA	97.7
P1 K3 SA	96.5
P2 K2 SA	96.2
P3 K1 SA	96.4
P3 K3 SA	96.9
P3 K4 SF	95.5
P4 K3 SF	97.2
P4 K4 S	94.9
P4 K5 S	95.1
P4 K5 SF	96.8
P4 K6 S	97.8
P5 K4 S	96.6
P5 K4 SF	97.3
P5 K5 S	97.0
P5 K6 S	96.9
P6 K4 S	96.3
P6 K5 S	97.5
P6 K6 S	97.0
MEAN	96.6

PLOT AREA HARVESTED 0.00210

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

	TREATMENT
MAX-MIN	- - S V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

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85/R/RN/17

SERIES II SPRING BARLEY

GRAIN TONNES/HECTARE

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

TREATMNT	
- - -	5.65
P6 K6 T	5.17
- - S	5.62
- - SA	5.43
- - SF	5.26
P2 - SA	5.57
P3 - SF	5.61
P4 - S	5.48
P5 - S	5.47
P5 - SF	4.82
P6 - S	5.55
- K2 SA	5.62
- K3 SF	5.40
- K4 S	5.58
- K5 S	5.70
- K5 SF	5.18
- K6 S	5.82
P1 K1 SA	5.45
P1 K3 SA	5.52
P2 K2 SA	5.34
P3 K1 SA	5.50
P3 K3 SA	5.33
P3 K4 SF	5.13
P4 K3 SF	5.03
P4 K4 S	5.31
P4 K5 S	5.35
P4 K5 SF	5.00
P4 K6 S	5.22
P5 K4 S	5.15
P5 K4 SF	5.10
P5 K5 S	5.09
P5 K6 S	5.51
P6 K4 S	4.92
P6 K5 S	5.82
P6 K6 S	4.98
MEAN	5.38

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

TABLE	TREATMNT*
SED	0.277 MIN REP
	0.226 MAX-MIN

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

STRATUM	DF	SE	CV%
WP	5	0.196	3.6

GRAIN MEAN DM% 80.2 PLOT AREA HARVESTED 0.00420

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85/R/RN/17

SERIES III SPRING BEANS

GRAIN TONNES/HECTARE

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

TREATMNT	
- - -	4.86
P6 K6 T	5.57
- - S	6.05
- - SA	6.20
- - SF	5.84
P2 - SA	6.37
P3 - SF	6.31
P4 - S	5.96
P5 - S	6.07
P5 - SF	5.69
P6 - S	5.64
- K2 SA	5.64
- K3 SF	5.32
- K4 S	4.44
- K5 S	5.78
- K5 SF	5.81
- K6 S	5.86
P1 K1 SA	6.40
P1 K3 SA	6.23
P2 K2 SA	6.08
P3 K1 SA	6.17
P3 K3 SA	5.56
P3 K4 SF	5.85
P4 K3 SF	6.08
P4 K4 S	5.65
P4 K5 S	5.58
P4 K5 SF	5.36
P4 K6 S	6.18
P5 K4 S	6.58
P5 K4 SF	5.58
P5 K5 S	5.71
P5 K6 S	5.62
P6 K4 S	4.87
P6 K5 S	5.64
P6 K6 S	5.60
MEAN	5.77

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

TABLE	TREATMNT*	
SED	0.570	MIN REP
	0.465	MAX-MIN

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

STRATUM	DF	SE	CV%
WP	5	0.403	7.0

GRAIN MEAN DM% 83.5 PLOT AREA HARVESTED 0.00386

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85/R/RN/17

SERIES IV WINTER WHEAT

GRAIN TONNES/HECTARE

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

TREATMNT	
- - -	5.91
P6 K6 T	6.10
- - S	5.61
- - SA	5.44
- - SF	6.13
P2 - SA	5.15
P3 - SF	5.51
P4 - S	5.65
P5 - S	6.07
P5 - SF	4.89
P6 - S	5.45
- K2 SA	5.33
- K3 SF	6.04
- K4 S	5.80
- K5 S	5.94
- K5 SF	5.88
- K6 S	5.82
P1 K1 SA	5.67
P1 K3 SA	6.05
P2 K2 SA	5.25
P3 K1 SA	4.99
P3 K3 SA	6.46
P3 K4 SF	5.12
P4 K3 SF	6.21
P4 K4 S	5.87
P4 K5 S	5.79
P4 K5 SF	5.32
P4 K6 S	6.46
P5 K4 S	6.09
P5 K4 SF	5.82
P5 K5 S	6.04
P5 K6 S	5.78
P6 K4 S	4.92
P6 K5 S	6.12
P6 K6 S	5.80
MEAN	5.73

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

TABLE	TREATMNT*	
SED	0.397	MIN REP
	0.324	MAX-MIN

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

STRATUM	DF	SE	CV%
WP	5	0.281	4.9

GRAIN MEAN DM% 77.2 PLOT AREA HARVESTED 0.00420

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85/R/RN/19

WORM-WORKED WASTES

Object: To study the effects of the residues of pig manure, after it has been worked by earthworms, on the growth and yield of arable crops - Ninnings.

Sponsor: K.E. Fletcher.

The first year, potatoes, maize, kale.

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

Whole plot dimensions: 3.05 x 2.8.

Treatments to each series:

MANURE	Fertilizers and organic manures:
FERTLZER	Inorganic fertilizers
WW FYM	Worm-worked pig farmyard manure
WW SS	Worm-worked pig separated solids

NOTES: (1) Fertilizers to potatoes: (10:10:15+4.5 Mg) at 870 kg followed by 1330 kg to seedbed, 'Nitro-Chalk' (27.5% N) at 180 kg in summer.
(2) Fertilizers to maize: (20:10:10) at 750 kg to seedbed.
(3) Fertilizers to kale: 'Nitro-Chalk' (27.5% N) at 450 kg (0:20:20) at 500 kg to seedbed, 'Nitro-Chalk' (27.5% N) at 180 kg in summer.
(4) WW FYM and WW SS were each applied to potatoes at 44.7 t to maize at 24.7 t and to kale at 28.2 t.

Standard applications:
Potatoes: Weedkillers: Linuron at 1.3 kg with paraquat at 0.28 kg ion in 220 l. Fungicide: Mancozeb at 1.3 kg in 220 l on eight occasions, with the insecticide on the third, fourth and fifth occasions. Insecticide: Pirimicarb at 0.14 kg. Desiccant: Diquat at 0.60 kg ion in 220 l.
Maize: Weedkillers: Glyphosate at 1.0 kg in 220 l. Atrazine at 2.8 kg in 220 l.
Kale: Weedkillers: Glyphosate at 1.0 kg in 220 l. Trifluralin at 0.55 kg in 220 l. Desmetryne (as 'Semeron 25 WP' at 1.7 kg) in 220 l, on two occasions.

Seed: Maize: Leader, sown at 50 kg.
Potatoes: Maris Piper.
Kale: Merlin, sown at 3.6 kg.

Cultivations, etc.:-
Potatoes: Ploughed: 5 Feb, 1985. Spring-tine cultivated, organic manures applied, power harrowed, planted by hand: 29 Apr. First NPK Mg applied: 9 May. Weedkillers applied: 16 May. Second NPK Mg applied: 23 May (omitted in error on 9 May). Fungicide alone applied: 13 June, 28 June, 20 Aug, 30 Aug, 5 Sept. N applied: 26 July. Fungicide with insecticide applied: 10 July, 23 July, 6 Aug. Desiccant applied: 17 Sept. Lifted by hand: 27 Sept.

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Maize: Ploughed: 5 Feb, 1985. Glyphosate applied: 16 May. Spring-tine cultivated, treatments applied, power harrowed, seed sown: 20 May. Atrazine applied: 30 May. Harvested by hand: 6 Nov.
Kale: Ploughed: 5 Feb, 1985. Glyphosate applied: 16 May. Spring-tine cultivated, treatments applied, power harrowed, trifluralin applied, power harrowed, seed sown: 20 May. Desmetryne applied: 10 July, 23 July. N applied: 26 July. Harvested by hand: 6 Nov. Previous crops: Grass 1983, w. wheat 1984.

NOTES: (1) Because of an error dry matter percentages were not measured on one block of kale. Yields presented are based on only two blocks and consequently standard errors have been omitted.
(2) Emergence counts were made on potatoes at the end of May, and stem counts made just before harvest. Number of maize plants, cobs, and size of cobs were noted at the end of September.

POTATOES

TOTAL TUBERS TONNES/HECTARE

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

MANURE	FERTLZER	WW FYM	WW SS	MEAN
	88.4	72.5	85.5	82.1

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

TABLE	MANURE
SED	6.300

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

STRATUM	DF	SE	CV%
BLOCK.WP	4	7.716	9.4

PLOT AREA HARVESTED 0.00042

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85/R/RN/19

MAIZE

FORAGE DRY MATTER TONNES/HECTARE

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

MANURE	FERTLZER	WW FYM	WW SS	MEAN
	11.80	11.24	11.70	11.58

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

TABLE	MANURE
SED	1.307

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

STRATUM	DF	SE	CV%
BLOCK.WP	4	1.601	13.8

FORAGE MEAN DM% 34.7

PLOT AREA HARVESTED 0.00030

KALE

FORAGE DRY MATTER TONNES/HECTARE

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

MANURE	FERTLZER	WW FYM	WW SS	MEAN
	6.48	8.08	7.11	7.22

FORAGE MEAN DM% 13.8

PLOT AREA HARVESTED 0.00028

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85/R/CS/10 and 85/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.

Sponsor: S.P. McGrath.

The 24th year, s. barley.

For previous years see 'Details' 1967, 1973 and 74-84/R&W/CS/10.

Design: 2 randomised blocks of 16 plots.

Whole plot dimensions: 6.40 x 18.3.

Treatments: All combinations of:-

1. CHALK — Residual effects of ground chalk (tonnes CaCO3) (total applied 1962-83):

		Rothamsted total		Woburn total	
R	W	1962-78	1982-83	1962-78	1982-83
0	0	0	0	0	0
14	8	7	7	6	2
23	24	15	8	14	10
50	43	30	20	23	20

2. P — Residual effects of P fertilizer applied:

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

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

NOTES: Until 1978 test P was applied cumulatively, rates varied with crop, K was also applied cumulatively, to P1 and P3 plots. Since 1981 K has been applied basally.

Basal applications:-
Sawyers I (R): Manures: (25:0:16) at 450 kg. Weedkillers: Mecoprop at 1.6 kg with bromoxynil at 0.20 kg and ioxynil at 0.20 kg with fungicide in 200 l. Fungicide: Tridemorph at 0.52 kg.
Stackyard C (W): Manures: (25:0:16) at 490 kg. Weedkillers: Mecoprop at 1.2 kg with bromoxynil at 0.26 kg and ioxynil at 0.26 kg in 250 l.

Seed: Sawyers I (R): Klaxon, sown at 160 kg.
Stackyard C (W): Klaxon, sown at 150 kg.

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85/R/CS/10 and 85/W/CS/10

Cultivations, etc.:-
Sawyers I (R): Ploughed: 3 Jan, 1985. NK applied, spring-tine cultivated, rotary harrowed, seed sown: 18 Mar. Weedkillers with fungicide applied: 16 May. Combine harvested: 23 Aug.
Stackyard C (W): Ploughed: 13 Mar. Spring-tine cultivated, NK applied, harrowed, seed sown: 18 Mar. Weedkillers applied: 16 May. Combine harvested: 28 Aug.

NOTE: On Sawyers I (R) plots with treatment CHALK 0 gave no measurable yield.

85/R/CS/10 SAWYERS I (R)

GRAIN TONNES/HECTARE

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

P / CHALK	0	P1	P2	P3	MEAN
0	*	*	*	*	*
14	3.87	5.34	7.15	7.93	6.08
23	6.27	7.36	8.16	8.26	7.51
50	7.02	7.67	8.22	8.19	7.78
MEAN	5.72	6.79	7.84	8.13	7.12

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

TABLE	CHALK	P	CHALK P
SED	0.416	0.480	0.831

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.831	11.7

GRAIN MEAN DM% 76.7

PLOT AREA HARVESTED 0.00373

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85/W/CS/10 STACKYARD C (W)

GRAIN TONNES/HECTARE

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

P / CHALK	0	P1	P2	P3	MEAN
0	0.40	0.56	1.27	0.87	0.78
8	5.00	6.54	6.92	7.14	6.40
24	6.92	7.67	7.67	7.51	7.44
43	7.25	7.71	7.53	7.30	7.45
MEAN	4.89	5.62	5.85	5.70	5.52

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

TABLE	CHALK	P	CHALK P
SED	0.213	0.213	0.426

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

STRATUM	DF	SE	CV%
BLOCK.WP	15	0.426	7.7

GRAIN MEAN DM% 83.0

PLOT AREA HARVESTED 0.00503

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85/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 21st year, old grass.

For previous years see 'Details' 1973 and 74-84/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, not applied in 1985)
0	0 (duplicated)
56	
112	
168	
225	
281	
338	

NOTES: Rates of fertilizer nitrogen per cut were unchanged but as in 1983 and 1984, only three cuts were taken instead of 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, Mg and test NK applied: 23 Apr, 1985. Test NK applied: 23 May, 12 Aug. Cut: 22 May, 1 Aug, 11 Dec.

NOTE: Because of a harvesting error the 3rd cut yield was lost on one plot, with treatment 0(S), estimated values were used in the 3rd cut and total of 3 cuts analyses.

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85/R/CS/13

1ST CUT (22/5/85) DRY MATTER TONNES/HECTARE

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

TOTAL N	0(S)	0	56	112	168	225	281	338	MEAN
	0.28	1.48	1.47	1.59	2.16	2.62	3.03	3.10	1.75

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

TABLE	TOTAL N	
SED	0.177	MIN REP
	0.154	MAX-MIN
	0.125	MAX REP

	TOTAL N
MAX REP	0(S) V 0
MAX-MIN	0(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	0.251	14.3

1ST CUT MEAN DM% 14.3

2ND CUT (1/8/85) DRY MATTER TONNES/HECTARE

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

TOTAL N	0(S)	0	56	112	168	225	281	338	MEAN
	1.78	4.40	3.96	4.70	4.35	4.09	2.94	3.37	3.58

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

TABLE	TOTAL N	
SED	0.479	MIN REP
	0.414	MAX-MIN
	0.338	MAX REP

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

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.677	18.9

2ND CUT MEAN DM% 19.0

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85/R/CS/13

3RD CUT (11/12/85) DRY MATTER TONNES/HECTARE

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

TOTAL N	0(S)	0	56	112	168	225	281	338	MEAN
	0.46	1.18	1.64	1.69	1.99	2.03	2.24	1.38	1.42

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

TABLE	TOTAL N	
SED	0.196	MIN REP
	0.170	MAX-MIN
	0.139	MAX REP

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

STRATUM	DF	SE	CV%
BLOCK.WP	28	0.277	19.5

3RD CUT MEAN DM% 13.7

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

TOTAL N	0(S)	0	56	112	168	225	281	338	MEAN
	2.39	7.07	7.06	7.98	8.51	8.74	8.21	7.84	6.73

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

TABLE	TOTAL N	
SED	0.520	MIN REP
	0.451	MAX-MIN
	0.368	MAX REP

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

STRATUM	DF	SE	CV%
BLOCK.WP	28	0.736	10.9

TOTAL OF 3 CUTS MEAN DM% 15.6

PLOT AREA HARVESTED 0.00086

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85/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 17th year, potatoes, s. barley.

For previous years see 71/W/CS/34(t), 72/W/CS/34(t) and 73-84/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:-

	1970	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
Series I	P	P*	SB	B	P	P*	W	B	P	P*	B	B	P	P*	W	B
Series II	P	P	P*	SB	B	P	P*	W	B	P	P*	W	B	P	P*	B
Series III	B	P	P	P*	SB	B	P	P*	W	B	P	P*	W	B	P	P*
Series IV	B	P	P	P	P*	SB	B	P	P*	W	B	P	P*	W	B	P

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

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

Treatments to s. barley (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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85/W/CS/34

Treatments to s. barley (Series II) replacing w. wheat which failed:
All combinations of:-

1. NEMACIDE(84)	Residues of nematicides applied 1984:	
	ALDICARB	
	SDS38697	
	SDS46995	
2. RATE	Rates of nematicide (kg a.i.):	
	SINGLE	Single (2.8 kg of aldicarb, 1.4 kg of SDS materials)
	DOUBLE	Double (5.6 kg of aldicarb, 2.8 kg of SDS materials)
	QUAD	Quadruple (11.2 kg of aldicarb, 5.6 kg of SDS materials)

plus one untreated plot per block

RATE

NONE

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

1. NEMACIDE(85)	Nematicides applied 1985:	
	OXAMYL	Oxamyl
	SDS46995	'SDS 46995'
	THIODICA	Thiodicarb
2. RATE	Rates of nematicide (kg a.i.):	
	SINGLE	Single (1.4 kg of 'SDS 46995', 2.8 kg of other materials)
	DOUBLE	Double (2.8 kg of 'SDS 46995', 5.6 kg of other materials)
	QUAD	Quadruple (5.6 kg of 'SDS 46995', 11.2 kg of other materials)

plus one untreated plot per block

RATE

NONE

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

1. NEMACIDE(82)	Residues of nematicides applied 1982:	
	SDS46995	
	SDS47187	
	OXAMYL	
2. RATE	Rates of nematicide (kg a.i.):	
	SINGLE	Single (1.5 kg of SDS materials, 2.8 kg of oxamyl)
	DOUBLE	Double (3.0 kg of SDS materials, 5.6 kg of oxamyl)
	QUAD	Quadruple (6.0 kg of SDS materials, 11.2 kg of oxamyl)

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85/W/CS/34

plus one untreated plot per block

RATE

NONE

Standard applications:
S. barley (Series I): Manures: (20:10:10) at 620 kg. Weedkillers: Clopyralid at 0.07 kg with bromoxynil octanoate at 0.34 kg and mecoprop at 2.1 kg in 250 l applied with the fungicide. Fungicide: Tridemorph at 0.52 kg.
W. wheat/s. barley (Series II): Manures: Magnesian limestone at 7.5 t. (5:14:30) at 340 kg. (20:10:10) at 620 kg. Weedkillers: Paraquat at 0.5 kg ion in 250 l. Clopyralid at 0.07 kg with bromoxynil octanoate at 0.34 kg and mecoprop at 2.1 kg in 250 l applied with the fungicide. Fungicide: Tridemorph at 0.52 kg.
Potatoes (series III and IV): Manures: (10:10:15+4.5 Mg) at 2510 kg. Weedkillers: Linuron at 1.0 kg with paraquat at 0.40 kg ion in 250 l. Fungicide: Mancozeb at 1.4 kg in 250 l on six occasions, with the insecticide on the second occasion. Fentin acetate with maneb (as 'Brestan 60' at 0.50 kg) in 250 l. Insecticide: Pirimicarb at 0.14 kg.

NOTE: W. wheat (Series II) failed and was replaced by s. barley.

Seed: W. wheat: Avalon, sown at 190 kg.
S. barley: Triumph, dressed with flutriafol, thiabendazole and ethirimol, sown at 160 kg.
Potatoes: Pentland Crown.

Cultivations, etc.:-
S. barley (Series I): Disced: 18 Sept, 1984. Ploughed: 12 Dec. Power harrowed, NPK applied, rotary harrowed, seed sown: 21 Mar, 1985. Weedkillers and fungicide applied: 17 May. Combine harvested: 29 Aug.
W. wheat/s. barley (Series II): Magnesian limestone applied: 23 Oct, 1984. (5:14:30) applied, power harrowed, wheat seed sown: 31 Oct. Paraquat applied, spring-tine cultivated with crumbler attached, (20:10:10) applied, barley seed sown: 21 Mar, 1985. Remaining weedkillers and fungicide applied: 17 May. Combine harvested: 29 Aug.
Potatoes (Series III and IV): Disced (Series IV): 18 Sept, 1984. Harrowed off haulm (Series III): 31 Oct. Ploughed (Series IV): 12 Dec. NPK Mg applied: 9 Apr, 1985. Heavy spring-tine cultivated: 12 Apr. Treatments applied (Series III), rotary cultivated (both series). Potatoes planted (Series IV): 29 Apr. Potatoes planted (Series III): 30 Apr. Weedkillers applied: 20 May. Mancozeb applied: 20 June, 23 July, 6 Aug, 14 Aug, 7 Sept. Mancozeb applied with insecticide: 3 July. Fentin acetate with maneb applied: 21 Aug. Haulm mechanically destroyed: 27 Sept. Lifted: 8 Oct.

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85/W/CS/34

POTATOES SERIES III

TOTAL TUBERS TONNES/HECTARE

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

RATE NEMACIDE(85)	SINGLE	DOUBLE	QUAD	MEAN
OXAMYL	30.1	27.8	28.8	28.9
SDS46995	21.2	26.9	26.2	24.7
THIODICA	6.3	7.0	11.4	8.2
MEAN	19.2	20.6	22.1	20.6

RATE NONE 7.8

GRAND MEAN 19.3

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

TABLE	NEMACIDE(85)	RATE NEMACIDE(85) & RATE NONE
SED	2.29	2.29	3.97

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	4.86	25.1

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

RATE NEMACIDE(85)	SINGLE	DOUBLE	QUAD	MEAN
OXAMYL	92.1	91.3	91.3	91.5
SDS46995	89.2	93.3	93.1	91.8
THIODICA	59.6	64.0	73.2	65.6
MEAN	80.3	82.9	85.9	83.0

RATE NONE 64.7

GRAND MEAN 81.2

PLOT AREA HARVESTED 0.00130

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85/W/CS/34

POTATOES SERIES IV

TOTAL TUBERS TONNES/HECTARE

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

RATE NEMACIDE(82)	SINGLE	DOUBLE	QUAD	MEAN
SDS46995	17.4	26.7	23.5	22.5
SDS47187	21.6	22.4	23.0	22.3
OXAMYL	25.1	29.9	31.9	29.0
MEAN	21.3	26.3	26.1	24.6

RATE NONE 15.8

GRAND MEAN 23.7

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

TABLE	NEMACIDE(82)	RATE NEMACIDE(82)	RATE & RATE NONE
SED	1.70	1.70	2.95

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	3.61	15.2

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

RATE NEMACIDE(82)	SINGLE	DOUBLE	QUAD	MEAN
SDS46995	89.9	93.1	91.8	91.6
SDS47187	90.3	93.3	92.8	92.2
OXAMYL	90.5	92.3	93.0	92.0
MEAN	90.3	92.9	92.6	91.9

RATE NONE 82.8

GRAND MEAN 91.0

PLOT AREA HARVESTED 0.00130

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85/W/CS/34

S. BARLEY SERIES I

GRAIN TONNES/HECTARE

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

RATE NEMACIDE(83)	2.8	5.6	11.2	MEAN
FMC65201	7.62	7.34	7.62	7.53
FMC67825	7.86	7.80	7.80	7.82
OXAMYL	7.89	7.72	7.56	7.73
MEAN	7.79	7.62	7.66	7.69

RATE 0.0 7.72

GRAND MEAN 7.69

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

TABLE	NEMACIDE(83)	RATE	NEMACIDE(83) RATE & RATE 0.0
SED	0.108	0.108	0.187

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.229	3.0

GRAIN MEAN DM% 86.2

PLOT AREA HARVESTED 0.00251

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85/W/CS/34

S. BARLEY SERIES II

GRAIN TONNES/HECTARE

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

RATE NEMACIDE(84)	SINGLE	DOUBLE	QUAD	MEAN
ALDICARB	6.65	6.57	6.52	6.58
SDS38697	6.42	6.47	6.50	6.46
SDS46995	6.49	6.03	6.36	6.29
MEAN	6.52	6.36	6.46	6.45

RATE NONE 6.41

GRAND MEAN 6.44

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

TABLE	NEMACIDE(84)	RATE NEMACIDE(84)	RATE & RATE NONE
SED	0.134	0.134	0.231

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.283	4.4

GRAIN MEAN DM% 86.1

PLOT AREA HARVESTED 0.00251

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85/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 18th year, s. barley.

For previous years see 72/W/CS/35(t) and 73-84/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	85
Series II	P	P*	SB	B	P*	P	P	P*	W	B	B	P*	W	B
Series III	P	P	P*	SB	B	P*	P	P	P*	W	B	B	P*	B

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, s. barley 1985, 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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85/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, s. barley 1985, replacing winter wheat which failed, tests the residual 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 — Nematicides applied in spring 1980 and 1984:

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:
S. barley (Series II): Manures: (20:10:10) at 620 kg. Weedkillers: Mecoprop at 1.2 kg with bromoxynil at 0.26 kg and ioxynil at 0.26 kg in 250 l.
W. wheat/s. barley (Series III): Manures: (5:14:30) at 340 kg, (20:10:10) at 620 kg. Weedkillers: Mecoprop at 1.2 kg with bromoxynil at 0.3 kg and ioxynil at 0.3 kg in 250 l.

Seed: W. wheat: Avalon, sown at 190 kg.
S. barley: Triumph, dressed with flutriafol, thiabendazole and ethirimol, sown at 160 kg.

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85/W/CS/35

Cultivations, etc.:-
S. barley (Series II): Ploughed: 2 Oct, 1984. Spring-tine cultivated with crumbler attached: 18 Mar, 1985. NPK applied, rotary harrowed, seed sown: 21 Mar. Weedkillers applied: 16 May. Combine harvested: 27 Aug.
W. wheat/s. barley (Series III): (5:14:30) applied: 22 Oct, 1984. Power harrowed, wheat seed sown: 30 Oct. Spring-tine cultivated with crumbler attached: 18 Mar, 1985. (20:10:10) applied, rotary harrowed, barley seed sown: 21 Mar. Weedkillers: 16 May. Combine harvested: 27 Aug.

S. BARLEY SERIES II

GRAIN TONNES/HECTARE

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

A NEM(79)	NONE	TELONE	MEAN
S NEM YR			
1979	6.35	6.23	6.29
1979+83	6.55	6.56	6.55
MEAN	6.45	6.39	6.42

S NEM	ALDICARB	OXAMYL	MEAN
S NEM YR			
1979	6.30	6.29	6.29
1979+83	6.54	6.56	6.55
MEAN	6.42	6.42	6.42

S NEM	ALDICARB	OXAMYL	MEAN
A NEM(79)			
NONE	6.30	6.60	6.45
TELONE	6.54	6.25	6.39
MEAN	6.42	6.42	6.42

SNEMRATE	2.5	5.0	7.5	10.0	MEAN
S NEM YR					
1979	6.24	6.33	6.36	6.24	6.29
1979+83	6.66	6.80	6.48	6.27	6.55
MEAN	6.45	6.56	6.42	6.26	6.42

SNEMRATE	2.5	5.0	7.5	10.0	MEAN
A NEM(79)					
NONE	6.44	6.64	6.55	6.18	6.45
TELONE	6.46	6.49	6.29	6.34	6.39
MEAN	6.45	6.56	6.42	6.26	6.42

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85/W/CS/35

S. BARLEY SERIES II

GRAIN TONNES/HECTARE

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

SNEMRATE S NEM	2.5	5.0	7.5	10.0	MEAN
ALDICARB	6.46	6.54	6.40	6.29	6.42
OXAMYL	6.44	6.59	6.44	6.22	6.42
MEAN	6.45	6.56	6.42	6.26	6.42

A NEM(79)	NONE		TELONE	
S NEM	ALDICARB	OXAMYL	ALDICARB	OXAMYL
S NEM YR				
1979	6.05	6.66	6.55	5.92
1979+83	6.55	6.54	6.54	6.58

	SNEMRATE	2.5	5.0	7.5	10.0
S NEM YR	A NEM(79)				
1979	NONE	6.19	6.44	6.65	6.14
	TELONE	6.29	6.23	6.06	6.34
1979+83	NONE	6.69	6.84	6.44	6.22
	TELONE	6.63	6.75	6.51	6.33

	SNEMRATE	2.5	5.0	7.5	10.0
S NEM YR	S NEM				
1979	ALDICARB	6.31	6.41	6.36	6.13
	OXAMYL	6.17	6.26	6.36	6.35
1979+83	ALDICARB	6.61	6.67	6.44	6.45
	OXAMYL	6.71	6.92	6.51	6.09

	SNEMRATE	2.5	5.0	7.5	10.0
A NEM(79)	S NEM				
NONE	ALDICARB	6.12	6.58	6.42	6.09
	OXAMYL	6.75	6.70	6.68	6.27
TELONE	ALDICARB	6.80	6.50	6.39	6.49
	OXAMYL	6.13	6.48	6.19	6.18

	SNEMRATE		2.5	5.0	7.5	10.0
S NEM YR	A NEM(79)	S NEM				
1979	NONE	ALDICARB	5.59	6.32	6.43	5.86
		OXAMYL	6.78	6.55	6.88	6.42
	TELONE	ALDICARB	7.02	6.49	6.28	6.40
		OXAMYL	5.56	5.96	5.85	6.29
1979+83	NONE	ALDICARB	6.65	6.84	6.40	6.31
		OXAMYL	6.73	6.84	6.49	6.12
	TELONE	ALDICARB	6.57	6.50	6.49	6.58
		OXAMYL	6.69	7.00	6.53	6.07

RATE 0.0 6.47

GRAND MEAN 6.43

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85/W/CS/35

S. BARLEY SERIES II

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

TABLE	A NEM(79)	S NEM	SNEMRATE
SED	0.100	0.100	0.142

TABLE	S NEM YR* A NEM(79)	S NEM YR* S NEM	A NEM(79) S NEM	S NEM YR* SNEMRATE
SED	0.142	0.142	0.142	0.201

TABLE	A NEM(79) SNEMRATE	S NEM SNEMRATE	S NEM YR* A NEM(79) S NEM	S NEM YR* A NEM(79) SNEMRATE
SED	0.201	0.201	0.201	0.284

TABLE	S NEM YR* S NEM SNEMRATE	A NEM(79) S NEM SNEMRATE	S NEM YR* A NEM(79) S NEM SNEMRATE
SED	0.284	0.284	0.402

* WITHIN THE SAME LEVELS OF S NEM YR ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	35	0.402	6.3

GRAIN MEAN DM% 84.2

PLOT AREA HARVESTED 0.00168

S. BARLEY SERIES III

GRAIN TONNES/HECTARE

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

S NEM	ALDICARB	OXAMYL	MEAN
S NEM YR			
1980	6.18	6.26	6.22
1980+84	6.10	5.98	6.04
MEAN	6.14	6.12	6.13

SNEMRATE	2.5	5.0	7.5	10.0	MEAN
S NEM YR					
1980	6.22	6.29	6.26	6.10	6.22
1980+84	6.00	6.10	6.02	6.04	6.04
MEAN	6.11	6.20	6.14	6.07	6.13

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85/W/CS/35

S. BARLEY SERIES III

GRAIN TONNES/HECTARE

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

SNEMRATE S NEM	2.5	5.0	7.5	10.0	MEAN
ALDICARB	6.20	6.11	6.16	6.10	6.14
OXAMYL	6.02	6.29	6.12	6.04	6.12
MEAN	6.11	6.20	6.14	6.07	6.13

S NEM YR	SNEMRATE S NEM	2.5	5.0	7.5	10.0
1980	ALDICARB	6.36	6.17	6.12	6.05
	OXAMYL	6.09	6.41	6.39	6.14
1980+84	ALDICARB	6.04	6.04	6.19	6.14
	OXAMYL	5.96	6.17	5.86	5.94

RATE 0.0 5.99

GRAND MEAN 6.11

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

TABLE	S NEM	SNEMRATE	S NEM YR* S NEM
SED	0.069	0.097	0.097

TABLE	S NEM YR* SNEMRATE	S NEM SNEMRATE	S NEM YR* S NEM SNEMRATE
SED	0.137	0.137	0.194

* WITHIN THE SAME LEVEL OF S NEM YR ONLY

SED FOR COMPARING RATE 0.0 WITH ANY ITEM
IN SNEMRATE.S NEM.S NEM YR IS 0.168

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

STRATUM	DF	SE	CV%
BLOCK.WP	52	0.275	4.5

GRAIN MEAN DM% 83.5

PLOT AREA HARVESTED 0.00126

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85/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 14th year, w. oats.

For previous years see 72/W/CS/99(t) and 73-84/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.

Note: Yields were not taken and no new treatments were applied.

Standard applications: Manures: (5:14:30) at 340 kg. N at 120 kg as 'Nitro-Chalk' (27.5% N). Weedkillers: Methabenzthiazuron at 1.6 kg in 250 l. Clopyralid at 0.07 kg with bromoxynil octanoate at 0.34 kg and mecoprop at 2.5 kg in 250 l with the growth regulator. Growth regulator: Chlormequat on two occasions, on the first occasion (as 'Power 3 C' at 2.0 l) with the weedkillers, on the second occasion (as 'Power 3 C' at 4.2 l) with the fungicide. Fungicide: Tridemorph at 0.52 kg in 250 l.

Seed: Panema, sown at 160 kg.

Cultivations, etc.:- Disced: 18 Sept, 1984. Subsoiled, tines 142 cm apart, 56 cm deep, ploughed: 6 Oct. NPK applied: 15 Oct. Rotary harrowed, seed sown: 16 Oct. Methabenzthiazuron applied: 27 Oct. N applied: 16 Apr, 1985. Remaining weedkillers and growth regulator applied: 17 Apr. Fungicide and growth regulator applied: 26 May. Combine harvested: 22 Aug.

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85/R/CS/133

CONTROL OF PATHOGENS

Object: To study the effects of a range of chemicals on the 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 12th year, forage maize.

For previous years see 74-84/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 and 1985)
PHORATE	Phorate, 1.68 kg as granules to seedbed
PIRIMICA	Pirimicarb, 0.14 kg as foliar spray (1979, 1984 & 1985 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 and 1985.

Basal applications: Manures: N at 150 kg as 'Nitro-Chalk' (27.5% N).
Weedkiller: Atrazine at 2.8 l in 220 l.

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

Cultivations, etc.:- Ploughed: 27 Dec, 1984. Spring-tine cultivated, dazomet plots only: 20 Mar, 1985. Dazomet treatments applied and these plots only rotary cultivated: 21 Mar. Spring-tine cultivated, remaining seedbed treatments applied, power harrowed, seed sown: 9 May.
N applied, weedkiller applied: 17 May. Foliar treatments applied: 31 July.
Harvested by hand: 4 Nov.

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85/R/CS/133

FORAGE DRY MATTER TONNES/HECTARE

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

CHEMICAL	
NONE	11.41
ALDICARB	12.66
BENOMYL	11.26
DAZOMET	12.81
PERMETH	11.59
PHORATE	10.86
PIRIMICA	10.92
BE+DA+PH	13.29
MEAN	11.85

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

TABLE	CHEMICAL	
	1.131	MIN REP
	0.979	MAX-MIN

	CHEMICAL
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	17	1.385	11.7

FORAGE MEAN DM% 29.5

PLOT AREA HARVESTED 0.00059

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85/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 12th year, s. barley.

For previous years see 74-84/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 1.4 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, 1982 and 1984, 0.28 kg in autumn 1983.
3.	FUNGCIDE(2)	Fungicide in spring:
	NONE	None
	BENOMYL	Benomyl at 4 kg to seedbed
4.	INSCTCDE	Insecticide:
	NONE	None
	CHLORFEN	Chlorfenvinphos at 2 kg to the seedbed
5.	NEMACIDE	Nematicide:
	NONE	None
	ALDICARB	Aldicarb at 6 kg to the seedbed as granules

NOTE: Glyphosate and triadimefon were applied in 220 l on 26 Sept, 1984 and 17 Oct respectively. Other treatments were applied on 19 Mar, 1985.

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Basal applications: Manures: 'Nitro-Chalk' (27.5% N) at 550 kg.
Weedkillers: Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 220 l.

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

Cultivations, etc.:- Ploughed: 1 Nov, 1984. N applied, spring-tine cultivated: 18 Mar, 1985. Power harrowed, seed sown: 19 Mar. Weedkillers applied: 10 May. Combine harvested: 23 Aug.

GRAIN TONNES/HECTARE

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

FUNGCIDE(1)	NONE	TRIADIM	MEAN
WEEDKLLR			
NONE	6.92	7.33	7.13
GLYPHOS	7.04	7.24	7.14
MEAN	6.98	7.29	7.14

FUNGCIDE(2)	NONE	BENOMYL	MEAN
WEEDKLLR			
NONE	7.04	7.21	7.13
GLYPHOS	7.23	7.06	7.14
MEAN	7.13	7.14	7.14

FUNGCIDE(2)	NONE	BENOMYL	MEAN
FUNGCIDE(1)			
NONE	7.00	6.97	6.98
TRIADIM	7.27	7.30	7.29
MEAN	7.14	7.14	7.14

INSCTCDE	NONE	CHLORFEN	MEAN
WEEDKLLR			
NONE	7.01	7.24	7.13
GLYPHOS	7.39	6.90	7.14
MEAN	7.20	7.07	7.14

INSCTCDE	NONE	CHLORFEN	MEAN
FUNGCIDE(1)			
NONE	7.16	6.80	6.98
TRIADIM	7.24	7.34	7.29
MEAN	7.20	7.07	7.14

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85/R/CS/140

GRAIN TONNES/HECTARE

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

INSCTCDE	NONE	CHLORFEN	MEAN
FUNGCIDE(2)			
NONE	7.21	7.06	7.14
BENOMYL	7.19	7.08	7.14
MEAN	7.20	7.07	7.14

NEMACIDE	NONE	ALDICARB	MEAN
WEEDKLLR			
NONE	6.94	7.32	7.13
GLYPHOS	7.18	7.11	7.14
MEAN	7.06	7.21	7.14

NEMACIDE	NONE	ALDICARB	MEAN
FUNGCIDE(1)			
NONE	6.84	7.12	6.98
TRIADIM	7.27	7.30	7.29
MEAN	7.06	7.21	7.14

NEMACIDE	NONE	ALDICARB	MEAN
FUNGCIDE(2)			
NONE	7.10	7.17	7.14
BENOMYL	7.01	7.26	7.14
MEAN	7.06	7.21	7.14

NEMACIDE	NONE	ALDICARB	MEAN
INSCTCDE			
NONE	7.08	7.32	7.20
CHLORFEN	7.04	7.10	7.07
MEAN	7.06	7.21	7.14

FUNGCIDE(1)	NONE		TRIADIM	
FUNGCIDE(2)	NONE	BENOMYL	NONE	BENOMYL
WEEDKLLR				
NONE	6.85	7.00	7.23	7.43
GLYPHOS	7.15	6.94	7.30	7.18

FUNGCIDE(1)	NONE		TRIADIM	
INSCTCDE	NONE	CHLORFEN	NONE	CHLORFEN
WEEDKLLR				
NONE	6.93	6.91	7.09	7.58
GLYPHOS	7.39	6.70	7.38	7.10

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85/R/CS/140

GRAIN TONNES/HECTARE

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

FUNGCIDE(2)	NONE		BENOMYL	
INSCTCDE	NONE	CHLORFEN	NONE	CHLORFEN
WEEDKLLR				
NONE	6.93	7.15	7.09	7.34
GLYPHOS	7.48	6.97	7.29	6.82

FUNGCIDE(2)	NONE		BENOMYL	
INSCTCDE	NONE	CHLORFEN	NONE	CHLORFEN
FUNGCIDE(1)				
NONE	7.11	6.89	7.21	6.72
TRIADIM	7.30	7.24	7.17	7.43

FUNGCIDE(1)	NONE		TRIADIM	
NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
WEEDKLLR				
NONE	6.72	7.12	7.15	7.51
GLYPHOS	6.97	7.12	7.39	7.09

FUNGCIDE(2)	NONE		BENOMYL	
NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
WEEDKLLR				
NONE	6.92	7.16	6.95	7.48
GLYPHOS	7.28	7.17	7.08	7.04

FUNGCIDE(2)	NONE		BENOMYL	
NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
FUNGCIDE(1)				
NONE	6.91	7.09	6.78	7.16
TRIADIM	7.30	7.24	7.25	7.36

INSCTCDE	NONE		CHLORFEN	
NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
WEEDKLLR				
NONE	6.79	7.23	7.09	7.40
GLYPHOS	7.37	7.41	6.99	6.80

INSCTCDE	NONE		CHLORFEN	
NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
FUNGCIDE(1)				
NONE	7.03	7.29	6.65	6.96
TRIADIM	7.12	7.35	7.42	7.25

INSCTCDE	NONE		CHLORFEN	
NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
FUNGCIDE(2)				
NONE	7.13	7.28	7.08	7.05
BENOMYL	7.03	7.36	7.00	7.15

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85/R/CS/140

GRAIN TONNES/HECTARE

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

MARGINS OF TWO FACTOR TABLES	0.124
TWO FACTOR TABLES	0.175
THREE FACTOR TABLES	0.247

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

STRATUM	DF	SE	CV%
WP	6	0.350	4.9

GRAIN MEAN DM% 83.6

PLOT AREA HARVESTED 0.00075

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85/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 eighth year, s. beans, w. wheat.

For previous years see 78-84/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 1985:

	1978	1979	1980	1981	1982	1983	1984
CONT W	W	W	W	W	W	W	W
FIRST W	W	W	BE	W	W	BE	W
BEANS	BE	W	W	BE	W	W	BE

BE = s. beans, W = w. wheat

NOTE: An additional crop sequence was in s. beans 1985, yields not taken.

Standard applications:

W. wheat: Manures: (0:20:20) at 330 kg, combine drilled. 'Nitro-Chalk' (27.5% N) at 330 kg. Weedkillers: Isoproturon at 2.0 kg, bromoxynil at 0.34 kg, clopyralid at 0.07 kg and mecoprop (as 'CMPP' at 4.2 l) with the fungicides in 500 l. Fungicides: Prochloraz at 0.4 kg and carbendazim at 0.15 kg.

Seed: W. wheat: Avalon, sown at 190 kg.
S. beans: Minden, sown at 220 kg.

Cultivations, etc.:-

W. wheat: Ploughed: 8 Oct, 1984. Rotary harrowed, seed sown: 15 Oct. N applied: 12 Apr, 1985. Weedkillers and fungicides applied: 16 Apr. Combine harvested: 29 Aug.

S. beans: Ploughed: 8 Oct, 1984. Heavy spring-tine cultivated: 19 Mar, 1985. Rotary harrowed, seed sown: 20 Mar. Combine harvested: 27 Sept.

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

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85/R/CS/212

WINTER WHEAT

GRAIN TONNES/HECTARE

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

PREVCROP	CONT W	FIRST W	BEANS	MEAN
	4.45	4.41	6.08	4.98

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

TABLE	PREVCROP
SED	0.335

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

STRATUM	DF	SE	CV%
BLOCK.WP	4	0.410	8.2

GRAIN MEAN DM% 84.7

PLOT AREA HARVESTED 0.00430

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85/R/CS/216 and 85/W/CS/216

EFFECTS OF SUBSOILING AND 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 eighth year, s. barley.

For previous years see 78-84/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 and autumn 1979
N00 N0	N.C.A.E. winged subsoiler, no P or K, autumn 1977 and 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 P205, as triple superphosphate and 460 kg K20 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 and K this was distributed ahead of the rotary cultivator.

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85/R/CS/216 and 85/W/CS/216

Basal applications:-
Delharding (R): Manures: (20:10:10) at 560 kg. Weedkillers: Clopyralid at 0.05 kg with bromoxynil octanoate at 0.24 kg and mecoprop at 1.8 kg with the fungicide in 200 l. Fungicide: Tridemorph at 0.52 kg.
Road Piece (W): Manures: (20:10:10) at 750 kg. Weedkillers: Clopyralid at 0.07 kg with bromoxynil octanoate at 0.34 kg and mecoprop at 2.1 kg with the fungicide in 250 l. Fungicide: Tridemorph at 0.52 kg.

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

Cultivations, etc.:-
Delharding (R): Ploughed: 8 Oct, 1984. Spring-tine cultivated, NPK applied, spring-tine cultivated second stroke, seed sown: 18 Mar, 1985. Rolled: 21 Mar. Weedkillers and fungicide applied: 10 May. Combine harvested: 23 Aug.
Road Piece (W): Disced: 17 Sept, 1984. Ploughed: 4 Dec. Spring-tine cultivated, NPK applied, seed sown: 14 Mar, 1985. Weedkillers and fungicide applied: 17 May. Combine harvested: 29 Aug.

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85/R/CS/216

GRAIN TONNES/HECTARE DELHARDING (R)

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

TREATMNT	000 00	F00 F0	N00 N0	NPK N0	W00 00	WPK 00	MEAN
	6.45	7.08	6.67	6.64	6.56	7.24	6.77

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

TABLE	TREATMNT
SED	0.523

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.641	9.5

GRAIN MEAN DM% 82.3

PLOT AREA HARVESTED 0.00260

85/W/CS/216

GRAIN TONNES/HECTARE ROAD PIECE (W)

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

TREATMNT	000 00	F00 F0	N00 N0	NPK N0	W00 00	WPK 00	MEAN
	7.71	8.10	7.76	8.36	7.57	7.85	7.89

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

TABLE	TREATMNT
SED	0.448

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.549	7.0

GRAIN MEAN DM% 86.9

PLOT AREA HARVESTED 0.00251

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85/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. oilseed rape, 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. oilseed rape, w. wheat and w. barley.

For previous years see 80-84/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 WOS	Series I, w. oilseed rape in rotation with two cereals
SER2 WW8	Series II, w. wheat, eighth cereal after a break crop
SER3 WB8	Series III, w. barley, eighth 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:

Rape	Cereals	Rape	Cereals	
125 ENHD	75 ENHD	125 kg N	75 kg N	enhanced pathogen control
200 ENHD	150 ENHD	200 kg N	150 kg N	enhanced pathogen control
275 ENHD	225 ENHD	275 kg N	225 kg N	enhanced pathogen control
200 STND	150 STND	200 kg N	150 kg N	standard pathogen control

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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 P205, as superphosphate, 250 kg K20 as muriate of potash.

(2) Subsoiling was done with the Wye double-digger which turns a furrow with a conventional plough share, to a depth of 23 cm, and at the same time rotary cultivates the bottom of the adjacent furrow to a further depth of 15 cm. When applying P and K this was distributed ahead of the rotary cultivator.

(3) The topsoil PK dressing was equally divided before and after ploughing.

(4) N for treatments and basals to cereals and for basals to w. oilseed rape was applied as 'Nitro-Chalk' (26% N). N for treatments to w. oilseed rape was applied as 'Nitro-Chalk' (27.5% N).

(5) Standard pathogen control was conventional seed dressings. Enhanced pathogen control had in addition, (Series I, w. oilseed rape) prochloraz at 0.27 kg with carbendazim at 0.10 kg in 250 l on 10 Apr, 1985. (Series II, w. wheat) cypermethrin at 0.025 kg applied with the basal isoproturon on 2 Nov, 1984. Prochloraz at 0.40 kg in 250 l on 29 May, 1985. Propiconazole on two occasions, on the first occasion at 0.25 kg on 17 June, on the second occasion at 0.12 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 250 l on 3 July. (Series III, w. barley) cypermethrin at 0.025 kg with the basal isoproturon on 2 Nov, 1984. Prochloraz at 0.40 kg with propiconazole at 0.25 kg in 250 l on 29 May, 1985.

Standard applications:

Series I: W. oilseed rape: Manures: (0:20:20) at 290 kg. N at 60 kg as 'Nitro-Chalk'. Weedkiller: Propyzamide at 0.82 kg in 300 l. Desiccant: Diquat at 0.60 kg ion in 250 l.

Series II: W. wheat, Series III: W. barley: Manures: (5:14:30) at 340 kg combine drilled. N at 25 kg as 'Nitro-Chalk'. Weedkillers: Paraquat at 0.30 kg ion in 250 l, isoproturon at 2.0 kg in 250 l, mecoprop at 2.0 kg with bromoxynil at 0.25 kg and ioxynil at 0.25 kg in 250 l. Growth regulator: Mepiquat chloride with 2-chloroethylphosphonic acid (as 'Terpal' at 1.5 l) with a wetting agent ('Citowett' at 0.04 l) in 250 l to w. barley only.

Seed: W. oilseed rape: Jet Neuf, sown at 9 kg.
W. wheat: Avalon, sown at 200 kg.
W. barley: Igri, sown at 170 kg.

Cultivations, etc.:-

All series: Straw burnt: 20 Aug, 1984. Disced: 21 Aug. Ploughed CNVNTIAL plots: 30 Aug.

Series I: W. oilseed rape: PK and N applied: 3 Sept, 1984. Disc CNVNTIAL plots, harrow, seed sown: 7 Sept. Weedkiller applied: 27 Jan, 1985. N treatments applied: 11 Mar. Desiccant applied:

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85/W/CS/245

31 July. Combine harvested: 15 Aug.
Series II: W. wheat, Series III: W. barley: N applied: 13 Sept, 1984. Disced CNVNTIAL plots: 19 Sept. Paraquat applied: 24 Sept. Heavy spring-tine cultivated: 26 Sept. Disced, harrowed, seed sown: 27 Sept. Isoproturon applied: 2 Nov. Treatment N applied: 10 Apr, 1985. Weedkillers applied: 19 Apr. Growth regulator applied to w. barley only: 16 May. Combine harvested, w. barley: 13 Aug, w. wheat: 6 Sept.

WINTER OILSEED RAPE SERIES I

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

PK SUB / N PATH	---	--S	PKS	MEAN
125 ENHD	2.18	2.80	2.81	2.60
200 ENHD	2.39	3.32	3.17	2.96
275 ENHD	2.48	3.34	3.22	3.01
200 STND	2.12	2.74	2.82	2.56
MEAN	2.29	3.05	3.01	2.78

YEAR / N PATH	1980	1983	MEAN
125 ENHD	2.41	2.79	2.60
200 ENHD	2.95	2.97	2.96
275 ENHD	3.02	3.01	3.01
200 STND	2.34	2.79	2.56
MEAN	2.68	2.89	2.78

YEAR / PK SUB	1980	1983	MEAN
---	2.21	2.38	2.29
--S	3.06	3.04	3.05
PKS	2.77	3.24	3.01
MEAN	2.68	2.89	2.78

DRILL / N PATH	CNVNTIAL	DIRECT	MEAN
125 ENHD	1.84	2.98	2.60
200 ENHD	1.99	3.44	2.96
275 ENHD	1.88	3.58	3.01
200 STND	1.63	3.03	2.56
MEAN	1.84	3.26	2.78

DRILL / PK SUB	CNVNTIAL	DIRECT	MEAN
---	0.69	3.09	2.29
--S	2.45	3.35	3.05
PKS	2.36	3.33	3.01
MEAN	1.84	3.26	2.78

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85/W/CS/245 WINTER OILSEED RAPE SERIES I

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

DRILL	CNVNTIAL	DIRECT	MEAN
YEAR			
1980	1.68	3.18	2.68
1983	1.99	3.34	2.89
MEAN	1.84	3.26	2.78

PK SUB	---		--S		PKS	
YEAR	1980	1983	1980	1983	1980	1983
N PATH						
125 ENHD	2.17	2.20	2.61	2.99	2.45	3.18
200 ENHD	2.40	2.37	3.46	3.19	3.00	3.34
275 ENHD	2.41	2.55	3.48	3.20	3.16	3.28
200 STND	1.84	2.41	2.69	2.78	2.47	3.17

PK SUB	---		--S		PKS	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH						
125 ENHD	0.87	2.84	2.21	3.09	2.43	3.01
200 ENHD	0.84	3.16	2.69	3.64	2.45	3.53
275 ENHD	0.77	3.34	2.45	3.79	2.44	3.61
200 STND	0.29	3.04	2.47	2.87	2.13	3.17

YEAR	1980		1983	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
125 ENHD	1.63	2.80	2.05	3.16
200 ENHD	2.01	3.43	1.98	3.46
275 ENHD	1.90	3.58	1.87	3.58
200 STND	1.20	2.91	2.06	3.15

YEAR	1980		1983	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
PK SUB				
---	1.14	2.74	0.24	3.45
--S	2.37	3.41	2.54	3.29
PKS	1.53	3.39	3.19	3.27

YEAR		1980		1983	
DRILL		CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH	PK SUB				
125 ENHD	---	1.50	2.50	0.24	3.18
	--S	1.83	3.00	2.59	3.19
	PKS	1.54	2.91	3.32	3.10
200 ENHD	---	1.37	2.92	0.31	3.40
	--S	2.68	3.85	2.70	3.43
	PKS	1.97	3.52	2.93	3.55
275 ENHD	---	1.37	2.93	0.16	3.75
	--S	2.50	3.98	2.40	3.60
	PKS	1.82	3.83	3.05	3.39
200 STND	---	0.32	2.61	0.26	3.48
	--S	2.47	2.81	2.46	2.94
	PKS	0.80	3.31	3.46	3.03

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85/W/CS/245 WINTER OILSEED RAPE SERIES I

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

N PATH EXTRA	125 ENHD	200 ENHD	275 ENHD	200 STND	MEAN
TPK 80 D	3.06	3.16	3.58	3.23	3.26
TPK 80 C	1.87	2.05	1.53	1.48	1.73
MEAN	2.47	2.61	2.55	2.36	2.50

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

TABLE	EXTRA	PK SUB	YEAR	DRILL	
SED	0.442	0.181	0.147	0.156	
TABLE	N PATH* PK SUB	N PATH* YEAR	PK SUB YEAR	N PATH* DRILL	
SED	0.206	0.168	0.255	0.179	MAX-MIN
TABLE	PK SUB DRILL	YEAR DRILL	N PATH* EXTRA	N PATH* PK SUB YEAR	
SED	0.313	0.256			MIN REP
	0.271	0.222	0.505	0.292	MAX-MIN
	0.221	0.181			MAX REP
TABLE	N PATH* PK SUB DRILL	N PATH* YEAR DRILL	PK SUB YEAR DRILL	N PATH* PK SUB YEAR DRILL	
SED	0.357	0.291	0.442	0.505	MIN REP
	0.309	0.252	0.383	0.437	MAX-MIN
	0.253	0.206	0.313	0.357	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	0.313	11.4
WP1.WP2	18	0.199	7.2

GRAIN MEAN DM% 86.1

SUB PLOT AREA HARVESTED 0.00341

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85/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

PK SUB N PATH	---	--S	PKS	MEAN
75 ENHD	6.67	6.59	6.92	6.73
150 ENHD	8.25	7.97	8.08	8.10
225 ENHD	8.97	8.97	9.01	8.98
150 STND	7.49	7.35	7.33	7.39
MEAN	7.85	7.72	7.84	7.80

YEAR N PATH	1980	1983	MEAN
75 ENHD	6.91	6.54	6.73
150 ENHD	8.44	7.76	8.10
225 ENHD	9.27	8.69	8.98
150 STND	7.67	7.11	7.39
MEAN	8.07	7.53	7.80

YEAR PK SUB	1980	1983	MEAN
---	8.06	7.63	7.85
--S	8.06	7.38	7.72
PKS	8.10	7.57	7.84
MEAN	8.07	7.53	7.80

DRILL N PATH	CNVNTIAL	DIRECT	MEAN
75 ENHD	6.14	7.02	6.73
150 ENHD	7.29	8.50	8.10
225 ENHD	8.09	9.43	8.98
150 STND	6.53	7.82	7.39
MEAN	7.01	8.19	7.80

DRILL PK SUB	CNVNTIAL	DIRECT	MEAN
---	6.99	8.27	7.85
--S	6.97	8.09	7.72
PKS	7.07	8.22	7.84
MEAN	7.01	8.19	7.80

DRILL YEAR	CNVNTIAL	DIRECT	MEAN
1980	7.31	8.45	8.07
1983	6.71	7.93	7.53
MEAN	7.01	8.19	7.80

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85/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

PK SUB	---		--S		PKS	
YEAR	1980	1983	1980	1983	1980	1983
N PATH						
75 ENHD	6.85	6.48	6.72	6.46	7.15	6.69
150 ENHD	8.58	7.92	8.34	7.60	8.40	7.76
225 ENHD	9.07	8.87	9.39	8.54	9.36	8.66
150 STND	7.75	7.23	7.77	6.92	7.48	7.17

PK SUB	---		--S		PKS	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH						
75 ENHD	6.04	6.98	5.92	6.93	6.45	7.16
150 ENHD	7.34	8.71	7.17	8.36	7.37	8.44
225 ENHD	8.08	9.42	8.39	9.25	7.79	9.62
150 STND	6.52	7.98	6.40	7.82	6.67	7.66

YEAR	1980		1983	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	6.38	7.18	5.89	6.87
150 ENHD	7.47	8.93	7.11	8.08
225 ENHD	8.53	9.65	7.65	9.22
150 STND	6.87	8.07	6.19	7.57

YEAR	1980		1983	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
PK SUB				
---	7.26	8.47	6.72	8.08
--S	7.25	8.46	6.69	7.72
PKS	7.43	8.44	6.71	8.00

YEAR	1980		1983	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH PK SUB				
75 ENHD ---	6.26	7.15	5.82	6.81
--S	5.89	7.14	5.96	6.71
PKS	7.00	7.23	5.90	7.09
150 ENHD ---	7.44	9.15	7.24	8.27
--S	7.48	8.77	6.87	7.96
PKS	7.50	8.86	7.24	8.02
225 ENHD ---	8.50	9.35	7.65	9.49
--S	8.77	9.69	8.01	8.81
PKS	8.30	9.90	7.28	9.35
150 STND ---	6.83	8.21	6.20	7.75
--S	6.88	8.22	5.93	7.41
PKS	6.91	7.77	6.43	7.55

N PATH	75 ENHD	150 ENHD	225 ENHD	150 STND	MEAN
EXTRA					
TPK 80 D	7.39	9.12	9.32	7.95	8.44
TPK 80 C	6.59	7.77	8.37	6.81	7.39
MEAN	6.99	8.45	8.85	7.38	7.92

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85/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

TABLE	EXTRA	PK SUB	YEAR	DRILL	
SED	0.438	0.179	0.146	0.155	

TABLE	N PATH* PK SUB	N PATH* YEAR	PK SUB YEAR	N PATH* DRILL
SED	0.253	0.206	0.253	0.219

TABLE	PK SUB DRILL	YEAR DRILL	N PATH* EXTRA	N PATH* PK SUB YEAR	
SED	0.309	0.253			MIN REP
	0.268	0.219	0.619	0.357	MAX-MIN
	0.219	0.179			MAX REP

TABLE	N PATH* PK SUB DRILL	N PATH* YEAR DRILL	PK SUB YEAR DRILL	N PATH* PK SUB YEAR DRILL	
SED	0.438	0.358	0.438	0.619	MIN REP
	0.379	0.310	0.379	0.536	MAX-MIN
	0.309	0.253	0.309	0.438	MAX REP

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

STRATUM	DF	SE	CV%
WP1	6	0.309	4.0
WP1.WP2	18	0.357	4.6

GRAIN MEAN DM% 80.1

SUB PLOT AREA HARVESTED 0.00341

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85/W/CS/245 WINTER BARLEY SERIES III

GRAIN TONNES/HECTARE

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

PK SUB N PATH	---	--S	PKS	MEAN
75 ENHD	6.96	6.98	6.94	6.96
150 ENHD	8.07	8.44	8.14	8.22
225 ENHD	8.51	8.78	8.36	8.55
150 STND	7.76	8.01	7.62	7.80
MEAN	7.83	8.05	7.77	7.88

YEAR N PATH	1980	1983	MEAN
75 ENHD	7.00	6.92	6.96
150 ENHD	8.55	7.89	8.22
225 ENHD	8.73	8.37	8.55
150 STND	8.00	7.59	7.80
MEAN	8.07	7.69	7.88

YEAR PK SUB	1980	1983	MEAN
---	8.05	7.60	7.83
--S	8.18	7.93	8.05
PKS	7.99	7.54	7.77
MEAN	8.07	7.69	7.88

DRILL N PATH	CNVNTIAL	DIRECT	MEAN
75 ENHD	6.82	7.03	6.96
150 ENHD	7.96	8.35	8.22
225 ENHD	8.17	8.74	8.55
150 STND	7.20	8.10	7.80
MEAN	7.53	8.05	7.88

DRILL PK SUB	CNVNTIAL	DIRECT	MEAN
---	7.42	8.03	7.83
--S	7.80	8.18	8.05
PKS	7.39	7.95	7.77
MEAN	7.53	8.05	7.88

DRILL YEAR	CNVNTIAL	DIRECT	MEAN
1980	7.63	8.29	8.07
1983	7.44	7.82	7.69
MEAN	7.53	8.05	7.88

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85/W/CS/245 WINTER BARLEY SERIES III

GRAIN TONNES/HECTARE

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

PK SUB	---		--S		PKS	
YEAR	1980	1983	1980	1983	1980	1983
N PATH						
75 ENHD	7.02	6.90	6.91	7.06	7.06	6.81
150 ENHD	8.50	7.64	8.72	8.17	8.44	7.85
225 ENHD	8.57	8.45	8.98	8.58	8.65	8.07
150 STND	8.11	7.42	8.10	7.91	7.81	7.43

PK SUB	---		--S		PKS	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH						
75 ENHD	6.98	6.95	6.82	7.06	6.65	7.08
150 ENHD	7.71	8.25	8.30	8.52	7.86	8.29
225 ENHD	7.77	8.88	8.62	8.85	8.10	8.49
150 STND	7.20	8.05	7.44	8.29	6.96	7.95

YEAR	1980		1983	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	6.83	7.08	6.80	6.98
150 ENHD	8.19	8.73	7.72	7.97
225 ENHD	8.13	9.03	8.21	8.45
150 STND	7.38	8.32	7.02	7.87

YEAR	1980		1983	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
PK SUB				
---	7.34	8.40	7.49	7.66
--S	8.12	8.21	7.48	8.15
PKS	7.43	8.27	7.35	7.64

YEAR		1980		1983	
DRILL		CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH	PK SUB				
75 ENHD	---	6.82	7.12	7.14	6.77
	--S	7.11	6.81	6.54	7.32
	PKS	6.57	7.31	6.73	6.85
150 ENHD	---	7.77	8.86	7.65	7.64
	--S	8.77	8.69	7.83	8.34
	PKS	8.03	8.64	7.69	7.93
225 ENHD	---	7.49	9.11	8.05	8.65
	--S	8.88	9.03	8.37	8.68
	PKS	8.01	8.96	8.19	8.01
150 STND	---	7.30	8.51	7.10	7.58
	--S	7.70	8.29	7.18	8.28
	PKS	7.13	8.15	6.79	7.75

N PATH	75 ENHD	150 ENHD	225 ENHD	150 STND	MEAN
EXTRA					
TPK 80 D	6.74	8.62	9.23	8.24	8.21
TPK 80 C	6.76	8.19	8.81	7.39	7.79
MEAN	6.75	8.40	9.02	7.81	8.00

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85/W/CS/245 WINTER BARLEY SERIES III

GRAIN TONNES/HECTARE

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

TABLE	EXTRA	PK SUB	YEAR	DRILL	
SED	0.404	0.165	0.135	0.143	
TABLE	N PATH* PK SUB	N PATH* YEAR	PK SUB YEAR	N PATH* DRILL	
SED	0.251	0.205	0.234	0.218	
TABLE	PK SUB DRILL	YEAR DRILL	N PATH* EXTRA	N PATH* PK SUB YEAR	
SED	0.286	0.233			MIN REP
	0.248	0.202	0.616	0.355	MAX-MIN
	0.202	0.165			MAX REP
TABLE	N PATH* PK SUB DRILL	N PATH* YEAR DRILL	PK SUB YEAR DRILL	N PATH* PK SUB YEAR DRILL	
SED	0.435	0.355	0.404	0.616	MIN REP
	0.377	0.307	0.350	0.533	MAX-MIN
	0.308	0.251	0.286	0.435	MAX REP

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

STRATUM	DF	SE	CV%
WP1	6	0.286	3.6
WP1.WP2	18	0.379	4.8

GRAIN MEAN DM% 82.3

SUB PLOT AREA HARVESTED 0.00341

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85/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 - Great Field I.

Sponsors: J. McEwen, A.E. Johnston, D.P. Yeoman.

The sixth year, s. barley.

For previous years see 80-84/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) as 'Nitro-Chalk' (27.5% N) (cumulative to previous years):

0
40
80
120

NOTES: (1) Rates of P and K were 1000 kg P205, as superphosphate, 500 kg K20, as muriate of potash.
(2) Subsoiling was done with 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 to 1985.

Basal applications: Manures: (0:24:24) at 260 kg. Weedkillers: Clopyralid at 0.05 kg and bromoxynil octanoate at 0.24 kg with mecoprop (as 'CMPP' at 3.0 l) applied with the fungicide in 200 l. Fungicide: Tridemorph at 0.52 kg.

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

Cultivations, etc.:- Ploughed: 13 Nov, 1984. PK applied, spring-tine cultivated, N treatments applied, spring-tine cultivated again, seed sown: 19 Mar, 1985. Weedkillers and fungicide applied: 10 May. Combine harvested: 22 Aug.

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85/R/CS/246

GRAIN TONNES/HECTARE

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

N PK SUB	0	40	80	120	MEAN
- - -	3.72	5.74	7.64	7.38	6.12
- - S	3.41	6.35	7.54	8.26	6.39
P - S	4.16	5.19	7.59	7.95	6.22
- K S	3.49	5.69	7.35	7.97	6.12
P K S	4.39	6.22	7.60	8.13	6.58
P K T	4.56	6.05	7.44	7.96	6.50
MEAN	3.92	5.86	7.54	7.86	6.29

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

TABLE	PK SUB	N	PK SUB N	
SED	0.283		0.567	MIN REP
	0.245	0.214	0.491	MAX-MIN
			0.401	MAX REP

PKSUB
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	32	0.567	9.0

GRAIN MEAN DM% 81.3

STRAW TONNES/HECTARE

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

N PK SUB	0	40	80	120	MEAN
- - -	1.38	2.80	4.07	5.06	3.33
- - S	1.10	2.85	4.01	5.20	3.29
P - S	1.67	2.51	4.44	5.26	3.47
- K S	1.13	2.93	4.20	4.51	3.19
P K S	1.74	2.94	4.57	5.80	3.76
P K T	1.63	3.25	4.28	5.57	3.68
MEAN	1.43	2.87	4.23	5.21	3.44

STRAW MEAN DM% 82.1

PLOT AREA HARVESTED 0.00217

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85/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 sixth year, s. barley.

For previous years see 80-84/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 for 1981 and 1982 plus farmyard manure at 40 t for each year including 1985

Basal applications: Manures: (20:10:10) at 630 kg. Weedkillers: Paraquat at 0.60 kg ion in 500 l. Clopyralid at 0.05 kg and bromoxynil at 0.24 kg with mecoprop at 1.7 kg applied with the fungicide in 500 l. Fungicide: Tridemorph at 0.52 kg.

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

Cultivations, etc.:- Paraquat applied: 20 Nov, 1984. Cultivated by rotary grubber: 1 Feb, 1985. FYM treatments applied: 5 Feb. Spring-tine cultivated twice, NPK applied, seed sown: 15 Mar. Remaining weedkillers applied with the fungicide: 9 May. Combine harvested: 22 Aug.

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85/R/CS/247

GRAIN TONNES/HECTARE

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

ORG MATT / WORMINOC(80)	NONE	STR	STR+FYM	MEAN
NONE	5.99	5.72	6.13	5.95
EVEN	6.02	6.39	6.21	6.21
CONC	6.28	6.29	6.28	6.28
MEAN	6.10	6.13	6.21	6.15

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

TABLE	WORMINOC(80)	ORG MATT	WORMINOC(80) ORG MATT
SED	0.218	0.218	0.378

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	0.463	7.5

GRAIN MEAN DM% 80.3

PLOT AREA HARVESTED 0.00244

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85/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 fourth year, s. barley, potatoes.

For previous years see 82-84/W/CS/273.

Design: In the fourth year: 2 randomised blocks of 2 plots split into 8.

Whole plot dimensions: 9.00 x 24.7.

Treatments: All combinations of:-

Whole plots

1. VARIETY		Varieties (both following Desiree in 1983, s. barley in other years)
	DESIREE	Desiree
	M PIPER	Maris Piper

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 2 Aug, 1985, 16 Aug, 30 Aug, 13 Sept.

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

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

5 June 12.5	15 July 12.5
9 July 12.5	26 July 12.5
	Total 50

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85/W/CS/273

Standard applications:
Potatoes: Manures: (0:14:28) at 540 kg. (10:10:15+4.5 Mg) at 2940 kg. Weedkiller: Linuron at 0.90 kg in 500 l. Fungicides: Mancozeb at 1.4 kg in 250 l on six occasions, with the insecticide on the second occasion. Fentin acetate with maneb (as 'Brestan 60' at 0.50 kg) in 250 l. Insecticide: Pirimicarb at 0.14 kg.
S. barley: Manures: (20:10:10) at 640 kg. Weedkillers: Clopyralid at 0.07 kg with bromoxynil at 0.34 kg and mecoprop at 2.1 kg in 250 l applied with the fungicide. Fungicide: Tridemorph at 0.52 kg.

Seed: S. barley: Triumph, dressed with flutriafol, thiabendazole and ethirimol, sown at 160 kg.

Cultivations, etc.:-
Potatoes: Disced: 14 Sept, 1984. PK applied: 4 Oct. Ploughed: 29 Nov. Spring-tine cultivated with crumbler attached: 19 Mar, 1985. Rotary harrowed: 20 Mar. NPK with Mg applied, spring-tine cultivated: 9 Apr. Oxamyl applied, rotary cultivated, potatoes planted: 26 Apr. Weedkiller applied: 29 May. Mancozeb applied: 20 June, 3 July, 23 July, 5 Aug, 13 Aug, 7 Sept. Insecticide applied: 3 July. 'Brestan 60' applied: 21 Aug. Lifted: 30 Sept.
S. barley: Disced: 14 Sept, 1984. Ploughed: 28-29 Nov. NPK applied, spring-tine cultivated with crumbler attached: 19 Mar, 1985. Rotary harrowed, seed sown: 20 Mar. Weedkillers and fungicide applied: 17 May. Combine harvested: 30 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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85/W/CS/273

POTATOES

TOTAL TUBERS TONNES/HECTARE

***** TABLES OF MEAN *****

SD TREAT	NONE	TOL+IMAZ	MEAN
VARIETY			
DESIREE	22.2	21.7	21.9
M PIPER	19.9	17.7	18.8
MEAN	21.1	19.7	20.4

NEMACIDE	NONE	OXAMYL	MEAN
VARIETY			
DESIREE	14.7	29.1	21.9
M PIPER	13.7	23.9	18.8
MEAN	14.2	26.5	20.4

NEMACIDE	NONE	OXAMYL	MEAN
SD TREAT			
NONE	14.4	27.8	21.1
TOL+IMAZ	14.1	25.3	19.7
MEAN	14.2	26.5	20.4

MOLLCIDE	NONE	METHIOCA	MEAN
VARIETY			
DESIREE	19.1	24.7	21.9
M PIPER	18.8	18.9	18.8
MEAN	19.0	21.8	20.4

MOLLCIDE	NONE	METHIOCA	MEAN
SD TREAT			
NONE	19.3	22.9	21.1
TOL+IMAZ	18.7	20.7	19.7
MEAN	19.0	21.8	20.4

MOLLCIDE	NONE	METHIOCA	MEAN
NEMACIDE			
NONE	11.6	16.9	14.2
OXAMYL	26.4	26.7	26.5
MEAN	19.0	21.8	20.4

	NEMACIDE	NONE		OXAMYL	
	MOLLCIDE	NONE	METHIOCA	NONE	METHIOCA
VARIETY	SD TREAT				
DESIREE	NONE	9.6	19.9	27.6	31.7
	TOL+IMAZ	11.4	18.0	27.9	29.3
M PIPER	NONE	13.2	14.9	26.6	25.1
	TOL+IMAZ	12.0	14.8	23.4	20.7

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85/W/CS/273

POTATOES

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

TABLE	VARIETY	SD TREAT	NEMACIDE	MOLLCIDE
SED	0.36	1.88	1.88	1.88

TABLE	VARIETY SD TREAT	VARIETY NEMACIDE	SD TREAT NEMACIDE	VARIETY MOLLCIDE
SED	1.92	1.92	2.66	1.92
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY	2.66	2.66		2.66

TABLE	SD TREAT MOLLCIDE	NEMACIDE MOLLCIDE	VARIETY SD TREAT NEMACIDE	VARIETY SD TREAT MOLLCIDE
SED	2.66	2.66	3.28	3.28
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
VARIETY			3.76	3.76

TABLE	VARIETY NEMACIDE MOLLCIDE	SD TREAT NEMACIDE MOLLCIDE	VARIETY SD TREAT NEMACIDE MOLLCIDE
SED	3.28	3.76	4.99
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
VARIETY	3.76		5.32

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	14	5.32	26.1

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85/W/CS/273

POTATOES

PERCENTAGE WARE 4.44 CM (1.75 INCH) RIDDLE

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

SD TREAT	NONE	TOL+IMAZ	MEAN
VARIETY			
DESIREE	66.1	67.5	66.8
M PIPER	73.2	81.0	77.1
MEAN	69.7	74.3	72.0

NEMACIDE	NONE	OXAMYL	MEAN
VARIETY			
DESIREE	58.3	75.3	66.8
M PIPER	72.6	81.6	77.1
MEAN	65.4	78.5	72.0

NEMACIDE	NONE	OXAMYL	MEAN
SD TREAT			
NONE	64.4	74.9	69.7
TOL+IMAZ	66.5	82.1	74.3
MEAN	65.4	78.5	72.0

MOLLCIDE	NONE	METHIOCA	MEAN
VARIETY			
DESIREE	67.2	66.4	66.8
M PIPER	75.1	79.1	77.1
MEAN	71.1	72.8	72.0

MOLLCIDE	NONE	METHIOCA	MEAN
SD TREAT			
NONE	69.4	69.9	69.7
TOL+IMAZ	72.9	75.7	74.3
MEAN	71.1	72.8	72.0

MOLLCIDE	NONE	METHIOCA	MEAN
NEMACIDE			
NONE	63.3	67.6	65.4
OXAMYL	79.0	78.0	78.5
MEAN	71.1	72.8	72.0

NEMACIDE	NONE		OXAMYL	
MOLLCIDE	NONE	METHIOCA	NONE	METHIOCA
VARIETY SD TREAT				
DESIREE NONE	60.6	58.1	73.8	71.9
TOL+IMAZ	54.9	59.6	79.4	76.2
M PIPER NONE	66.7	72.3	76.6	77.3
TOL+IMAZ	71.1	80.3	86.1	86.6

SUB PLOT AREA HARVESTED 0.00075

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85/W/CS/293

NITRIFICATION INHIBITORS

Object: To study the effects of nitrification inhibitors on the yield and nitrogen uptake of w. oats - Woburn The Pightle.

Sponsors: G.A. Rodgers, A. Penny.

The fourth year, w. oats.

For previous years see 82/W/WW/3 and 83-84/W/CS/293.

Design: 2 randomised blocks of 21 plots.

Whole plot dimensions: 4.0 x 12.0.

Treatments, applied cumulatively to 1982, 1983 and 1984:
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' (26% N):

0
35
70

plus 3 extra treatments given nitrogen fertilizer in spring only (kg N) as 'Nitro-Chalk' (26% N).

N RATE X
0
35
70

NOTE: Nitrification inhibitors were applied on 11 Oct, 1984.

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85/W/CS/293

Basal applications: Manure: 0.18 kg Mn as 'Vytel' applied in 250 l with the weedkillers and the growth regulator. Weedkillers: Paraquat at 0.30 kg ion in 250 l; clopyralid at 0.07 kg with bromoxynil at 0.34 kg applied with the manure and the growth regulator. Growth regulator: Chlormequat applied on two occasions, on the first occasion (as 'Power C' at 1.25 l) with the manure and the weedkillers, on the second occasion (as 'Power C' at 4.2 l) with the fungicide. Fungicide: Tridemorph at 0.52 kg in 250 l.

Seed: Panema, sown at 160 kg.

Cultivations, etc.:- Paraquat applied: 18 Sept, 1984. Ploughed: 25 Sept. Autumn treatments applied, harrowed, seed sown: 11 Oct. Spring treatments applied: 9 Apr, 1985. Mn, weedkillers and chlormequat applied: 17 Apr. Chlormequat and the fungicide applied: 26 May. Combine harvested: 23 Aug.

NOTES: (1) Soil samples were taken in late autumn, then at intervals until April and again before harvest for ammonia and nitrate analyses.
(2) Plant samples were taken in spring, June 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	7.54	7.05	7.16	7.25
35	7.27	7.17	7.69	7.38
70	6.22	6.90	6.87	6.66
MEAN	7.01	7.04	7.24	7.10

I RATE / N RATE	SINGLE	DOUBLE	MEAN
0	7.57	6.93	7.25
35	7.28	7.48	7.38
70	6.49	6.84	6.66
MEAN	7.11	7.08	7.10

I RATE / I FORM	SINGLE	DOUBLE	MEAN
DICYANDI	7.05	6.97	7.01
ETRIDIAZ	6.98	7.10	7.04
NITRAPYR	7.31	7.17	7.24
MEAN	7.11	7.08	7.10

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85/W/CS/293

GRAIN TONNES/HECTARE

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

I FORM	DICYANDI		ETRIDIAZ		NITRAPYR	
I RATE	SINGLE	DOUBLE	SINGLE	DOUBLE	SINGLE	DOUBLE
N RATE						
0	7.90	7.18	7.35	6.76	7.46	6.86
35	7.11	7.44	7.11	7.23	7.63	7.76
70	6.14	6.30	6.48	7.32	6.85	6.89

EXTRA PLOTS

N RATE X	0	35	70	MEAN
	7.50	7.13	6.95	7.19

GRAND MEAN 7.11

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

TABLE	N RATE X	N RATE	I FORM	I RATE
	0.478	0.195	0.195	0.159

TABLE	N RATE I FORM	N RATE I RATE	I FORM I RATE	N RATE I FORM I RATE
SED	0.338	0.276	0.276	0.478

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

STRATUM	DF	SE	CV%
BLOCK.WP	20	0.478	6.7

GRAIN MEAN DM% 79.5

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85/W/CS/293

STRAW TONNES/HECTARE

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

I FORM / N RATE	DICYANDI	ETRIDIAZ	NITRAPYR	MEAN
0	6.39	6.37	5.17	5.98
35	6.09	5.87	5.71	5.89
70	6.33	6.59	6.68	6.53
MEAN	6.27	6.28	5.85	6.13

I RATE / N RATE	SINGLE	DOUBLE	MEAN
0	5.97	5.99	5.98
35	5.95	5.83	5.89
70	6.85	6.22	6.53
MEAN	6.26	6.01	6.13

I RATE / I FORM	SINGLE	DOUBLE	MEAN
DICYANDI	6.20	6.35	6.27
ETRIDIAZ	6.48	6.08	6.28
NITRAPYR	6.10	5.61	5.85
MEAN	6.26	6.01	6.13

I FORM	DICYANDI		ETRIDIAZ		NITRAPYR	
I RATE / N RATE	SINGLE	DOUBLE	SINGLE	DOUBLE	SINGLE	DOUBLE
0	6.49	6.29	6.24	6.51	5.19	5.16
35	5.50	6.68	6.29	5.44	6.06	5.35
70	6.60	6.06	6.90	6.28	7.05	6.31

EXTRA PLOTS

N RATE X	0	35	70	MEAN
	5.45	5.48	6.89	5.94

GRAND MEAN 6.11

STRAW MEAN DM% 80.7

PLOT AREA HARVESTED 0.00244

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85/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 third year, lucerne.

For previous years see 83-84/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

NOTES: (1) Carbofuran was applied to seed furrow, in 1983 only. The other chemicals were applied after each cut in 1983; after each cut except the last in 1984; before the first cut and after each cut except the last in 1985. Aldicarb was applied in 7500 l by weeder bar. Hydraulic sprays were applied in 310 l and electrostatic sprays in 5.7 l.

(2) The carbendazim application by electrostatic sprayer due after the first cut 1985 was omitted because of a formulation problem.

(3) Pirimiphos methyl was applied before and after the first cut 1985 but the material was not available for subsequent treatments.

Basal applications: Manures: (0:24:24) at 730 kg. Weedkiller: Propyzamide at 0.70 kg in 220 l.

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Cultivations, etc.:- PK applied: 26 Nov, 1984. Weedkiller applied: 22 Jan, 1985. Treatments applied: 1 May. Cut: 17 June. Aldicarb treatment applied: 2 July. Remaining treatments applied: 12 July. Cut: 20 Aug. Aldicarb treatment applied: 2 Sept. Remaining treatments applied: 6 Sept. Cut: 4 Nov.

1ST CUT (17/6/85) DRY MATTER TONNES/HECTARE

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

TREATMNT	
EV 0	4.63
EV C	5.34
ER 0	3.67
ER C	3.58
ER C AW	4.93
ER C CE	4.89
ER C CH	5.67
ER C DE	3.95
ER C DH	6.08
ER C PE	3.49
ER C PH	4.32
ER C TCE	6.50
ER C TCH	5.59
ER C TBE	5.65
ER C TBH	5.73
MEAN	4.86

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

TABLE	TREATMNT	
SED	1.207	MIN REP
	1.045	MAX-MIN

	TREATMENT
MAX-MIN	ER 0 V ANY OF REMAINDER
MIN REP	ANY OF THE REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	1.207	24.9

1ST CUT MEAN DM% 19.6

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85/R/CS/298

2ND CUT (20/8/85) DRY MATTER TONNES/HECTARE

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

TREATMNT	
EV 0	4.57
EV C	4.35
ER 0	3.38
ER C	3.00
ER C AW	4.19
ER C CE	4.02
ER C CH	4.43
ER C DE	3.48
ER C DH	5.51
ER C PE	2.73
ER C PH	3.25
ER C TCE	5.20
ER C TCH	4.98
ER C TBE	5.41
ER C TBH	4.22
MEAN	4.13

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

TABLE	TREATMNT	
SED	0.806	MIN REP
	0.698	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	0.806	19.5

2ND CUT MEAN DM% 22.9

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85/R/CS/298

3RD CUT (4/11/85) DRY MATTER TONNES/HECTARE

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

TREATMNT	
EV 0	2.57
EV C	2.72
ER 0	1.61
ER C	1.64
ER C AW	1.57
ER C CE	1.93
ER C CH	1.57
ER C DE	2.00
ER C DH	2.22
ER C PE	1.43
ER C PH	1.71
ER C TCE	2.14
ER C TCH	2.00
ER C TBE	2.57
ER C TBH	1.57
MEAN	1.93

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

TABLE	TREATMNT	
SED	0.444	MIN REP
	0.384	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	0.444	23.0

3RD CUT MEAN DM% 28.1

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85/R/CS/298

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

TREATMNT	
EV O	11.77
EV C	12.41
ER O	8.66
ER C	8.23
ER C AW	10.70
ER C CE	10.85
ER C CH	11.67
ER C DE	9.43
ER C DH	13.80
ER C PE	7.65
ER C PH	9.29
ER C TCE	13.85
ER C TCH	12.57
ER C TBE	13.63
ER C TBH	11.53
MEAN	10.92

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

TABLE	TREATMNT	
SED	2.008	MIN REP
	1.739	MAX-MIN

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

STRATUM	DF	SE	CV%
BLOCK.WP	16	2.008	18.4

TOTAL OF 3 CUTS MEAN DM% 23.5

PLOT AREA HARVESTED 0.00045

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85/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 a sequence of crops - Meadow.

Sponsors: G.A. Hide, P.J. Read.

The third year, potatoes.

For previous year see 84/R/CS/299.

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. PREVCROP(84) Crops in 1984:

   W WHEAT
   W BARLEY

Sub plots

2. PREVCROP(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: Manures: Chalk at 5.0 t. (10:10:15+4.5Mg) at 1960 kg. Weedkillers: Linuron at 1.3 kg with paraquat at 0.50 kg ion in 500 l. Fungicides: Mancozeb at 1.4 kg in 200 l on four occasions, applied with the insecticide on the second and third occasion. Fentin hydroxide at 0.28 kg in 200 l. Insecticide: Pirimicarb at 0.14 kg on two occasions. Desiccant: Diquat at 0.80 kg ion in 200 l.

Seed: Desiree.

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85/R/CS/299

Cultivations, etc.:- Chalk applied: 2 Oct, 1984. Ploughed: 18 Dec. NPK Mg applied: 3 Apr, 1985. Rotary harrowed, potatoes planted: 9 Apr. Weedkillers applied: 16 May. Mancozeb applied: 20 June, 6 Aug. Mancozeb with pirimicarb applied: 3 July, 23 July. Fentin hydroxide applied: 21 Aug. Haulm mechanically destroyed: 6 Sept. Desiccant applied: 9 Sept. Lifted: 16 Oct.

NOTE: Plants were sampled in mid-June for measurements of leaf area, weight of haulm, roots and tubers and assessment of diseases on stem bases.

POTATOES

TOTAL TUBERS TONNES/HECTARE

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

PREVCROP(83) PREVCROP(84)	FALLOW B	FALLOW P	POTATOES	S BARLEY	MEAN
W WHEAT	57.4	58.1	57.1	56.5	57.3
W BARLEY	58.2	58.4	58.6	61.4	59.2
MEAN	57.8	58.3	57.9	58.9	58.2

INOC(83) PREVCROP(84)	NONE	RHIZ C W	RHIZ S B	RHIZ S P	MEAN
W WHEAT	56.7	58.3	55.0	59.1	57.3
W BARLEY	59.7	59.2	58.5	59.2	59.2
MEAN	58.2	58.8	56.8	59.2	58.2

INOC(83) PREVCROP(83)	NONE	RHIZ C W	RHIZ S B	RHIZ S P	MEAN
FALLOW B	56.5	58.0	56.9	59.7	57.8
FALLOW P	58.3	58.3	58.1	58.4	58.3
POTATOES	59.2	58.8	55.5	58.1	57.9
S BARLEY	58.7	59.9	56.7	60.5	58.9
MEAN	58.2	58.8	56.8	59.2	58.2

PREVCROP(84)	INOC(83) PREVCROP(83)	NONE	RHIZ C W	RHIZ S B	RHIZ S P
W WHEAT	FALLOW B	56.9	57.1	55.5	60.0
	FALLOW P	58.1	58.4	57.3	58.7
	POTATOES	56.2	59.6	53.5	59.2
	S BARLEY	55.4	58.0	53.8	58.5
W BARLEY	FALLOW B	56.2	58.9	58.3	59.4
	FALLOW P	58.5	58.3	58.8	58.0
	POTATOES	62.1	58.0	57.4	57.0
	S BARLEY	62.0	61.8	59.5	62.4

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

TABLE	PREVCROP(83)	INOC(83)	PREVCROP(84)* PREVCROP(83)
SED	0.94	1.55	1.33

TABLE	PREVCROP(84)* INOC(83)	PREVCROP(83) INOC(83)	PREVCROP(84)* PREVCROP(83) INOC(83)
SED	2.19	2.84	4.02
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
PREVCROP(83)		3.10	
PREVCROP(84).PREVCROP(83)			4.38

* WITHIN THE SAME LEVEL OF PREVCROP(84) ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	6	1.33	2.3
BLOCK.WP.SP.SSP	24	4.38	7.5

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85/R/CS/299

POTATOES

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

PREVCROP(83) PREVCROP(84)	FALLOW B	FALLOW P	POTATOES	S BARLEY	MEAN
W WHEAT	83.5	85.3	77.7	85.1	82.9
W BARLEY	84.8	85.6	82.5	86.1	84.7
MEAN	84.1	85.5	80.1	85.6	83.8

INOC(83) PREVCROP(84)	NONE	RHIZ C W	RHIZ S B	RHIZ S P	MEAN
W WHEAT	81.5	84.3	81.9	83.9	82.9
W BARLEY	84.8	84.9	84.5	84.8	84.7
MEAN	83.1	84.6	83.2	84.3	83.8

INOC(83) PREVCROP(83)	NONE	RHIZ C W	RHIZ S B	RHIZ S P	MEAN
FALLOW B	84.3	83.7	83.0	85.4	84.1
FALLOW P	84.9	84.7	86.4	86.0	85.5
POTATOES	77.6	83.7	78.9	80.4	80.1
S BARLEY	85.8	86.4	84.5	85.6	85.6
MEAN	83.1	84.6	83.2	84.3	83.8

PREVCROP(84)	INOC(83) PREVCROP(83)	NONE	RHIZ C W	RHIZ S B	RHIZ S P
W WHEAT	FALLOW B	83.2	82.4	83.1	85.2
	FALLOW P	84.1	85.6	85.5	86.1
	POTATOES	74.3	82.7	75.5	78.6
	S BARLEY	84.4	86.7	83.5	85.6
W BARLEY	FALLOW B	85.5	85.1	82.9	85.5
	FALLOW P	85.6	83.9	87.2	85.8
	POTATOES	80.9	84.7	82.3	82.3
	S BARLEY	87.2	86.0	85.5	85.5

SUB PLOT AREA HARVESTED 0.00132

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85/R/CS/302

EYESPOT RESISTANCE TO MBC

Object: To study the development of resistance to MBC fungicides in eyespot and the ability of resistant strains to survive, spread and infect - Meadow.

Sponsors: G.L. Bateman, B.D.L. Fitt.

The first year, w. wheat.

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

Whole plot dimensions: 12.0 x 24.0.

Treatments: All combinations of:-

Whole plots

1. FUNGCIDE	Fungicides:	
	NONE	None
	CARB	Carbendazim at 0.25 kg
	PRO	Prochloraz at 0.40 kg
	CARB+PRO	Carbendazim at 0.15 kg + prochloraz at 0.40 kg

Sub plots

2. EYE INOC	Eyespot inoculum:	
	NATURAL	Natural background population (duplicated)
	W 19R 1S	Inoculated with wheat strains in proportion 19 resistant to one sensitive
	W 1R 19S	As above but one resistant to 19 sensitive
	R 19R 1S	Inoculated with rye strains, 19 resistant to one sensitive
	R 1R 19S	As above but one resistant to 19 sensitive

NOTES: (1) Fungicide treatments were applied in 200 l on 26 Nov, 1984 repeated on 10 Apr, 1985.
(2) The eyespot inoculum was colonised on oat seed and this was broadcast on 18 Oct, 1984.

Basal applications: Manures: Chalk at 5.0 t. (5:14:30) at 340 kg. 'Nitro-Chalk' (27.5% N) at 720 kg. Weedkillers: Chlortoluron at 3.5 kg in 250 l. Clopyralid at 0.07 kg and bromoxynil octanoate 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: Avalon, sown at 170 kg.

Cultivations, etc.:- Chalk applied, ploughed: 2 Oct, 1984. NPK applied, spring-tine cultivated, rotary harrowed, seed sown, chlortoluron applied: 4 Oct. Remaining weedkillers applied: 10 Apr, 1985. N applied: 16 Apr. Insecticide applied: 10 July. Combine harvested: 29 Aug. Previous crops: S. barley 1983, w. wheat 1984.

NOTE: Eyespot and sharp eyespot were assessed in April and July. Eyespot was characterized according to type and MBC resistance.

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85/R/CS/302

GRAIN TONNES/HECTARE

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

EYE INOC FUNGCIDE	NATURAL	W 19R 1S	W 1R 19S	R 19R 1S	R 1R19S	MEAN
NONE	6.75	6.55	5.68	6.20	6.82	6.46
CARB	6.78	6.41	6.72	5.98	6.88	6.59
PRO	6.30	5.80	6.93	6.78	6.82	6.49
CARB+PRO	7.71	7.55	6.80	7.24	7.32	7.39
MEAN	6.89	6.58	6.53	6.55	6.96	6.73

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

TABLE	EYE INOC	FUNGCIDE* EYE INOC	
SED	0.255	0.510	MIN REP
	0.221	0.442	MAX-MIN

	EYE INOC
MAX-MIN	NATURAL V ANY OF THE REMAINDER
MIN REP	ANY OF THE REMAINDER

* WITHIN THE SAME LEVEL OF FUNGCIDE ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	24	0.510	7.6

GRAIN MEAN DM% 84.0

PLOT AREA HARVESTED 0.00142

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85/R/CS/303

FACTORS AFFECTING TILLERING AND YIELD

Object: To study the effects of applying nitrogen at a range of growth stages on tiller production and survival and on the yield of winter wheat - Long Hoos I/II.

Sponsors: R.D. Prew, R.J. Darby, A. Penny, G.C. Scott, G.N. Thorne, A.D. Todd, D.W. Wood.

Associate sponsors: P.B. Barraclough, A.H. Weir, F.V. Widdowson.

The second year, winter wheat.

Design: 2 x 2 x 2 x 2 x 2 + 26 extra plots.

Whole plot dimensions: 3.0 x 18.0.

Treatments: All combinations of the following (all given insecticides and molluscicide):

1. PREVCROP		Previous cropping:
	RAPE	W. oilseed rape, failed and re-sown to s. oilseed rape in 1984
	OATS	W. oats in 1984
2. WINTER N		Nitrogen (kg N), as urea, in winter:
	0	None
	60	60 kg N on 7 Nov, 1984
3. E SPNG N		Application of nitrogen, 60 kg N after rape, 80 kg N after oats, as 'Nitro-Chalk' (26% N) in early spring:
	EARLY D	Half on 25 Feb, 1985 half on 18 Mar
	EARLY S	All on 18 Mar
4. L SPNG N		Application of nitrogen, 120 kg N after rape, 160 kg N after oats, as 'Nitro-Chalk' (26% N) in late spring:
	LATE D	Half on 15 Apr, half on 9 May
	LATE S	All on 15 Apr
5. SUMMER N		Nitrogen (kg N), as 'Nitro-Chalk' (26% N), in summer:
	0	None
	60	60 kg N on 30 May

plus all combinations of the following (all given late spring N divided and summer N but not given insecticides):

1. PRECROPX		Previous cropping:
	RAPE	W. oilseed rape failed and re-sown to s. oilseed rape in 1984
	OATS	W. oats in 1984

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85/R/CS/303

2. WINTR NX		Nitrogen (kg N), as urea, in winter:
	0	None
	60	60 kg N on 7 Nov, 1984
3. ESPNG NX		Application of nitrogen, 60 kg N after rape, 80 kg N after oats, as 'Nitro-Chalk' (26% N) in early spring:
	EARLY D	Half on 25 Feb, 1985 half on 18 Mar
	EARLY S	All on 18 Mar

plus all combinations of the following (all given insecticides and molluscicide but not summer N):

1. PRECROPN		Previous cropping:
	RAPE	W. oilseed rape, failed and re-sown to s. oilseed rape in 1984
	OATS	W. oats in 1984
2. WINTR NN		Nitrogen (kg N), as urea, in winter:
	0	None
	60	60 kg N on 7 Nov, 1984
3. SPRNG NN		Nitrogen in spring (kg N), one third on 18 Mar, 1985, two thirds on 15 Apr:
	N1	120 kg after rape, 180 kg after oats
	N3	240 kg after rape, 300 kg after oats

plus five extra treatments, all given insecticides, all duplicated:

EXTRA	
RAPE N0	After oilseed rape as above, given molluscicide, no nitrogen
OATS N0	After oats as above, given molluscicide, no nitrogen
RAPE M0	After oilseed rape as above, given no molluscicide, given winter N, early spring N divided, late spring N divided and summer N
OATSS0 F	After oats as above, given no summer nitrogen, given fenpropimorph at 0.75 kg in 220 l on 10 Dec, 1984 given early spring N divided, late spring N divided and molluscicide
OATSSN F	As for OATSS0 F also given summer nitrogen

Eight additional plots following fallow were used for root sampling, yields not taken.

NOTES: (1) Insecticide treatments were: Cypermethrin at 0.02 kg in 200 l on 30 Oct, 1984 plus chlorpyrifos at 0.72 kg in 220 l on 30 Jan, 1985 plus omethoate at 0.65 kg in 220 l on 4 Apr.
(2) The molluscicide treatment was: Methiocarb at 0.22 kg applied as pellets on 13 Sept, 1984.

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85/R/CS/303

Standard applications (1984 crops):
Rape: Manures: 'Nitro-Chalk' (26% N) at 250 kg followed by 770 kg. Weedkillers: TCA at 11 kg in 220 l. Propachlor at 4.3 kg in 250 l.
Oats: Manures: 'Nitro-Chalk' (26% N) at 130 kg followed by 380 kg. Weedkillers: Paraquat at 0.60 kg ion in 200 l. Methabenzthiazuron at 2.4 kg in 220 l. Dicamba, mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 250 l.

Seed (1984 crops):
Rape: Jet Neuf, dressed thiram and iprodione, sown at 9.0 kg (crop failed). Re-sown in spring with Brutor, dressed thiram and fenpropimorph, sown at 8.0 kg.
Oats: Pennal, sown at 190 kg.

Cultivations, etc. (1984 crops):-
Both crops and fallow: Heavy spring-tine cultivated twice: 24 Aug, 1983. Disced: 26 Aug.
Rape: First N applied, TCA applied: 30 Aug, 1983. Rotary harrowed, seed sown: 31 Aug. Rotary cultivated (crop failed) : 7 Dec. Second N applied: 5 Apr, 1984. Heavy spring-tine cultivated, rotary harrowed: 12 Apr. Rotary harrowed, seed sown: 13 Apr. Propachlor applied: 18 Apr. Combine harvested: 3 Sept.
Oats: N applied: 30 Aug, 1983. Paraquat applied: 2 Oct. Spring-tine cultivated, rotary harrowed, seed sown: 4 Oct. Methabenzthiazuron applied: 6 Oct. N applied: 5 Apr, 1984. 'Herrisol' applied: 18 Apr. Combine harvested: 3 Aug.
Fallow: Rotary hoed: 22 June, 1984.
Previous crops: Potatoes 1982, w. barley 1983.

Basal applications (to 1985 wheat): Manures: (0:18:36) at 280 kg. Weedkillers: Isoproturon at 2.4 kg with mecoprop at 1.1 kg, bromoxynil at 0.14 kg and ioxynil at 0.14 kg in 250 l. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg in 200 l. Propiconazole at 0.25 kg in 200 l. Propiconazole at 0.12 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 200 l. Insecticide: Pirimicarb at 0.14 kg in 200 l.

Seed (1985 wheat): Avalon, sown at 220 kg.

Cultivations, etc. (to 1985 wheat):- Cultivated by rotary digger (1984 rape stubble only): 8 Sept, 1984. PK applied: 10 Sept. Ploughed, spring-tine cultivated: 11 Sept. Disced three times: 12 Sept. Rotary harrowed, seed sown: 19 Sept. Weedkillers applied: 7 Dec. Prochloraz and carbendazim applied: 10 Apr, 1985. Propiconazole applied: 31 May. Propiconazole with 'Septal' applied: 2 July. Insecticide applied: 15 July. Combine harvested: 29 Aug.

NOTE: Soil samples were taken for measurements of water and mineral N contents in October, November and February. Light interception, dry weight, leaf area, shoot numbers, N content of the above-ground crop and stem nitrate contents were measured on several occasions. Foliar and stem-based diseases and shoot borers were assessed.

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85/R/CS/303

GRAIN TONNES/HECTARE

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

WINTER N	0	60	MEAN
PREVCROP			
RAPE	10.34	9.82	10.08
OATS	10.66	10.42	10.54
MEAN	10.50	10.12	10.31

E SPNG N	EARLY D	EARLY S	MEAN
PREVCROP			
RAPE	10.06	10.10	10.08
OATS	10.55	10.53	10.54
MEAN	10.31	10.31	10.31

E SPNG N	EARLY D	EARLY S	MEAN
WINTER N			
0	10.39	10.60	10.50
60	10.22	10.03	10.12
MEAN	10.31	10.31	10.31

L SPNG N	LATE D	LATE S	MEAN
PREVCROP			
RAPE	10.20	9.96	10.08
OATS	10.73	10.34	10.54
MEAN	10.47	10.15	10.31

L SPNG N	LATE D	LATE S	MEAN
WINTER N			
0	10.66	10.33	10.50
60	10.27	9.97	10.12
MEAN	10.47	10.15	10.31

L SPNG N	LATE D	LATE S	MEAN
E SPNG N			
EARLY D	10.52	10.09	10.31
EARLY S	10.42	10.21	10.31
MEAN	10.47	10.15	10.31

SUMMER N	0	60	MEAN
PREVCROP			
RAPE	9.94	10.22	10.08
OATS	10.34	10.74	10.54
MEAN	10.14	10.48	10.31

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85/R/CS/303

GRAIN TONNES/HECTARE

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

SUMMER N	0	60	MEAN
WINTER N			
0	10.34	10.66	10.50
60	9.95	10.30	10.12
MEAN	10.14	10.48	10.31

SUMMER N	0	60	MEAN
E SPNG N			
EARLY D	10.09	10.52	10.31
EARLY S	10.19	10.44	10.31
MEAN	10.14	10.48	10.31

SUMMER N	0	60	MEAN
L SPNG N			
LATE D	10.25	10.68	10.47
LATE S	10.03	10.28	10.15
MEAN	10.14	10.48	10.31

WINTR NX	0	60	MEAN
PRECROPX			
RAPE	10.49	10.58	10.53
OATS	10.72	10.82	10.77
MEAN	10.60	10.70	10.65

ESPNG NX	EARLY D	EARLY S	MEAN
PRECROPX			
RAPE	10.63	10.44	10.53
OATS	11.08	10.46	10.77
MEAN	10.85	10.45	10.65

ESPNG NX	EARLY D	EARLY S	MEAN
WINTR NX			
0	10.99	10.21	10.60
60	10.71	10.68	10.70
MEAN	10.85	10.45	10.65

WINTR NN	0	60	MEAN
PRECROPN			
RAPE	10.05	9.86	9.96
OATS	10.32	10.09	10.20
MEAN	10.18	9.98	10.08

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85/R/CS/303

GRAIN TONNES/HECTARE

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

SPRNG NN	N1	N3	MEAN
PRECROPN			
RAPE	9.99	9.92	9.96
OATS	10.31	10.10	10.20
MEAN	10.15	10.01	10.08

SPRNG NN	N1	N3	MEAN
WINTR NN			
0	10.03	10.33	10.18
60	10.27	9.69	9.98
MEAN	10.15	10.01	10.08

EXTRA	RAPE NO	OATS NO	RAPE MO	OATSSO F	OATSSN F
	8.39	5.04	9.34	10.77	10.77

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

(MAIN FACTORIAL PLOTS ONLY)
MARGIN OF TWO FACTOR TABLES 0.114
TWO FACTOR TABLES 0.161

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

STRATUM	DF	SE	CV%
WP	16	0.322	3.1

GRAIN MEAN DM% 85.4

PLOT AREA HARVESTED 0.00246

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85/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 second year, grass ley.

For previous year see 84/W/CS/304.

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	30 Jan, 1985
SPRING	7 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 11 Mar, 12 July, 6 Sept
SINGLE	Single dressing on 11 Mar

plus six extra treatments:

EXTRA	'Nitro-Chalk' (26% N) dressings (kg N):
0	None
	Dressings equally divided between 11 Mar, 12 July, 6 Sept:
NC1 D	125
NC2 D	250
NC3 D	375
NC4 D	500
	Single dressing on 11 Mar:
NC3 S	375

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85/W/CS/304

Basal applications: Manures: (0:18:36) at 470 kg. Weedkiller: Mecoprop at 2.1 kg in 250 l.

Cultivations, etc.:- PK applied: 13 Mar, 1985. Weedkiller applied: 4 Nov. Cut: 2 July, 3 Sept, 12 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 (2/7/85) DRY MATTER TONNES/HECTARE

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

APP TIME INHIB I	WINTER	SPRING	MEAN
0 AQU3	6.51	6.98	6.75
NIT AQU3	7.43	7.29	7.36
C+P AQU3	6.64	7.26	6.95
MEAN	6.86	7.18	7.02

APP DIV INHIB B	DIVIDED	SINGLE	MEAN
0 PU3	7.61	6.22	6.91
DIC PU3	7.11	7.24	7.17
PHEN PU3	6.89	6.71	6.80
MEAN	7.20	6.72	6.96

EXTRA	0	NC1 D	NC2 D	NC3 D	NC4 D	NC3 S	MEAN
	2.76	7.11	6.64	6.42	6.69	5.03	5.77

GRAND MEAN 6.58

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

TABLE	EXTRA	APP TIME	APP DIV	INHIB I
SED	0.848	0.490	0.490	0.600

TABLE	INHIB B	APP TIME INHIB I	APP DIV INHIB B
SED	0.600	0.848	0.848

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	1.039	15.8

1ST CUT MEAN DM% 22.7

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85/W/CS/304

2ND CUT (3/9/85) DRY MATTER TONNES/HECTARE

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

APP TIME INHIB I	WINTER	SPRING	MEAN
0 AQU3	3.69	4.28	3.98
NIT AQU3	3.75	4.57	4.16
C+P AQU3	3.87	3.95	3.91
MEAN	3.77	4.27	4.02

APP DIV INHIB B	DIVIDED	SINGLE	MEAN
0 PU3	3.37	2.45	2.91
DIC PU3	3.45	2.81	3.13
PHEN PU3	3.59	3.71	3.65
MEAN	3.47	2.99	3.23

EXTRA	0	NC1 D	NC2 D	NC3 D	NC4 D	NC3 S	MEAN
	0.61	2.39	3.61	3.58	3.86	3.99	3.00

GRAND MEAN 3.42

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

TABLE	EXTRA	APP TIME	APP DIV	INHIB I
SED	0.243	0.140	0.140	0.172

TABLE	INHIB B	APP TIME INHIB I	APP DIV INHIB B
SED	0.172	0.243	0.243

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.298	8.7

2ND CUT MEAN DM% 16.4

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85/W/CS/304

3RD CUT (12/11/85) DRY MATTER TONNES/HECTARE

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

APP TIME INHIB I	WINTER	SPRING	MEAN
0 AQU3	0.79	1.34	1.07
NIT AQU3	0.91	1.26	1.09
C+P AQU3	1.07	1.39	1.23
MEAN	0.93	1.33	1.13

APP DIV INHIB B	DIVIDED	SINGLE	MEAN
0 PU3	1.48	0.44	0.96
DIC PU3	1.47	0.51	0.99
PHEN PU3	1.84	0.94	1.39
MEAN	1.60	0.63	1.11

EXTRA	0	NC1 D	NC2 D	NC3 D	NC4 D	NC3 S	MEAN
	0.59	1.20	1.87	1.95	2.00	1.15	1.46

GRAND MEAN 1.23

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

TABLE	EXTRA	APP TIME	APP DIVN	INHIB I
SED	0.172	0.099	0.099	0.121

TABLE	INHIB B	APP TIME INHIB I	APP DIV INHIB B
SED	0.121	0.172	0.172

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.210	17.0

3RD CUT MEAN DM% 28.2

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85/W/CS/304

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

APP TIME INHIB I	WINTER	SPRING	MEAN
0 AQU3	10.99	12.60	11.80
NIT AQU3	12.09	13.12	12.61
C+P AQU3	11.58	12.60	12.09
MEAN	11.55	12.77	12.16

APP DIV INHIB B	DIVIDED	SINGLE	MEAN
0 PU3	12.46	9.11	10.79
DIC PU3	12.03	10.55	11.29
PHEN PU3	12.32	11.36	11.84
MEAN	12.27	10.34	11.31

EXTRA	0	NC1 D	NC2 D	NC3 D	NC4 D	NC3 S	MEAN
	3.95	10.69	12.12	11.95	12.54	10.18	10.24

GRAND MEAN 11.24

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

TABLE	EXTRA	APP TIME	APP DIV	INHIB I
SED	0.976	0.563	0.563	0.690

TABLE	INHIB B	APP TIME INHIB I	APP DIVN INHIB B
SED	0.690	0.976	0.976

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	1.195	10.6

TOTAL OF 3 CUTS MEAN DM% 22.4

PLOT AREA HARVESTED 0.00084

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85/R/CS/309 and 85/W/CS/309

LONG-TERM STRAW INCORPORATION

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

Sponsors: R.D. Prew, D.G. Christian, B.M. Church, M.J. Goss, R.J. Gutteridge, S.H.T. Harper, J.F. Jenkyn, A.E. Johnston, B.R. Kerry, R. Moffitt, W. Powell, G.C. Scott.

Associate sponsors: G.G. Briggs, D.S. Powlson, A.J. Thomasson.

The first year, w. wheat.

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

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

Treatments: All combinations of:-

1. STRAW	Treatments to straw from previous wheat:
BURNT	Burnt
CHOPPED	Chopped and spread (duplicated)
2. CULTIVTN	Cultivations:
TINE 10	Tine cultivated to 10 cm depth
TN1OPL2O	Tine cultivated to 10 cm depth, ploughed to 20 cm
TN1OTN2O	Tine cultivated to 10 cm depth and again to 20 cm
PLOUGH2O	Ploughed to 20 cm depth

NOTES: (1) Straw was chopped by trailed straw chopper and spread on 27 Aug (R), 28 Aug (W). Burnt straw plots were shallow disced on 30 Aug. Straw was spread and burnt for both sites on 29 Aug, 1984.
(2) A heavy spring-tine cultivator was used to cultivate to 10 cm depth, twice on 8 Sept (R), 29 Aug, 11 Sept (W). A chisel plough was used to cultivate to 20 cm depth, on 17 Sept (R) and a deep-tine cultivator to 20 cm on 11 Sept (W). All tine-cultivated plots on both sites were disced on 19 Sept.
(3) Ploughed plots were ploughed to 20 cm depth on 31 Aug (W), 13, 14 Sept (R)

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85/R/CS/309 and 85/W/CS/309

Basal applications:
Great Knott III (R): Manures: N at 40 kg followed by 200 kg as 'Nitro-Chalk' (27.5% N). Weedkillers: Glyphosate at 1.4 kg in 200 l. Paraquat at 0.60 kg ion in 250 l. Isoproturon at 2.0 kg with clopyralid at 0.07 kg, bromoxynil octanoate at 0.34 kg and mecoprop at 2.5 kg applied with the prochloraz and carbendazim in 200 l. Fungicides: Prochloraz at 0.40 kg with carbendazim at 0.15 kg. Propiconazole, applied on two occasions, at 0.25 kg alone in 200 l on the first, at 0.12 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 200 l on the second. Insecticide: Pirimicarb at 0.14 kg in 200 l. Desiccant: Glyphosate at 1.4 kg in 200 l.

Far Field I (W): Manures: N applied at 40 kg followed by 200 kg, as 'Nitro-Chalk' (27.5% N). Weedkillers: Paraquat at 0.30 kg ion on two occasions in 250 l. Mecoprop at 2.0 kg with bromoxynil at 0.25 kg and ioxynil at 0.25 kg in 250 l. Fungicides: Propiconazole on two occasions, at 0.25 kg and at 0.12 kg, with tridemorph at 0.19 kg on both occasions and with carbendazim and maneb (as 'Septal' at 2.5 kg) on the second, both in 250 l.

Seed: Great Knott III (R): Avalon, sown at 220 kg.
Far Field I (W): Avalon, sown at 170 kg.

Cultivations, etc.:-
Great Knott III (R): Glyphosate applied: 6 Aug, 1984. Paraquat applied: 2 Oct. Rotary harrowed, seed sown: 12 Oct. Spring-tine cultivated: 13 Oct. N applied: 6 Mar, 1985, 12 Apr. Weedkillers with fungicides applied: 9 Apr. Propiconazole applied: 3 June, with 'Septal': 2 July. Insecticide applied: 10 July. Desiccant applied: 21 Aug. Combine harvested: 30 Aug. Previous crops: Potatoes 1983, w. wheat 1984.

Far Field I (W): Paraquat applied: 19 Sept, 10 Oct, 1984. Rotary harrowed, seed sown: 11 Oct. N applied: 11 Mar, 1985, 18 Apr. Mecoprop with bromoxynil and ioxynil applied: 18 Apr. Propiconazole and tridemorph applied: 15 June. Propiconazole, tridemorph and 'Septal' applied: 2 July. Combine harvested: 7 Sept. Previous crops: Potatoes 1983, s. barley and w. wheat 1984.

NOTES: (1) Establishment counts were made in the autumn and measurements were made of total dry matter in spring.
(2) Fungal diseases were assessed at intervals during the season.
(3) Components of yield were measured.

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

GRAIN TONNES/HECTARE

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

CULTIVTN	TINE 10	TN10PL20	TN10TN20	PLOUGH20	MEAN
STRAW					
BURNT	9.88	10.06	10.01	10.01	9.99
CHOPPED	9.76	9.93	9.69	9.88	9.81
MEAN	9.80	9.97	9.80	9.93	9.87

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

TABLE	STRAW	CULTIVTN	STRAW CULTIVTN	
SED			0.113	MIN REP
	0.049	0.065	0.098	MAX-MIN
			0.080	MAX REP

	STRAW
MIN REP	BURNT ONLY
MAX-MIN	BURNT V CHOPPED
MAX REP	CHOPPED ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	37	0.160	1.6

GRAIN MEAN DM% 85.5

PLOT AREA HARVESTED 0.00315

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

GRAIN TONNES/HECTARE

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

CULTIVTN STRAW	TINE 10	TN10PL20	TN10TN20	PLOUGH20	MEAN
BURNT	9.69	9.40	9.49	9.35	9.49
CHOPPED	9.44	9.40	9.66	9.53	9.51
MEAN	9.53	9.40	9.60	9.47	9.50

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

TABLE	STRAW	CULTIVTN	STRAW CULTIVTN	
SED			0.357	MIN REP
	0.154	0.206	0.309	MAX-MIN
			0.252	MAX REP

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

STRATUM	DF	SE	CV%
BLOCK.WP	15	0.357	3.8

GRAIN MEAN DM% 80.6

PLOT AREA HARVESTED 0.00442

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85/R/CS/311

EFFECTS OF SHALLOW STRAW INCORPORATION

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

Sponsors: R.D. Prew, D.G. Christian, B.M. Church, R.J. Gutteridge, S.H.T. Harper, J.F. Jenkyn, A.E. Johnston, B.R. Kerry, R. Moffitt, W. Powell, G.C. Scott, A.D. Todd.

The first year, w. wheat.

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

Whole plot dimensions: 9.0 x 51.0.

Treatments: All combinations of:-

Whole plots

1. STRAW		Treatments to straw of previous wheat:
	BURNT	Burnt on 21 Aug, 1984, ash disced in on 22 Aug
	BALED	Baled and removed on 15 Aug
	CHOPPED	Chopped on 17 Aug
2. CULTTIME		Time of cultivation, to 10 cm depth:
	EARLY	Heavy spring-tine cultivated twice on 24 Aug, disced twice on 27 Aug
	LATER	Heavy spring-tine cultivated twice and disced twice on 2 Oct

Sub plots

3. AUT N		Autumn N as 'Nitro-Chalk' (26% N) applied just before cultivation:
	0	None
	50	50 kg N on 24 Aug (CULTTIME EARLY), 1 Oct (CULTTIME LATER)
4. FUNGCIDE		Fungicides:
	0	None
	FULL	Full programme:- Prochloraz at 0.40 kg and carbendazim at 0.15 kg in 500 l on 17 Apr, 1985 Propiconazole at 0.25 kg in 500 l on 4 June Propiconazole at 0.12 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 200 l on 2 July
5. INSCTCDE		Insecticide:
	0	None
	PIRIMICA	Pirimicarb at 0.14 kg in 500 l on 8 July

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85/R/CS/311

Basal applications: Manures: 'Nitro-Chalk' (27.5% N) at 140 kg followed by 730 kg. Weedkillers: Paraquat at 0.60 kg ion in 500 l. Isoproturon at 2.0 kg, with mecoprop at 1.6 kg, bromoxynil at 0.20 kg and ioxynil at 0.20 kg in 200 l.

Seed: Avalon, sown at 220 kg.

Cultivations, etc.:- Paraquat applied: 28 Aug, 1984. Rotary harrowed: 11 Oct. Seed sown: 12 Oct. Spring-tine cultivated: 13 Oct. First N applied: 28 Feb, 1985. Remaining weedkillers applied: 10 Apr. Second N applied: 12 Apr. Combine harvested: 30 Aug. Previous crops: Potatoes 1983, w. wheat 1984.

NOTE: Growth was measured and incidence of pests and diseases assessed at intervals during the season. Components of yield were measured.

GRAIN TONNES/HECTARE

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

CULTTIME	EARLY	LATER	MEAN
STRAW			
BURNT	7.95	8.61	8.28
BALED	8.13	8.33	8.23
CHOPPED	8.47	8.25	8.36
MEAN	8.18	8.39	8.29

AUT N	0	50	MEAN
STRAW			
BURNT	8.19	8.37	8.28
BALED	8.11	8.34	8.23
CHOPPED	8.18	8.54	8.36
MEAN	8.16	8.42	8.29

AUT N	0	50	MEAN
CULTTIME			
EARLY	8.10	8.26	8.18
LATER	8.22	8.57	8.39
MEAN	8.16	8.42	8.29

FUNGCIDE	0	FULL	MEAN
STRAW			
BURNT	7.50	9.06	8.28
BALED	7.40	9.05	8.23
CHOPPED	7.66	9.06	8.36
MEAN	7.52	9.06	8.29

FUNGCIDE	0	FULL	MEAN
CULTTIME			
EARLY	7.44	8.93	8.18
LATER	7.60	9.19	8.39
MEAN	7.52	9.06	8.29

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GRAIN TONNES/HECTARE

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

FUNGCIDE	0	FULL	MEAN
AUT N			
0	7.46	8.86	8.16
50	7.58	9.25	8.42
MEAN	7.52	9.06	8.29

INSCTCDE	0	PIRIMICA	MEAN
STRAW			
BURNT	8.11	8.45	8.28
BALED	8.14	8.31	8.23
CHOPPED	8.19	8.53	8.36
MEAN	8.15	8.43	8.29

INSCTCDE	0	PIRIMICA	MEAN
CULTTIME			
EARLY	7.94	8.42	8.18
LATER	8.35	8.43	8.39
MEAN	8.15	8.43	8.29

INSCTCDE	0	PIRIMICA	MEAN
AUT N			
0	7.97	8.35	8.16
50	8.33	8.50	8.42
MEAN	8.15	8.43	8.29

INSCTCDE	0	PIRIMICA	MEAN
FUNGCIDE			
0	7.47	7.57	7.52
FULL	8.83	9.29	9.06
MEAN	8.15	8.43	8.29

CULTTIME	EARLY		LATER	
AUT N	0	50	0	50
STRAW				
BURNT	7.90	8.01	8.48	8.73
BALED	8.04	8.21	8.19	8.46
CHOPPED	8.37	8.56	7.98	8.51

CULTTIME	EARLY		LATER	
FUNGCIDE	0	FULL	0	FULL
STRAW				
BURNT	7.29	8.62	7.72	9.50
BALED	7.25	9.00	7.55	9.11
CHOPPED	7.78	9.16	7.54	8.96

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85/R/CS/311

GRAIN TONNES/HECTARE

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

AUT N	0		50	
FUNGCIDE	0	FULL	0	FULL
STRAW				
BURNT	7.38	9.00	7.63	9.12
BALED	7.50	8.73	7.30	9.37
CHOPPED	7.51	8.85	7.81	9.27

AUT N	0		50	
FUNGCIDE	0	FULL	0	FULL
CULTTIME				
EARLY	7.44	8.77	7.44	9.08
LATER	7.49	8.95	7.71	9.43

CULTTIME	EARLY		LATER	
INSCTCDE	0	PIRIMICA	0	PIRIMICA
STRAW				
BURNT	7.71	8.20	8.51	8.70
BALED	7.86	8.39	8.42	8.23
CHOPPED	8.25	8.69	8.13	8.37

AUT N	0		50	
INSCTCDE	0	PIRIMICA	0	PIRIMICA
STRAW				
BURNT	8.00	8.37	8.22	8.53
BALED	7.91	8.32	8.37	8.30
CHOPPED	7.99	8.37	8.39	8.68

AUT N	0		50	
INSCTCDE	0	PIRIMICA	0	PIRIMICA
CULTTIME				
EARLY	7.81	8.40	8.07	8.45
LATER	8.12	8.31	8.58	8.56

FUNGCIDE	0		FULL	
INSCTCDE	0	PIRIMICA	0	PIRIMICA
STRAW				
BURNT	7.49	7.51	8.73	9.39
BALED	7.38	7.41	8.90	9.20
CHOPPED	7.53	7.79	8.85	9.26

FUNGCIDE	0		FULL	
INSCTCDE	0	PIRIMICA	0	PIRIMICA
CULTTIME				
EARLY	7.41	7.47	8.47	9.38
LATER	7.52	7.68	9.18	9.19

FUNGCIDE	0		FULL	
INSCTCDE	0	PIRIMICA	0	PIRIMICA
AUT N				
0	7.39	7.54	8.55	9.17
50	7.55	7.61	9.11	9.40

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GRAIN TONNES/HECTARE

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

TABLE	AUT N	FUNGCIDE	INSCTCDE	STRAW* AUT N
SED	0.112	0.112	0.112	0.194

TABLE	CULTTIME* AUT N	STRAW* FUNGCIDE	CULTTIME* FUNGCIDE	AUT N FUNGCIDE
SED	0.159	0.194	0.159	0.159

TABLE	STRAW* INSCTCDE	CULTTIME* INSCTCDE	AUT N INSCTCDE	FUNGCIDE INSCTCDE
SED	0.194	0.159	0.159	0.159

TABLE	STRAW* CULTTIME AUT N	STRAW* CULTTIME FUNGCIDE	STRAW* AUT N FUNGCIDE	CULTTIME* AUT N FUNGCIDE
SED	0.275	0.275	0.275	0.224

TABLE	STRAW* CULTTIME INSCTCDE	STRAW* AUT N INSCTCDE	CULTTIME* AUT N INSCTCDE	STRAW* FUNGCIDE INSCTCDE
SED	0.275	0.275	0.224	0.275

TABLE	CULTTIME* FUNGCIDE INSCTCDE	AUT N FUNGCIDE INSCTCDE
SED	0.224	0.224

* WITHIN THE SAME LEVEL OF STRAW, CULTTIME OR STRAW.CULTTIME ONLY

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

STRATUM	DF	SE	CV%
WP.SP	11	0.388	4.7

GRAIN MEAN DM% 86.0

SUB PLOT AREA HARVESTED 0.00280

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85/R/CS/312

STRAW DECOMPOSITION

Object: To test the effects of whey and a fungal accelerator on the decomposition of wheat straw from a preceeding crop and on the establishment and yield of a following crop - West Barnfield I.

Sponsor: S.H.T. Harper.

The first year, w. wheat.

Design: 4 randomised blocks of 4 plots.

Whole plot area: 4.5 x 12.0.

Treatments: All combinations of treatments applied to chopped straw in the field:

1. TREATMNT(1) Treatment one:

NONE	None
WHEY	Whey at 15 kg

2. TREATMNT(2) Treatment two:

NONE	None
FUNG ACC	Fungal accelerator, Trichoderma harzianium, 100,000 spores per g of straw

NOTE: Straw was chopped and incorporated to a depth of about 10 cm by a heavy spring-tine cultivator.

Basal applications: Manures: 'Nitro-Chalk' (27.5% N) at 140 kg followed by 730 kg. Weedkillers: Paraquat at 0.60 kg ion in 500 l. Isoproturon at 2.0 kg with mecoprop at 1.6 kg, ioxynil at 0.20 kg and bromoxynil at 0.20 kg in 200 l. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg in 500 l. Propiconazole at 0.25 kg in 500 l. Propiconazole at 0.12 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 200 l. Insecticide: Pirimicarb at 0.14 kg in 500 l.

Seed: Avalon, sown at 220 kg.

Cultivations, etc.:- Straw chopped: 17 Aug, 1984. Treatments applied, heavy spring-tine cultivated twice: 21 Aug. Disced: 22 Aug. Paraquat applied: 28 Sept. Rotary harrowed: 11 Oct. Seed sown: 12 Oct. Spring-tine cultivated: 13 Oct. First N applied: 28 Feb, 1985. Remaining weedkillers applied: 10 Apr. Second N applied: 12 Apr. Prochloraz and carbendazim applied: 17 Apr. Propiconazole applied: 4 June. Propiconazole with 'Septal' applied: 2 July. Insecticide applied: 8 July. Combine harvested: 29 Aug. Previous crops: Potatoes 1983, w. wheat 1984.

NOTE: Samples of wheat straw were taken during September, October and November 1984 for observations on the rate of straw decomposition.

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85/R/CS/312

GRAIN TONNES/HECTARE

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

TREATMNT(2) / TREATMNT(1)	NONE	FUNG ACC	MEAN
NONE	9.38	9.66	9.52
WHEY	9.43	9.41	9.42
MEAN	9.41	9.54	9.47

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

TABLE	TREATMNT(1)	TREATMNT(2)	TREATMNT(1) TREATMNT(2)
SED	0.141	0.141	0.200

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

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.283	3.0

GRAIN MEAN DM% 85.9

PLOT AREA HARVESTED 0.00280

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85/R/CS/314

CONTROL OF STEM NEMATODE

Object: To study the effects of a range of nematicides and methods of application on the control of stem nematode and on the yield of lucerne - Long Hoos IV 2.

Sponsor: A.G. Whitehead.

The first year, lucerne.

Design: 3 randomised blocks of 13 plots.

Whole plot dimensions: 1.22 x 3.66.

Treatments:

TREATMNT	Nematicides and methods of application:
0	None (duplicated)
	Carbofuran at 1.5 kg to seed furrows at sowing, followed by materials applied after the first cut:
CF 0	None (triplicated)
CF CF	Carbofuran at 1.5 kg over the rows
CF AL	Aldicarb at 1.5 kg
CF DI H	Dimethoate at 1.5 kg over the rows, applied by conventional, hydraulic sprayer
CF DI E	As above by electrostatic sprayer
CF TB H	As above but thiabendazole at 1.5 kg by hydraulic sprayer
CF TB E	As above by electrostatic sprayer
CF TD H	As above but thiodicarb at 1.5 kg by hydraulic sprayer
CF TD E	As above by electrostatic sprayer

NOTES: (1) Aldicarb was applied in 7500 l by weeder bar.
(2) Hydraulic sprays were applied in 310 l and electrostatic sprays in 5.7 l.

Basal applications: Manures: (0:24:24) at 730 kg. Weedkiller: Glyphosate at 1.5 kg in 280 l.

Seed: Europe, seed inoculated with Rhizobium, sown at 11 kg.

Cultivations, etc.:- Glyphosate applied: 12 Nov, 1984. PK applied: 26 Nov. Ploughed: 27 Nov. Power-harrowed twice, seed sown and seed furrow treatments applied: 3 Apr, 1985. First cut: 21 Aug. Aldicarb treatment applied: 2 Sept. Other treatments applied: 6 Sept. Second cut: 6 Nov. Previous crops: Grass/white clover in 1983 and 1984.

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85/R/CS/314

1ST CUT (21/8/85) DRY MATTER TONNES/HECTARE

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

TREATMNT	
0	1.47
CF 0	2.73
CF CF	2.41
CF AL	2.61
CF DI H	2.99
CF DI E	2.86
CF TB H	2.82
CF TB E	2.99
CF TD H	2.53
CF TD E	2.90
MEAN	2.55

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

TABLE	TREATMNT
SED	0.304 (1)
	0.471 (2)
	0.385 (3)
	0.408 (4)

TREATMNT
(1) 0 V CF 0
(2) ANY OF THE REMAINDER
(3) CF 0 V ANY OF THE REMAINDER
(4) 0 V ANY OF THE REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	25	0.577	22.6

1ST CUT MEAN DM% 22.0

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85/R/CS/314

2ND CUT (6/11/85) DRY MATTER TONNES/HECTARE

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

TREATMNT	
0	0.22
CF 0	0.94
CF CF	0.55
CF AL	0.61
CF DI H	0.97
CF DI E	1.21
CF TB H	0.66
CF TB E	0.92
CF TD H	0.83
CF TD E	0.98
MEAN	0.77

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

TABLE	TREATMNT
SED	0.160 (1)
	0.248 (2)
	0.203 (3)
	0.215 (4)

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

STRATUM	DF	SE	CV%
BLOCK.WP	27	0.304	39.6

2ND CUT MEAN DM% 29.2

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85/R/CS/314

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

TREATMNT	
0	1.67
CF 0	3.67
CF CF	2.94
CF AL	3.22
CF DI H	3.96
CF DI E	4.07
CF TB H	3.48
CF TB E	3.90
CF TD H	3.36
CF TD E	3.87
MEAN	3.32

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

TABLE	TREATMNT
SED	0.437 (1)
	0.677 (2)
	0.552 (3)
	0.586 (4)

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

STRATUM	DF	SE	CV%
BLOCK.WP	25	0.829	25.0

TOTAL OF 2 CUTS MEAN DM% 25.9

PLOT AREA HARVESTED 0.00045

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85/W/CS/316

VARIETIES AND PCN TOLERANCE

Object: In the first year to establish a range of populations of potato cyst nematode (PCN) for subsequent tests on varieties - Woburn, Horsepool.

Sponsor: A.G. Whitehead.

The first year, potatoes.

Design: 3 randomised blocks of 32 plots.

Whole plot dimensions: 2.84 x 6.10.

Treatments:

VARIETY	Varieties:
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

NOTE: Eight replicates of each treatment were present in each block to allow for future treatments.

Basal applications: Manures: FYM at 50 t. (0:18:36) at 690 kg. (10:10:15+4.5 Mg) at 2330 kg. Weedkillers: Linuron at 0.90 kg with paraquat at 0.50 kg ion in 500 l. Fungicides: Mancozeb at 1.4 kg on six occasions, with the insecticide on the second occasion, in 250 l. Fentin acetate with maneb (as 'Brestan 60 ' at 0.50 kg) in 250 l. Insecticide: Pirimicarb at 0.14 kg.

Cultivations, etc.:- Straw burnt: 13 Aug, 1984. Heavy spring-tine cultivated: 14 Aug. Subsoiled, tines 45 cm deep, 142 cm apart, FYM applied: 11 Jan, 1985. PK applied: 24 Jan. Ploughed: 31 Jan. NPK Mg applied: 9 Apr. Heavy spring-tine cultivated: 12 Apr. Rotary cultivated, potatoes planted: 24 Apr. Weedkillers applied: 29 May. Mancozeb applied: 20 June, 3 July, 23 July, 6 Aug, 14 Aug, 7 Sept. Insecticide applied: 3 July. 'Brestan 60' applied: 21 Aug. Haulm mechanically destroyed: 26 Sept. Lifted: 2 Oct. Previous crops: S. barley 1983, w. oats 1984.

NOTE: Soil samples were taken before planting and after harvest for cyst and egg counts of potato cyst nematode.

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85/W/CS/316

TOTAL TUBERS TONNES/HECTARE

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

VARIETY	CARA	CROWN	CA CR	CA CA CR	MEAN
	50.4	52.1	56.7	55.5	53.7

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

TABLE	VARIETY
SED	1.79

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

STRATUM	DF	SE	CV%
BLOCK.WP	90	6.20	11.5
PLOT AREA HARVESTED	0.00087		

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85/R/CS/317

OLD GRASS

WORM-WORKED WASTES

Object: To study the effects of the residues of pig manure, after it has been worked by earthworms, and of calcified seaweed on numbers of earthworms in, and the yield of, old grass - Highfield Weighbridge Piece.

Sponsors: K.E. Fletcher, J.R. Lofty, I. Burrows.

The first year, old grass.

Design: 3 randomised blocks of 10 plots.

Whole plot dimensions: 2.74 x 7.62.

Treatments:

MANURE	Fertilizers and organic manures:
NONE	None
NC 60	'Nitro-Chalk' (27.5% N) supplying 60 kg N per cut
NC 90	'Nitro-Chalk' (27.5% N) supplying 90 kg N per cut
NC 120	'Nitro-Chalk' (27.5% N) supplying 120 kg N per cut
CSW 300	Calcified seaweed at 300 kg in spring only
CSW 600	Calcified seaweed at 600 kg in spring only
CSW 900	Calcified seaweed at 900 kg in spring only
WW 9800	Worm-worked pig manure at 9800 kg per cut
WW 14700	Worm-worked pig manure at 14700 kg per cut
WW 19600	Worm-worked pig manure at 19600 kg per cut

NOTE: All calcified seaweed plots were also given 'Nitro-Chalk' (27.5% N) supplying 90 kg N per cut.

Basal applications: Manures: Chalk at 10.0 t.

Cultivations, etc.:- Chalk applied: 23 Aug,1984. Treatments applied: 25 Apr, 1985, 4 June, 1 Aug. Cut: 30 May, 26 July, 8 Nov. Previous crops: Old grass 1983 and 1984.

NOTE: All plots were sampled for earthworms in November.

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85/R/CS/317

1ST CUT (30/5/85) DRY MATTER TONNES/HECTARE

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

MANURE	
NONE	3.82
NC 60	4.60
NC 90	4.25
NC 120	4.38
CSW 300	4.39
CSW 600	4.34
CSW 900	4.24
WW 9800	4.11
WW 14700	3.87
WW 19600	4.27
MEAN	4.23

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

TABLE	MANURE
SED	0.346

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.423	10.0

1ST CUT MEAN DM% 21.3

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85/R/CS/317

2ND CUT (26/7/85) DRY MATTER TONNES/HECTARE

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

MANURE	
NONE	1.39
NC 60	2.56
NC 90	2.80
NC 120	2.85
CSW 300	2.76
CSW 600	2.90
CSW 900	2.75
WW 9800	1.32
WW 14700	1.42
WW 19600	1.61
MEAN	2.24

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

TABLE	MANURE
SED	0.264

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.323	14.4

2ND CUT MEAN DM% 25.7

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85/R/CS/317

3RD CUT (8/11/85) DRY MATTER TONNES/HECTARE

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

MANURE	
NONE	5.11
NC 60	3.62
NC 90	4.35
NC 120	5.40
CSW 300	4.16
CSW 600	4.74
CSW 900	4.07
WW 9800	2.80
WW 14700	2.82
WW 19600	3.66
MEAN	4.07

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

TABLE	MANURE
SED	0.901

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	1.104	27.1

3RD CUT MEAN DM% 24.8

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85/R/CS/317

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

MANURE	
NONE	10.32
NC 60	10.78
NC 90	11.40
NC 120	12.63
CSW 300	11.31
CSW 600	11.98
CSW 900	11.06
WW 9800	8.23
WW 14700	8.11
WW 19600	9.53
MEAN	10.53

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

TABLE	MANURE
SED	1.216

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	1.489	14.1

TOTAL OF 3 CUTS MEAN DM% 23.9

PLOT AREA HARVESTED 0.00077

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85/W/CS/321

SOIL COMPACTION AND YIELD

Object: To study the residual effects of disrupting a compact layer in a sandy soil on the yield of winter oats - 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.

The second year, w. oats.

For previous year see 84/W/WW/3.

Design: A single replicate of 2 x 2 x 2 x 2 x 2 + 12 extra plots.

Whole plot dimesions: 2.75 x 14.8.

Treatments: All combinations of treatments applied for w. wheat 1984:

Whole plots

1. CULTIVTN(84)	Cultivations:	
	WYE DIG	Deep cultivation with Wye double-digger
	PLOUGH	Normal cultivation with mouldboard plough

Sub plots

2. IRRIGATN(84)	Irrigation:	
	NONE	None
	FULL	Full (175 mm)
3. WINTER N(84)	Amounts of nitrogen fertilizer applied on 30 Nov, 1983 and 31 Jan, 1984 (kg N) as urea:	
	0	
	35+35	
4. SPRING N(84)	Amounts of nitrogen fertilizer applied in spring (kg N) as 'Nitro-Chalk' (26% N):	
	115	
	185	
5. N TIME(84)	Times of applying spring fertilizer:	
	EARLY	All except 40 kg N on 8 Mar, 1984; remainder on 2 May
	LATE	All except 40 kg N on 3 Apr; remainder on 15 May

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85/W/CS/321

plus all combinations of the following all given irrigation, winter nitrogen and spring nitrogen timed early:-

Whole plots

1 CULTIVNX(84) Cultivations:

WYE DIG	Deep cultivations with Wye double-digger
PLOUGH	Normal cultivations with mouldboard plough

Sub plots

2. SPRNG NX(84) Amounts of nitrogen fertilizer applied in spring (kg N) as 'Nitro-Chalk' (26% N):

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(84)

WY N0 I	Deep cultivation, irrigated
PL N0 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.

Basal applications: Manures: Magnesian limestone at 7.5 t. N at 30 kg and 120 kg as 'Nitro-Chalk' (27.5% N). Weedkillers: Methabenzthiazuron at 1.6 kg in 250 l. Mecoprop at 2.1 kg in 250 l. Growth regulator: Chlormequat on two occasions (as 'Power 3 C' at 2.0 l and 4.2 l), on the first occasion with the mecoprop, and on the second with the fungicide. Fungicide: Tridemorph at 0.52 kg in 250 l.

Seed: Panema, sown at 180 kg.

Cultivations, etc.:- Disced: 7 Sept, 1984. Ploughed: 8 Sept. Magnesian limestone applied: 9 Oct. Power harrowed, seed sown: 16 Oct. Methabenzthiazuron applied: 27 Oct. N applied: 19 Mar, 1985, 16 Apr. Mecoprop with growth regulator applied: 17 Apr. Growth regulator with fungicide applied: 26 May. Combine harvested: 21 Aug.

NOTE: Crop samples were taken before grain harvest to measure total crop produce.

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85/W/CS/321

GRAIN TONNES/HECTARE

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

IRRIGATN(84)	NONE	FULL	MEAN
CULTIVTN(84)			
WYE DIG	6.47	6.36	6.41
PLOUGH	6.19	6.59	6.39
MEAN	6.33	6.47	6.40

WINTER N(84)	0	35+35	MEAN
CULTIVTN(84)			
WYE DIG	6.52	6.30	6.41
PLOUGH	6.38	6.40	6.39
MEAN	6.45	6.35	6.40

WINTER N(84)	0	35+35	MEAN
IRRIGATN(84)			
NONE	6.20	6.46	6.33
FULL	6.71	6.24	6.47
MEAN	6.45	6.35	6.40

SPRING N(84)	115	185	MEAN
CULTIVTN(84)			
WYE DIG	6.10	6.73	6.41
PLOUGH	6.33	6.45	6.39
MEAN	6.22	6.59	6.40

SPRING N(84)	115	185	MEAN
IRRIGATN(84)			
NONE	6.06	6.60	6.33
FULL	6.37	6.58	6.47
MEAN	6.22	6.59	6.40

SPRING N(84)	115	185	MEAN
WINTER N(84)			
0	6.25	6.66	6.45
35+35	6.18	6.52	6.35
MEAN	6.22	6.59	6.40

N TIME(84)	EARLY	LATE	MEAN
CULTIVTN(84)			
WYE DIG	6.28	6.55	6.41
PLOUGH	6.50	6.29	6.39
MEAN	6.39	6.42	6.40

N TIME(84)	EARLY	LATE	MEAN
IRRIGATN(84)			
NONE	6.28	6.38	6.33
FULL	6.49	6.46	6.47
MEAN	6.39	6.42	6.40

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85/W/CS/321

GRAIN TONNES/HECTARE

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

N TIME(84) / WINTER N(84)	EARLY	LATE	MEAN
0	6.50	6.40	6.45
35+35	6.27	6.43	6.35
MEAN	6.39	6.42	6.40

N TIME(84) / SPRING N(84)	EARLY	LATE	MEAN
115	6.16	6.27	6.22
185	6.61	6.56	6.59
MEAN	6.39	6.42	6.40

IRRIGATN(84)	NONE		FULL	
WINTER N(84)	0	35+35	0	35+35
CULTIVTN(84)				
WYE DIG	6.26	6.67	6.78	5.94
PLOUGH	6.13	6.26	6.64	6.54

IRRIGATN(84)	NONE		FULL	
SPRING N(84)	115	185	115	185
CULTIVTN(84)				
WYE DIG	5.99	6.94	6.21	6.51
PLOUGH	6.13	6.26	6.53	6.64

WINTER N(84)	0		35+35	
SPRING N(84)	115	185	115	185
CULTIVTN(84)				
WYE DIG	6.12	6.93	6.08	6.52
PLOUGH	6.39	6.38	6.28	6.52

WINTER N(84)	0		35+35	
SPRING N(84)	115	185	115	185
IRRIGATN(84)				
NONE	6.04	6.35	6.08	6.85
FULL	6.46	6.96	6.28	6.19

IRRIGATN(84)	NONE		FULL	
N TIME(84)	EARLY	LATE	EARLY	LATE
CULTIVTN(84)				
WYE DIG	6.28	6.66	6.27	6.45
PLOUGH	6.29	6.10	6.71	6.47

WINTER N(84)	0		35+35	
N TIME(84)	EARLY	LATE	EARLY	LATE
CULTIVTN(84)				
WYE DIG	6.45	6.60	6.10	6.50
PLOUGH	6.56	6.21	6.43	6.37

WINTER N(84)	0		35+35	
N TIME(84)	EARLY	LATE	EARLY	LATE
IRRIGATN(84)				
NONE	6.16	6.23	6.40	6.53
FULL	6.84	6.58	6.14	6.34

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85/W/CS/321

GRAIN TONNES/HECTARE

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

SPRING N(84)	115		185	
N TIME(84)	EARLY	LATE	EARLY	LATE
CULTIVTN(84)				
WYE DIG	5.89	6.31	6.66	6.80
PLOUGH	6.43	6.24	6.57	6.33

SPRING N(84)	115		185	
N TIME(84)	EARLY	LATE	EARLY	LATE
IRRIGATN(84)				
NONE	6.14	5.99	6.43	6.77
FULL	6.18	6.56	6.80	6.36

SPRING N(84)	115		185	
N TIME(84)	EARLY	LATE	EARLY	LATE
WINTER N(84)				
0	6.16	6.35	6.85	6.46
35+35	6.16	6.20	6.37	6.67

SPRING NX(84)	80	150	220	MEAN
CULTIVNX(84)				
WYE DIG	6.30	6.74	6.40	6.48
PLOUGH	6.75	6.40	6.30	6.48
MEAN	6.52	6.57	6.35	6.48

EXTRA	WY NO I	PL NO I	MEAN
	6.37	6.06	6.21

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

SED APPLY TO MAIN FACTORIAL PLOTS ONLY

MARGINS OF TWO FACTOR TABLES	0.173
TWO FACTOR TABLES	0.244
THREE FACTOR TABLES	0.345

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

STRATUM	DF	SE	CV%
WP	6	0.489	7.6

GRAIN MEAN DM% 80.1

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85/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 20th year, w. wheat.

For previous years see 66/C/30(t), 67/C/23(t), 68/C/39, 69-84/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: 8.53 x 18.3.

Treatments: On each site, combinations of:-

Whole plots

1. VARIETY — Varieties:

   GALAHAD
   MOULIN

2. WINTER N — Nitrogen fertilizer (kg N) as urea on 5 Mar, 1985 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 with benomyl at 0.28 kg in 220 l on 23 Apr, 1985
   Propiconazole at 0.13 kg with captafol at 1.1 kg in 220 l on 29 May
   Carbendazim at 0.15 kg, maneb at 1.6 kg, tridemorph at 0.37 kg, captafol at 1.1 kg and pirimicarb at 0.14 kg in 220 l on 26 June

Sub plots

4. N RATE — Total nitrogen fertilizer applied in spring (kg N) as 'Nitro-Chalk' (26% N) on 16 Apr:

After beans	After wheat
0	0
130	190
160	220
190	250
220	280

NOTE: All treatments were cumulative to those of 1984.

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85/S/CS/1

Basal applications: Manures: (0:24:24) at 340 kg (wheat after wheat only). Weedkillers: Isoproturon at 2.5 kg in 220 l. Fluroxypyr at 0.20 kg in 220 l.

Seed: Varieties, sown at 400 seeds per square metre.

Cultivations, etc.:- PK applied (after wheat): 13 Sept, 1984. Ploughed between 13 Sept and 30 Oct date not recorded. Power harrowed, seed sown, seedbed N applied: 30 Oct. Isoproturon applied: 31 Oct. Fluroxypyr applied: 23 Apr, 1985. Combine harvested: 28 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.

W. WHEAT AFTER W. BEANS

GRAIN TONNES/HECTARE

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

WINTER N	0	60	MEAN
VARIETY			
GALAHAD	8.61	8.16	8.39
MOULIN	6.26	6.50	6.38
MEAN	7.44	7.33	7.38

PATHCONT	NONE	FULL	MEAN
VARIETY			
GALAHAD	7.76	9.02	8.39
MOULIN	5.83	6.93	6.38
MEAN	6.79	7.97	7.38

PATHCONT	NONE	FULL	MEAN
WINTER N			
0	6.98	7.90	7.44
60	6.61	8.05	7.33
MEAN	6.79	7.97	7.38

N RATE	0	130	160	190	220	MEAN
VARIETY						
GALAHAD	6.40	8.90	9.06	8.91	8.67	8.39
MOULIN	5.07	6.78	6.79	6.72	6.52	6.38
MEAN	5.74	7.84	7.92	7.82	7.59	7.38

N RATE	0	130	160	190	220	MEAN
WINTER N						
0	5.07	7.85	8.24	8.06	7.97	7.44
60	6.41	7.84	7.61	7.58	7.21	7.33
MEAN	5.74	7.84	7.92	7.82	7.59	7.38

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85/S/CS/1 W. WHEAT AFTER W. BEANS

GRAIN TONNES/HECTARE

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

N RATE / PATHCONT	0	130	160	190	220	MEAN
NONE	5.40	7.40	7.05	7.12	7.01	6.79
FULL	6.08	8.28	8.80	8.52	8.18	7.97
MEAN	5.74	7.84	7.92	7.82	7.59	7.38

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

TABLE	N RATE	VARIETY* N RATE	WINTER N* N RATE	PATHCONT* N RATE
SED	0.210	0.297	0.297	0.297

* 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	0.420	5.7

GRAIN MEAN DM% 85.6

SUB PLOT AREA HARVESTED 0.00126

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85/S/CS/1 W. WHEAT AFTER W. WHEAT

GRAIN TONNES/HECTARE

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

WINTER N	0	60	MEAN
VARIETY			
GALAHAD	6.65	6.67	6.66
MOULIN	5.13	5.31	5.22
MEAN	5.89	5.99	5.94

PATHCONT	NONE	FULL	MEAN
VARIETY			
GALAHAD	6.04	7.28	6.66
MOULIN	4.75	5.69	5.22
MEAN	5.40	6.48	5.94

PATHCONT	NONE	FULL	MEAN
WINTER N			
0	5.60	6.18	5.89
60	5.19	6.79	5.99
MEAN	5.40	6.48	5.94

N RATE	0	190	220	250	280	MEAN
VARIETY						
GALAHAD	2.73	8.15	7.61	7.40	7.40	6.66
MOULIN	2.71	6.02	5.99	5.70	5.68	5.22
MEAN	2.72	7.09	6.80	6.55	6.54	5.94

N RATE	0	190	220	250	280	MEAN
WINTER N						
0	1.88	6.98	7.12	6.66	6.82	5.89
60	3.55	7.19	6.48	6.44	6.27	5.99
MEAN	2.72	7.09	6.80	6.55	6.54	5.94

N RATE	0	190	220	250	280	MEAN
PATHCONT						
NONE	2.08	6.57	6.25	6.05	6.03	5.40
FULL	3.36	7.60	7.35	7.05	7.06	6.48
MEAN	2.72	7.09	6.80	6.55	6.54	5.94

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85/S/CS/1 W. WHEAT AFTER W. WHEAT

GRAIN TONNES/HECTARE

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

TABLE	N RATE	VARIETY* N RATE	WINTER N* N RATE	PATHCONT* N RATE
SED	0.272	0.384	0.384	0.384

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

STRATUM	DF	SE	CV%
WP.SP	16	0.543	9.1

GRAIN MEAN DM% 85.9

SUB PLOT AREA HARVESTED 0.00126

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85/R/WW/1 and 85/W/WW/1

WINTER WHEAT

VARIETIES

Object: To study a selection of 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 Sawyers I (pathogen free RH) and Fosters West (pathogen infected RD), Woburn Horsepool Lane Close (pathogen free WH).

Sponsors: R. Moffitt, R.J. Gutteridge.

Design: 2 randomised blocks of 2 whole plots split into (RH, RD), 13, (WH) 11.

Sub plot dimensions: (RH, RD) 3.0 x 12.0, (WH) 4.0 x 12.0.

Treatments: All combinations of:-

Whole plots

1. INSCTCDE — Insecticide:

NONE	None
PIRIMICA	Pirimicarb at 0.14 kg in 250 l

Sub plots

2. VARIETY — Varieties:

AVALON	Avalon (on RH and WH only, duplicated on RH)
AVALON A	Avalon (grown after Avalon, RD only)
AVALON N	Avalon (grown after Norman, RD only)
BOXER	Boxer
BRIMSTON	Brimstone
BROCK	Brock
GALAHAD	Galahad
GAWAIN	Gawain
LONGBOW	Longbow
MOULIN	Moulin
NORMAN	Norman (on RH and WH only, duplicated on RH)
NORMAN A	Norman (grown after Avalon, RD only)
NORMAN N	Norman (grown after Norman, RD only)
RAPIER	Rapier
RENARD	Renard

Basal applications:
Sawyers I (RH): Manures: N at 190 kg as 'Nitro-Chalk' (27.5% N)). Weedkillers: Mecoprop at 1.6 kg with bromoxynil at 0.20 kg and ioxynil at 0.20 kg and isoproturon at 2.0 kg in 200 l. Fungicides: Captafol at 0.96 kg with fenpropimorph at 0.75 kg and carbendazim at 0.15 kg in 200 l. Insecticide: Pirimicarb at 0.14 kg in 500 l.

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85/R/WW/1 and 85/W/WW/1

Fosters West (RD): Manures: K at 250 kg as muriate of potash. N at 190 kg as 'Nitro-Chalk' (27.5% N). Weedkillers: Isoproturon at 2.0 kg. Clopyralid at 0.07 kg with bromoxynil at 0.34 kg and mecoprop at 2.5 kg applied with the prochloraz and carbendazim in 200 l. Fungicides: Prochloraz at 0.40 kg with carbendazim at 0.15 kg. Propiconazole on two occasions, on the first occasion at 0.25 kg in 200 l on the second occasion at 0.12 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 200 l. Insecticide: Pirimicarb at 0.14 kg in 500 l.

Horsepool Lane Close (WH): Manures: N on two occasions at 40 kg and 90 kg as 'Nitro-Chalk' (27.5% N). Weedkillers: Mecoprop at 2.0 kg with bromoxynil at 0.25 kg and ioxynil at 0.25 kg in 250 l. Fungicides: Propiconazole on two occasions, on the first occasion at 0.25 kg with tridemorph at 0.19 kg in 250 l, on the second occasion at 0.12 kg with tridemorph at 0.19 kg and with carbendazim and maneb (as 'Septal' at 2.5 kg) in 250 l. Insecticide: Pirimicarb at 0.14 kg in 250 l.

Seed: Sawyers I (RH), Fosters West (RD): Varieties sown at 180 kg. Horsepool Lane Close (WH): Varieties sown at 190 kg.

Cultivations, etc.:-

Sawyers I (RH): Ploughed: 3 Oct, 1984. Spring-tine cultivated, rotary harrowed, seed sown: 16 Oct. Weedkillers applied: 10 Apr, 1985. N applied: 12 Apr. Fungicides applied: 28 June. Insecticide applied: 8 July. Combine harvested: 2 Sept. Previous crops: S. barley 1983, s. beans 1984.

Fosters West (RD): K applied: 24 Sept, 1984. Ploughed: 25 Sept. Spring-tine cultivated, rotary harrowed, seed sown: 16 Oct. Weedkillers with prochloraz and carbendazim applied: 10 Apr, 1985. N applied: 12 Apr. Propiconazole applied: 3 June. Propiconazole with 'Septal' applied: 2 July. Insecticide applied: 8 July. Combine harvested: 31 Aug. Previous crops: W. beans 1983, w. wheat 1984.

Horsepool Lane Close (WH): Rotary cultivated with tine attachment: 1 Nov, 1984. Power harrowed, seed sown: 2 Nov. N applied: 12 Mar 1985, 18 Apr. Weedkillers applied: 18 Apr. Propiconazole and tridemorph applied: 15 June. Propiconazole with tridemorph and 'Septal' applied: 2 July. Insecticide applied: 10 July. Combine harvested: 9 Sept. Previous crops: W. oats 1983, potatoes 1984.

NOTE: Take-all was assessed on Fosters West (RD).

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85/R/WW/1

SAWYERS I HEALTHY SITE

GRAIN TONNES/HECTARE

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

INSCTCDE	NONE	PIRIMICA	MEAN
VARIETY			
AVALON	9.00	9.26	9.13
BOXER	9.99	9.97	9.98
BRIMSTON	8.55	9.07	8.81
BROCK	9.92	10.39	10.16
GALAHAD	10.10	10.34	10.22
GAWAIN	9.65	10.06	9.85
LONGBOW	8.41	8.90	8.65
MOULIN	7.94	8.14	8.04
NORMAN	8.53	8.74	8.64
RAPIER	9.49	9.89	9.69
RENARD	9.64	10.17	9.91
MEAN	9.20	9.54	9.37

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

TABLE	VARIETY	INSCTCDE* VARIETY	
SED	0.218	0.309	MIN REP
	0.189	0.268	MAX-MIN
	0.154	0.218	MAX REP

* WITHIN THE SAME LEVEL OF INSCTCDE ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	28	0.309	3.3

GRAIN MEAN DM% 83.6

PLOT AREA HARVESTED 0.00245

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85/R/WW/1

FOSTERS WEST DISEASED SITE

GRAIN TONNES/HECTARE

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

INSCTCDE	NONE	PIRIMICA	MEAN
VARIETY			
AVALON A	8.92	8.81	8.86
AVALON N	9.04	9.22	9.13
BOXER	9.22	8.51	8.87
BRIMSTON	8.99	10.02	9.51
BROCK	9.13	9.05	9.09
GALAHAD	9.40	10.44	9.92
GAWAIN	9.86	10.55	10.21
LONGBOW	9.94	10.30	10.12
MOULIN	7.51	7.57	7.54
NORMAN A	9.65	10.08	9.87
NORMAN N	10.18	10.16	10.17
RAPIER	9.61	9.88	9.75
RENARD	9.36	8.59	8.97
MEAN	9.29	9.47	9.38

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

TABLE	VARIETY	INSCTCDE* VARIETY
SED	0.342	0.483

* WITHIN THE SAME LEVEL OF INSCTCDE ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	24	0.483	5.1

GRAIN MEAN DM% 83.0

PLOT AREA HARVESTED 0.00245

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85/W/WW/1

HORSEPOOL LANE CLOSE (W)

GRAIN TONNES/HECTARE

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

INSCTCDE	NONE	PIRIMICA	MEAN
VARIETY			
AVALON	9.55	9.12	9.34
BOXER	9.78	9.31	9.55
BRIMSTON	8.66	8.48	8.57
BROCK	9.99	10.10	10.04
GALAHAD	9.78	9.69	9.74
GAWAIN	8.75	8.93	8.84
LONGBOW	10.07	9.69	9.88
MOULIN	7.28	6.88	7.08
NORMAN	10.40	10.31	10.36
RAPIER	8.95	9.01	8.98
RENARD	10.24	10.09	10.17
MEAN	9.41	9.24	9.32

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

TABLE	VARIETY	INSCTCDE* VARIETY
SED	0.233	0.330

* WITHIN THE SAME LEVEL OF INSCTCDE ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	20	0.330	3.5

GRAIN MEAN DM% 81.8

PLOT AREA HARVESTED 0.00330

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85/R/WW/3

WINTER WHEAT

FACTORS AFFECTING TAKE-ALL

Object: To study the effects of a seed treatment on the incidence of take-all and on the yield of wheat sown at different times - Delafield.

Sponsor: G.L. Bateman.

Design: 6 randomised blocks of 6 plots, with PREVCROP on blocks.

Whole plot dimensions: 3.0 x 12.0.

Treatments: All combinations of:-

Blocks

1. PREVCROP	Previous cropping:	
	BARLEY	Beans 1982, w. wheat 1983, s. barley 1984
	OATS	Beans 1982, w. wheat 1983, s. oats 1984

Whole plots

2. SEED DR	Seed dressing:	
	NONE	None
	TRIADIME	Triadimenol at 0.5 g per kg of seed plus fuberidazole at 0.06 g per kg of seed
3. SOWDATE	Dates of sowing:	
	11 SEPT	11 September, 1984
	26 SEPT	26 September
	15 OCT	15 October

Basal applications: Manures: 'Nitro-Chalk' (27.5% N) at 140 kg and on a second occasion at 570 kg. Weedkillers: Isoproturon at 2.0 kg with mecoprop at 2.0 kg, ioxynil at 0.25 kg and bromoxynil at 0.25 kg in 200 l. Fungicides: Propiconazole at 0.25 kg with carbendazim at 0.25 kg and maneb at 1.6 kg in 200 l.

Seed: Longbow, sown at 170 kg.

Cultivations, etc.:- Ploughed, disced: 10 Sept, 1984. Spring-tine cultivated, SOWDATE 11 SEPT plots rotary harrowed and seed sown: 11 Sept. SOWDATE 26 SEPT plots rotary harrowed and seed sown: 26 Sept. SOWDATE 15 OCT plots rotary harrowed and seed sown: 15 Oct. First N applied: 28 Feb, 1985. Weedkillers applied: 12 Mar. Second N applied: 15 Apr. Fungicides applied: 28 June. Combine harvested: 27 Aug.

NOTE: Plant samples were taken in October and November 1984, and April and July 1985 for assessments of take-all and eyespot. Additional samples were taken in November 1984 for assessment of Septoria tritici.

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85/R/WW/3

GRAIN TONNES/HECTARE

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

SEED DR / PREVCROP	NONE	TRIADIME	MEAN
BARLEY	8.83	9.20	9.02
OATS	10.20	10.30	10.25
MEAN	9.52	9.75	9.63

SOWDATE / PREVCROP	11 SEPT	26 SEPT	15 OCT	MEAN
BARLEY	8.33	9.35	9.37	9.02
OATS	10.63	10.13	9.99	10.25
MEAN	9.48	9.74	9.68	9.63

SOWDATE / SEED DR	11 SEPT	26 SEPT	15 OCT	MEAN
NONE	9.35	9.66	9.55	9.52
TRIADIME	9.61	9.83	9.81	9.75
MEAN	9.48	9.74	9.68	9.63

PREVCROP / SOWDATE / SEED DR	11 SEPT	26 SEPT	15 OCT
BARLEY / NONE	8.06	9.17	9.27
BARLEY / TRIADIME	8.60	9.54	9.47
OATS / NONE	10.64	10.14	9.82
OATS / TRIADIME	10.61	10.12	10.15

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

TABLE	PREVCROP	SEED DR	SOWDATE	PREVCROP SEED DR
SED	0.230	0.143	0.176	0.271
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
PREVCROP				0.203

TABLE	PREVCROP SOWDATE	SEED DR SOWDATE	PREVCROP SEED DR SOWDATE
SED	0.307	0.249	0.395
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
PREVCROP	0.249		0.351

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

STRATUM	DF	SE	CV%
BLOCK.WP	20	0.430	4.5

GRAIN MEAN DM% 81.5

PLOT AREA HARVESTED 0.00274

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85/R/WW/4

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 - Delafield.

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

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 3.0 x 12.0.

Treatments:

SPRING N	Spring nitrogen, 40 kg N on 6 March, 1985; 160 kg N on 9 April:
AMM CHL	Ammonium chloride
AMM NIT	Ammonium nitrate as 'Nitro-Chalk' (27.5% N)
AMM SUL	Ammonium sulphate
UREA	Urea
AN+PC	Ammonium nitrate + potassium chloride

Basal applications: Weedkillers: Isoproturon at 2.0 kg with mecoprop at 2.0 kg, ioxynil at 0.25 kg and bromoxynil at 0.25 kg in 200 l. Fungicides: Propiconazole at 0.25 kg with carbendazim at 0.25 kg and maneb at 1.6 kg in 200 l.

Seed: Longbow, sown at 170 kg.

Cultivations, etc.:- Ploughed, disced: 10 Sept, 1984. Spring-tine cultivated: 11 Sept. Rotary harrowed, seed sown: 26 Sept. Weedkillers applied: 12 Mar, 1985. Fungicides applied: 28 June. Combine harvested: 27 Aug. Previous crops: W. wheat 1983, s. barley 1984.

NOTE: Take-all assessments were made monthly from early March to early July.

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85/R/WW/4

GRAIN TONNES/HECTARE

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

SPRING N	AMM CHL	AMM NIT	AMM SUL	UREA	AN+PC	MEAN
	8.13	7.42	8.55	8.45	8.50	8.21

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

TABLE	SPRING N
SED	0.396

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

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.560	6.8

GRAIN MEAN DM% 83.2

PLOT AREA HARVESTED 0.00326

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85/R/WW/5

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 - Geescroft.

Sponsor: N. Carter.

Design: 4 randomised blocks of 14 plots.

Whole plot dimensions: 3.0 x 13.0.

Treatments: All combinations of:-

1. APHICIDE — Aphicides:

DELTAMET	Deltamethrin at 0.012 kg
DELT EL	Deltamethrin at 0.012 kg applied by electrostatic sprayer
DEMETON	Demeton-S-methyl at 0.24 kg
PIRIM ST	Pirimicarb (standard formulation) at 0.14 kg
PIR+321	Pirimicarb (standard formulation) at 0.14 kg plus 'PP 321' at 0.0075 kg a.i.
PIRIM EN	Pirimicarb (encapsulated) at 0.14 kg

2. APH TIME — Timing of aphicides:

GS 45	Booting, growth stage 45 on 4 June, 1985
GS 65	Flowering, growth stage 65 on 19 June

Plus one extra treatment:

EXTRA NONE	No aphicide (duplicated)

NOTE: All aphicides were applied in 200 l by hydraulic sprayer except DELT EL in 10 l by electrostatic sprayer.

Basal applications: Manures: 'Nitro-Chalk' (27.5% N) at 140 kg followed by 390 kg. Weedkillers: Isoproturon at 2.4 kg and mecoprop (as 'CMPP' at 4.2 l) with the insecticide in 250 l. Mecoprop at 2.0 kg, bromoxynil at 0.25 kg and ioxynil at 0.25 kg in 200 l. Fungicides: Propiconazole in 200 l on two occasions at 0.25 kg on the first, at 0.12 kg with carbendazim and maneb (as 'Septal' at 2.5 kg on the second). Insecticide: Cypermethrin at 0.025 kg.

Seed: Avalon, sown at 170 kg.

Cultivations, etc.:- Ploughed: 18 Sept, 1984. Rotary harrowed twice, seed sown: 19 Sept. Isoproturon, mecoprop and the insecticide applied: 31 Oct. First N applied: 11 Mar, 1985. Mecoprop, bromoxynil and ioxynil and second N applied: 15 Apr. First propiconazole applied: 14 June. Propiconazole with carbendazim and maneb applied: 2 July. Combine harvested: 29 Aug. Previous crops: S. barley 1983, w. beans 1984.

NOTE: Naturally occurring aphids were counted at weekly intervals from early June to the end of July.

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85/R/WW/5

GRAIN TONNES/HECTARE

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

APH TIME APHICIDE	GS 45	GS 65	MEAN
DELTAMET	10.13	9.77	9.95
DELT EL	10.17	10.29	10.23
DEMETON	9.69	10.00	9.85
PIRIM ST	9.55	9.93	9.74
PIR+321	10.38	9.66	10.02
PIRIM EN	10.11	9.95	10.03
MEAN	10.01	9.93	9.97

NONE 9.50

GRAND MEAN 9.90

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

TABLE	APH TIME	APHICIDE	APH TIME APHICIDE
SED	0.125	0.217	0.307

SED FOR COMPARING NONE WITH ANY ITEM IN
APH TIME.APHICIDE TABLE IS 0.266

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

STRATUM	DF	SE	CV%
BLOCK.WP	40	0.434	4.4

GRAIN MEAN DM% 83.6

PLOT AREA HARVESTED 0.00359

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85/R/WW/6

WINTER WHEAT

ELECTROSTATIC SPRAYERS AND WEED CONTROL

Object: To compare the weed control obtained with electrostatic and standard hydraulic sprayers in wheat following oats and wheat following potatoes - Rothamsted Summerdells I (after oats) and Great Harpenden I (after potatoes).

Sponsors: G.R. Cayley, D.C. Griffiths, B.J. Pye, P. Etheridge, G.C. Scott, R.E. Goodchild.

Design: 4 randomised blocks of 12 plots.

Whole plot dimensions: 3.0 x 15.0.

Treatments:

TREATMNT	Sprayers, weedkillers and times of application:
NONE	None
	Electrostatic sprayer, 'Tecnoma', applying chlorsulfuron plus metsulfuron methyl:
EST E	Early on 17 Oct, 1984 (Summerdells), 31 Oct (Great Harpenden)
EST L	Late on 13 Dec (Summerdells), 21 Dec (Great Harpenden)
EST L+I	Late plus isoproturon (duplicated)
	Electrostatic sprayer, 'Jumbo', applying chlorsulfuron plus metsulfuron methyl:
ESJ E	Early on above dates
ESJ L	Late on above dates
ESJ L+I	Late plus isoproturon (duplicated)
	Conventional, hydraulic sprayer, applying chlorsulfuron plus metsulfuron methyl:
H E	Early on above dates
H L	Late on above dates
H L+I	Late plus isoproturon

NOTES: (1) On one plot on the site after potatoes which should have received ESJ L the treatment was omitted in error. An estimated value was used in the analysis
(2) Chlorsulfuron was applied at 0.015 kg and metsulfuron methyl at 0.005 kg.
(3) Isoproturon was applied at 2.5 kg.
(4) The 'Tecnoma' electrostatic sprayer has vertically mounted, inductively charged rotary atomisers and spray was applied in 12.0 l.
(5) The 'Jumbo' electrostatic sprayer has spinning cone nozzles, spray was charged at 30 kv and was applied in 9.0 l.
(6) The hydraulic sprayer applied sprays in 200 l.

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Standard applications:
Summerdells I: Manures: 'Nitro-Chalk' (27.5% N) at 720 kg. Weedkiller: Paraquat at 0.60 kg ion in 500 l. Fungicides: Propiconazole at 0.25 kg in 200 l. Propiconazole at 0.12 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 200 l. Insecticide: Pirimicarb at 0.14 kg in 200 l.
Great Harpenden I: Manures: 'Nitro-Chalk' (27.5% N) at 540 kg. Fungicides: Captafol at 0.96 kg with fenpropimorph at 0.75 kg and carbendazim at 0.15 kg in 200 l.

Seed: Avalon, sown at 170 kg (both fields).

Cultivations, etc.:-
Summerdells I: Disced: 14 Aug, 1984. Paraquat applied, heavy spring-tine cultivated: 19 Sept. Rotary harrowed, seed sown: 26 Sept. N applied: 15 Apr, 1985. Propiconazole alone applied: 3 June. Propiconazole with carbendazim and maneb applied: 2 July. Insecticide applied: 10 July. Combine harvested: 30 Aug. Previous crops: S. barley 1983, w. oats 1984.
Great Harpenden I: Heavy spring-tine cultivated: 12 Oct, 1984. Rotary harrowed, seed sown: 13 Oct. N applied: 15 Apr, 1985. Fungicides applied: 28 June. Combine harvested: 29 Aug. Previous crops: W. beans 1983, potatoes 1984.

NOTE: Weed counts were made throughout the season.

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85/R/WW/6 SUMMERDELLS I

WINTER WHEAT (AFTER OATS)

GRAIN TONNES/HECTARE

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

TREATMNT	
NONE	5.27
EST E	8.02
EST L	7.58
EST L+I	9.22
ESJ E	8.04
ESJ L	7.89
ESJ L+I	8.93
H E	8.98
H L	7.66
H L+I	9.83
MEAN	8.19

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

TABLE	TREATMNT	
SED	0.451	MIN REP
	0.391	MAX-MIN
	0.319	MAX REP

	TREATMNT
MAX REP	EST L+I AND ESJ L+I
MAX-MIN	EST L+I OR ESJ L+I V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	35	0.638	7.8

GRAIN MEAN DM% 84.1

PLOT AREA HARVESTED 0.00306

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85/R/WW/6 GREAT HARPENDEN I

WINTER WHEAT (AFTER POTATOES)

GRAIN TONNES/HECTARE

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

TREATMNT	
NONE	6.15
EST E	7.35
EST L	8.35
EST L+I	8.29
ESJ E	7.72
ESJ L	7.94
ESJ L+I	8.38
H E	7.52
H L	8.62
H L+I	8.84
MEAN	7.96

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

TABLE	TREATMNT	
SED	0.378	MIN REP
	0.327	MAX-MIN
	0.267	MAX REP

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.534	6.7

GRAIN MEAN DM% 81.7

PLOT AREA HARVESTED 0.00306

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85/R/WW/11

WINTER WHEAT

N AND DCD

Object: To study the effects of a nitrification inhibitor in combination with different rates and timings of N on yield - Summerdells I.

Sponsors: G.A. Rodgers, F.V. Widdowson.

Design: 2 randomised blocks of 18 plots.

Whole plot dimensions: 3.0 x 11.0.

Treatments: All combinations of:-

1. N INHIB — Nitrification inhibitor added to nitrogen fertilizer:

NONE	None
DICYANDI	Dicyandiamide at 16 kg, divided equally between applications

2. N TIME — Time and division of nitrogen fertilizer:

1111	Quarter of N on each of 28 Feb 1985, 20 Mar, 18 Apr, 16 May
22--	Half of N on each of 28 Feb, 20 Mar
2-2-	Half of N on each of 28 Feb, 18 Apr
-22-	Half of N on each of 20 Mar, 18 Apr

3. N RATE — Amount of nitrogen fertilizer applied (kg N):

160	160
240	240

plus one extra treatment

EXTRA	
NONE	No nitrogen fertilizer or inhibitor (duplicated)

NOTE: Nitrogen was applied as a mixture of urea and ammonium nitrate (28% N).

Basal applications: Weedkillers: Paraquat at 0.60 kg ion in 500 l. Isoproturon at 2.0 kg with mecoprop at 2.0 kg, ioxynil at 0.25 kg and bromoxynil at 0.25 kg in 200 l. Fungicides: Propiconazole at 0.25 kg in 200 l. Propiconazole at 0.12 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 200 l. Insecticide: Pirimicarb at 0.14 kg in 200 l.

Seed: Avalon, sown at 170 kg.

Cultivations, etc.:- Disced: 14 Aug, 1984. Paraquat applied, heavy spring-tine cultivated: 19 Sept. Rotary harrowed, seed sown: 27 Sept. Remaining weedkillers applied: 12 Mar, 1985. Propiconazole applied: 3 June. Propiconazole with 'Septal' applied: 2 July. Insecticide applied: 10 July. Combine harvested: 29 Aug. Previous crops: S. barley 1983, w. oats 1984.

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85/R/WW/11

NOTE: Soil cores were taken in February and April for nitrate and ammonium analyses. Plant samples were taken at anthesis for measurements of dry weight, percentage N, N uptake and number of stems per square metre.

GRAIN TONNES/HECTARE

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

N TIME / N INHIB	1111	22--	2-2-	-22-	MEAN
NONE	9.01	8.41	8.69	8.19	8.58
DICYANDI	8.81	9.14	9.03	8.72	8.93
MEAN	8.91	8.77	8.86	8.45	8.75

N RATE / N INHIB	160	240	MEAN
NONE	7.90	9.25	8.58
DICYANDI	8.32	9.53	8.93
MEAN	8.11	9.39	8.75

N RATE / N TIME	160	240	MEAN
1111	8.36	9.46	8.91
22--	8.10	9.44	8.77
2-2-	8.29	9.44	8.86
-22-	7.68	9.23	8.45
MEAN	8.11	9.39	8.75

N INHIB	N RATE / N TIME	160	240
NONE	1111	8.59	9.43
	22--	7.69	9.13
	2-2-	8.04	9.35
	-22-	7.27	9.11
DICYANDI	1111	8.13	9.49
	22--	8.52	9.76
	2-2-	8.54	9.53
	-22-	8.09	9.34

NONE 2.68

GRAND MEAN 8.08

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85/R/WW/11

GRAIN TONNES/HECTARE

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

TABLE	N INHIB	N TIME	N RATE	N INHIB N TIME
SED	0.128	0.181	0.128	0.257

TABLE	N INHIB N RATE	N TIME N RATE	N INHIB N TIME N RATE
SED	0.181	0.257	0.363

SED FOR COMPARING EXTRA NONE WITH ANY ITEM IN
N INHIB.N TIME.N RATE TABLE IS 0.314

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.363	4.5

GRAIN MEAN DM% 84.9

PLOT AREA HARVESTED 0.00254

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85/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 - Long Hoos I/II.

Sponsors: F.V. Widdowson, R.J. Darby, R.J. Gutteridge, J.F. Jenkyn, B.R. Kerry, R.T. Plumb, G.J.S. Ross, G.C. Scott, D.W. Wood.

Design: Half replicate of (2 x 2 x 2 x 2 x 2 x 2) 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 square metre):	
	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, 1984, 30 on 4 Feb, 1985
3. SPRING N	Rates of nitrogen fertilizer in spring (kg N) as 'Nitro-Chalk' (26% N) on 2 Apr:	
	120	
	180	
4. E FUNG	Early fungicides:	
	NONE	None
	TFSD	Triadimenol and fuberidazole seed dressing
5. L FUNG	Late fungicides:	
	NONE	None
	SPRAYS	Prochloraz at 0.40 kg with carbendazim at 0.15 kg in 220 l on 10 Apr, 1985. Carbendazim at 0.15 kg with maneb at 1.6 kg and tridemorph at 0.38 kg in 220 l on 29 Apr. Captafol at 1.3 kg and triadimefon at 0.12 kg in 220 l on 20 May
6. GRTH REG	Growth regulator:	
	NONE	None
	CHLORMEQ	Chlormequat applied at GS 13, 24, 30, at 0.52 kg in 340 l on 23 Oct, 1984, 26 Nov, and in 220 l on 10 Apr, 1985

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85/R/B/1

7. INSCTCDE		Insecticide:
	NONE	None
	CYPERMET	Cypermethrin at 0.02 kg in 220 l on 30 Oct, 1984

plus 8 extra treatments with variety Panda sown at 300 seeds per square metre 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+120	30 on 9 Nov, 1984, 30 on 4 Feb, 1985 (both as prilled urea) plus 120 as 'Nitro-Chalk' (26% N) on 2 Apr
	180	180 as 'Nitro-Chalk' (26% N) on 2 Apr
3. E FUNGX		Early fungicides:
	NONE	None
	TFSD	Triadimenol and fuberidazole seed dressing

plus 8 extra treatments with variety Pirate sown at 300 seeds per square metre 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+120	30 on 9 Nov, 1984, 30 on 4 Feb, 1985 (both as prilled urea) plus 120 as 'Nitro-Chalk' (26% N) on 2 Apr
	180	180 as 'Nitro-Chalk' (26% N) on 2 Apr
3. E FUNGV		Early fungicides:
	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 fungicides, late fungicides and cypermethrin:

EXTRA NO	
SD 300	Seed sown at 300 seeds per square metre (duplicated)
SD 450	Seed sown at 450 seeds per square metre (duplicated)

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Basal applications: Manures: (0:18:36) at 280 kg. Weedkillers: Isoproturon at 2.4 kg with mecoprop at 1.1 kg, bromoxynil at 0.14 kg and ioxynil at 0.14 kg in 250 l. Mecoprop (as 'CMPP' at 3.6 l) with bromoxynil and ioxynil (as 'Deloxil' at 1.5 l) and isoproturon at 2.0 kg in 200 l. Growth regulator: Mepiquat chloride and 2-chloroethylphosphonic acid (as 'Terpal' at 2.0 l) with a wetting agent ('Agral' at 0.05 l) in 500 l.

Cultivations, etc.:- Cultivated by rotary digger: 1 Sept, 2 Sept, 1984. PK applied: 10 Sept. Ploughed, spring-tine cultivated: 11 Sept. Disced three times: 12 Sept. Rotary harrowed, seed sown: 13 Sept. Isoproturon, mecoprop, bromoxynil and ioxynil applied: 7 Dec. 'CMPP', 'Deloxil' and isoproturon applied: 15 Apr, 1985. Growth regulator applied: 3 May. Combine harvested: 15 Aug. Previous crops: W. barley 1983, w. barley, w. oats, fallow 1984.

NOTES: (1) Soil samples were taken in early October, November and February for amounts of nitrate and ammonium. Crop samples were taken from October to April for measurements of nitrate N concentration.
(2) Plants were counted in November and samples were taken in March, April and May to measure plant and shoot numbers, leaf areas, dry weights and nitrogen uptakes. After harvest thousand grain weights were measured.
(3) Leaf diseases, take-all, eyespot and barley yellow dwarf virus were assessed and aphids were counted.
(4) 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	6.48	6.87	6.67
450	6.21	6.75	6.48
MEAN	6.34	6.81	6.58

E FUNG	NONE	TFSD	MEAN
SEEDRATE			
300	6.53	6.82	6.67
450	6.34	6.62	6.48
MEAN	6.43	6.72	6.58

E FUNG	NONE	TFSD	MEAN
WINTER N			
0	6.04	6.64	6.34
30+30	6.82	6.80	6.81
MEAN	6.43	6.72	6.58

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85/R/B/1

GRAIN TONNES/HECTARE

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

L FUNG	NONE	SPRAYS	MEAN
SEEDRATE			
300	6.08	7.27	6.67
450	5.77	7.19	6.48
MEAN	5.92	7.23	6.58

L FUNG	NONE	SPRAYS	MEAN
WINTER N			
0	5.72	6.96	6.34
30+30	6.13	7.49	6.81
MEAN	5.92	7.23	6.58

L FUNG	NONE	SPRAYS	MEAN
E FUNG			
NONE	5.92	6.94	6.43
TFSD	5.92	7.52	6.72
MEAN	5.92	7.23	6.58

SPRING N	120	180	MEAN
SEEDRATE			
300	6.55	6.80	6.67
450	6.33	6.63	6.48
MEAN	6.44	6.71	6.58

SPRING N	120	180	MEAN
WINTER N			
0	6.26	6.43	6.34
30+30	6.62	7.00	6.81
MEAN	6.44	6.71	6.58

SPRING N	120	180	MEAN
E FUNG			
NONE	6.18	6.68	6.43
TFSD	6.69	6.75	6.72
MEAN	6.44	6.71	6.58

SPRING N	120	180	MEAN
L FUNG			
NONE	5.82	6.02	5.92
SPRAYS	7.05	7.41	7.23
MEAN	6.44	6.71	6.58

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85/R/B/1

GRAIN TONNES/HECTARE

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

INSCTCDE SEEDRATE	NONE	CYPERMET	MEAN
300	6.62	6.72	6.67
450	6.24	6.72	6.48
MEAN	6.43	6.72	6.58

INSCTCDE WINTER N	NONE	CYPERMET	MEAN
0	6.26	6.43	6.34
30+30	6.60	7.02	6.81
MEAN	6.43	6.72	6.58

INSCTCDE E FUNG	NONE	CYPERMET	MEAN
NONE	6.20	6.67	6.43
TFSD	6.67	6.77	6.72
MEAN	6.43	6.72	6.58

INSCTCDE L FUNG	NONE	CYPERMET	MEAN
NONE	5.81	6.04	5.92
SPRAYS	7.05	7.41	7.23
MEAN	6.43	6.72	6.58

INSCTCDE SPRING N	NONE	CYPERMET	MEAN
120	6.34	6.53	6.44
180	6.52	6.91	6.71
MEAN	6.43	6.72	6.58

GRTH REG SEEDRATE	NONE	CHLORMEQ	MEAN
300	6.59	6.75	6.67
450	6.47	6.49	6.48
MEAN	6.53	6.62	6.58

GRTH REG WINTER N	NONE	CHLORMEQ	MEAN
0	6.39	6.30	6.34
30+30	6.68	6.94	6.81
MEAN	6.53	6.62	6.58

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85/R/B/1

GRAIN TONNES/HECTARE

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

GRTH REG E FUNG	NONE	CHLORMEQ	MEAN
NONE	6.37	6.49	6.43
TFSD	6.69	6.75	6.72
MEAN	6.53	6.62	6.58

GRTH REG L FUNG	NONE	CHLORMEQ	MEAN
NONE	5.85	5.99	5.92
SPRAYS	7.21	7.24	7.23
MEAN	6.53	6.62	6.58

GRTH REG SPRING N	NONE	CHLORMEQ	MEAN
120	6.49	6.39	6.44
180	6.58	6.85	6.71
MEAN	6.53	6.62	6.58

GRTH REG INSCTCDE	NONE	CHLORMEQ	MEAN
NONE	6.41	6.45	6.43
CYPERMET	6.65	6.79	6.72
MEAN	6.53	6.62	6.58

N DIVX PRECROPX	30+30+120	180	MEAN
OATS	8.85	8.36	8.61
FALLOW	7.65	8.67	8.16
MEAN	8.25	8.51	8.38

E FUNGX PRECROPX	NONE	TFSD	MEAN
OATS	8.36	8.85	8.61
FALLOW	8.29	8.03	8.16
MEAN	8.32	8.44	8.38

E FUNGX N DIVX	NONE	TFSD	MEAN
30+30+120	8.33	8.17	8.25
180	8.32	8.71	8.51
MEAN	8.32	8.44	8.38

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85/R/B/1

GRAIN TONNES/HECTARE

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

PRECROPX	E FUNGX N DIVX	NONE	TFSD
OATS	30+30+120	8.66	9.04
	180	8.05	8.67
FALLOW	30+30+120	7.99	7.31
	180	8.59	8.74

N DIVV / PRECROPV	30+30+120	180	MEAN
BARLEY	8.39	6.79	7.59
OATS	9.10	9.06	9.08
MEAN	8.74	7.93	8.34

E FUNGV / PRECROPV	NONE	TFSD	MEAN
BARLEY	6.63	8.56	7.59
OATS	8.70	9.45	9.08
MEAN	7.66	9.01	8.34

E FUNGV / N DIVV	NONE	TFSD	MEAN
30+30+120	8.03	9.46	8.74
180	7.30	8.55	7.93
MEAN	7.66	9.01	8.34

PRECROPV	E FUNGV N DIVV	NONE	TFSD
BARLEY	30+30+120	7.29	9.50
	180	5.97	7.62
OATS	30+30+120	8.77	9.42
	180	8.63	9.48

EXTRA NO	SD 300	SD 450	MEAN
	4.00	3.98	3.99

GRAND MEAN 6.79

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

(NOT INCLUDING EXTRA PLOTS)
MARGIN OF TWO FACTOR TABLES 0.144
TWO FACTOR TABLES 0.203

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.575	8.7

GRAIN MEAN DM% 81.9

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85/R/B/1

STRAW TONNES/HECTARE

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

WINTER N	0	30+30	MEAN
SEEDRATE			
300	2.84	3.19	3.02
450	2.70	3.17	2.94
MEAN	2.77	3.18	2.98

E FUNG	NONE	TFSD	MEAN
SEEDRATE			
300	3.05	2.98	3.02
450	2.99	2.88	2.94
MEAN	3.02	2.93	2.98

E FUNG	NONE	TFSD	MEAN
WINTER N			
0	2.72	2.83	2.77
30+30	3.33	3.03	3.18
MEAN	3.02	2.93	2.98

L FUNG	NONE	SPRAYS	MEAN
SEEDRATE			
300	2.68	3.35	3.02
450	2.63	3.24	2.94
MEAN	2.66	3.30	2.98

L FUNG	NONE	SPRAYS	MEAN
WINTER N			
0	2.48	3.07	2.77
30+30	2.83	3.52	3.18
MEAN	2.66	3.30	2.98

L FUNG	NONE	SPRAYS	MEAN
E FUNG			
NONE	2.82	3.23	3.02
TFSD	2.50	3.36	2.93
MEAN	2.66	3.30	2.98

SPRING N	120	180	MEAN
SEEDRATE			
300	2.99	3.05	3.02
450	2.84	3.03	2.94
MEAN	2.91	3.04	2.98

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85/R/B/1

STRAW TONNES/HECTARE

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

SPRING N WINTER N	120	180	MEAN
0	2.79	2.76	2.77
30+30	3.04	3.31	3.18
MEAN	2.91	3.04	2.98

SPRING N E FUNG	120	180	MEAN
NONE	2.90	3.14	3.02
TFSD	2.93	2.93	2.93
MEAN	2.91	3.04	2.98

SPRING N L FUNG	120	180	MEAN
NONE	2.73	2.58	2.66
SPRAYS	3.10	3.49	3.30
MEAN	2.91	3.04	2.98

INSCTCDE SEEDRATE	NONE	CYPERMET	MEAN
300	2.97	3.06	3.02
450	2.78	3.09	2.94
MEAN	2.87	3.08	2.98

INSCTCDE WINTER N	NONE	CYPERMET	MEAN
0	2.73	2.81	2.77
30+30	3.02	3.34	3.18
MEAN	2.87	3.08	2.98

INSCTCDE E FUNG	NONE	CYPERMET	MEAN
NONE	2.89	3.15	3.02
TFSD	2.86	3.00	2.93
MEAN	2.87	3.08	2.98

INSCTCDE L FUNG	NONE	CYPERMET	MEAN
NONE	2.58	2.73	2.66
SPRAYS	3.16	3.43	3.30
MEAN	2.87	3.08	2.98

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85/R/B/1

STRAW TONNES/HECTARE

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

INSCTCDE	NONE	CYPERMET	MEAN
SPRING N			
120	2.82	3.01	2.91
180	2.93	3.14	3.04
MEAN	2.87	3.08	2.98

GRTH REG	NONE	CHLORMEQ	MEAN
SEEDRATE			
300	2.96	3.07	3.02
450	2.93	2.94	2.94
MEAN	2.94	3.01	2.98

GRTH REG	NONE	CHLORMEQ	MEAN
WINTER N			
0	2.78	2.77	2.77
30+30	3.11	3.24	3.18
MEAN	2.94	3.01	2.98

GRTH REG	NONE	CHLORMEQ	MEAN
E FUNG			
NONE	2.94	3.11	3.02
TFSD	2.95	2.91	2.93
MEAN	2.94	3.01	2.98

GRTH REG	NONE	CHLORMEQ	MEAN
L FUNG			
NONE	2.60	2.72	2.66
SPRAYS	3.29	3.30	3.30
MEAN	2.94	3.01	2.98

GRTH REG	NONE	CHLORMEQ	MEAN
SPRING N			
120	2.93	2.90	2.91
180	2.96	3.12	3.04
MEAN	2.94	3.01	2.98

GRTH REG	NONE	CHLORMEQ	MEAN
INSCTCDE			
NONE	2.91	2.84	2.87
CYPERMET	2.98	3.17	3.08
MEAN	2.94	3.01	2.98

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85/R/B/1

STRAW TONNES/HECTARE

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

N DIVX PRECROPX	30+30+120	180	MEAN
OATS	4.34	3.91	4.12
FALLOW	3.77	4.39	4.08
MEAN	4.06	4.15	4.10

E FUNGX PRECROPX	NONE	TFSD	MEAN
OATS	3.81	4.44	4.12
FALLOW	4.46	3.70	4.08
MEAN	4.14	4.07	4.10

E FUNGX N DIVX	NONE	TFSD	MEAN
30+30+120	4.10	4.01	4.06
180	4.17	4.12	4.15
MEAN	4.14	4.07	4.10

PRECROPX	E FUNGX N DIVX	NONE	TFSD
OATS	30+30+120	4.03	4.65
	180	3.58	4.23
FALLOW	30+30+120	4.17	3.37
	180	4.76	4.02

N DIVV PRECROPV	30+30+120	180	MEAN
BARLEY	3.52	2.74	3.13
OATS	3.90	4.06	3.98
MEAN	3.71	3.40	3.56

E FUNGV PRECROPV	NONE	TFSD	MEAN
BARLEY	2.56	3.71	3.13
OATS	3.69	4.27	3.98
MEAN	3.13	3.99	3.56

E FUNGV N DIVV	NONE	TFSD	MEAN
30+30+120	3.19	4.23	3.71
180	3.06	3.75	3.40
MEAN	3.13	3.99	3.56

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85/R/B/1

STRAW TONNES/HECTARE

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

PRECROPV	E FUNGV N DIVV	NONE	TFSD
BARLEY	30+30+120	2.77	4.26
	180	2.34	3.15
OATS	30+30+120	3.61	4.19
	180	3.77	4.35

EXTRA NO	SD 300	SD 450	MEAN
	1.57	1.37	1.47

GRAND MEAN 3.07

STRAW MEAN DM% 89.6

PLOT AREA HARVESTED 0.00249

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85/W/B/1

WINTER BARLEY

AUTUMN DISEASE CONTROL

Object: To examine the effects of autumn disease control, and interactions with growth regulator, in winter barley grown on contrasting soil types - Woburn, White Horse (light land), Broad Mead I (heavy land).

Sponsor: J.F. Jenkyn.

Design: On each site: 2 replicates of 20 plots, fully randomised.

Whole plot dimensions: 2.75 x 13.0.

Treatments: Duplicates of all combinations of:-

1. AUT FUNG — Autumn fungicide:

NONE	None (organo-Hg to seed)
ETHIRIMO	Ethirimol to seed (over organo-Hg S.D.)
FF 4050	FF 4050 to seed
FENPROPI	Fenpropimorph spray (organo-Hg to seed) at 0.75 kg in 220 l on 10 Dec, 1984
TRIADIME	Triadimenol and fuberidazole to seed

2. GR EARLY — Growth regulator early:

NONE	None
ME EARLY	Mepiquat chloride + 2-Chloroethylphosphonic acid at G.S. 30 (as 'Terpal' at 2.0 l) in 250 l, with a wetting agent ('Citowett' at 0.01 l), on 9 Apr, 1985

3. GR LATE — Growth regulator late:

NONE	None
ME LATE	Mepiquat chloride + 2-Chloroethylphosphonic acid at G.S. 32 (as 'Terpal' at 2.0 l) in 250 l, with a wetting agent ('Citowett' at 0.01 l), on 24 Apr.

Basal applications: Manures: (5:14:30) at 300 kg. N at 150 kg (White Horse), at 120 kg (Broad Mead I) as 'Nitro-Chalk' (27.5% N). Magnesian limestone at 7.5 t (Broad Mead I). Weedkillers: Paraquat at 0.30 kg ion in 250 l. Isoproturon at 2.0 kg in 250 l applied with the insecticide; mecoprop at 2.0 kg with cyanazine at 0.30 kg in 250 l applied with the prochloraz. Insecticide: Permethrin at 0.06 kg. Fungicides: Prochloraz at 0.40 kg. Carbendazim at 0.25 kg in 250 l. Carbendazim at 0.15 kg with tridemorph at 0.38 kg and maneb at 1.6 kg in 250 l. Triadimefon at 0.12 kg and captafol at 1.3 kg in 250 l. Desiccant: Diquat at 0.56 kg ion in 250 l (Broad Mead I).

Seed: Panda, sown at 300 seeds per square metre (150 kg).

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Cultivations, etc.:-
NPK applied, heavy spring-tine cultivated (White Horse): 4 Sept, 1984. Straw burnt, disced (Broad Mead I): 6 Sept. NPK applied (Broad Mead I): 12 Sept. Paraquat applied: 18 Sept. Magnesian limestone applied, heavy spring-tine cultivated, seed sown (Broad Mead I): 19 Sept. Ploughed (White Horse): 19 Sept. Rotary harrowed, seed sown (White Horse): 26 Sept. Weedkiller with insecticide applied: 1 Nov. N applied: 4 Apr, 1985. Weedkillers with fungicide applied: 10 Apr. Carbendazim applied: 16 Apr. Carbendazim with tridemorph and maneb applied: 3 May. Triadimefon with captafol applied: 30 May. Desiccant applied (Broad Mead I): 31 July. Combine harvested (Broad Mead I): 5 Aug, (White Horse): 13 Aug. Previous crops: (White Horse): W. wheat 1983, s. barley 1984. (Broad Mead I): W. wheat 1983 and 1984.

NOTES: (1) Seed emergence counts were made in October.
(2) Assessments of leaf and root diseases were made during the season.
(3) Crop samples were taken in May for counts of shoots, ear numbers and assessment of dry weights and in July for grain and ear numbers.

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85/W/B/1 WHITE HORSE

GRAIN TONNES/HECTARE

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

GR EARLY AUT FUNG	NONE	ME EARLY	MEAN
NONE	6.89	5.99	6.44
ETHIRIMO	6.98	6.65	6.82
FF 4050	7.63	6.32	6.98
FENPROPI	7.09	6.43	6.76
TRIADIME	7.38	6.58	6.98
MEAN	7.20	6.39	6.79

GR LATE AUT FUNG	NONE	ME LATE	MEAN
NONE	7.14	5.74	6.44
ETHIRIMO	7.16	6.47	6.82
FF 4050	7.14	6.82	6.98
FENPROPI	6.87	6.65	6.76
TRIADIME	7.22	6.74	6.98
MEAN	7.11	6.48	6.79

GR LATE GR EARLY	NONE	ME LATE	MEAN
NONE	7.78	6.62	7.20
ME EARLY	6.44	6.35	6.39
MEAN	7.11	6.48	6.79

GR EARLY	NONE		ME EARLY	
GR LATE	NONE	ME LATE	NONE	ME LATE
AUT FUNG				
NONE	7.90	5.89	6.39	5.59
ETHIRIMO	7.77	6.19	6.55	6.75
FF 4050	8.27	6.99	6.00	6.65
FENPROPI	6.98	7.19	6.75	6.12
TRIADIME	7.95	6.82	6.50	6.65

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

TABLE	AUT FUNG	GR EARLY	GR LATE	AUT FUNG GR EARLY
SED	0.561	0.355	0.355	0.793

TABLE	AUT FUNG GR LATE	GR EARLY GR LATE	AUT FUNG GR EARLY GR LATE
SED	0.793	0.501	1.121

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

STRATUM	DF	SE	CV%
WP	20	1.121	16.5

GRAIN MEAN DM% 81.2

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85/W/B/1 WHITE HORSE

STRAW TONNES/HECTARE

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

GR EARLY AUT FUNG	NONE	ME EARLY	MEAN
NONE	3.63	3.41	3.52
ETHIRIMO	4.03	3.62	3.82
FF 4050	4.29	3.52	3.90
FENPROPI	3.70	3.41	3.55
TRIADIME	3.63	3.37	3.50
MEAN	3.85	3.47	3.66

GR LATE AUT FUNG	NONE	ME LATE	MEAN
NONE	3.81	3.23	3.52
ETHIRIMO	3.51	4.14	3.82
FF 4050	4.06	3.75	3.90
FENPROPI	3.69	3.42	3.55
TRIADIME	3.75	3.24	3.50
MEAN	3.76	3.56	3.66

GR LATE GR EARLY	NONE	ME LATE	MEAN
NONE	3.89	3.82	3.85
ME EARLY	3.64	3.29	3.47
MEAN	3.76	3.56	3.66

GR EARLY	NONE		ME EARLY	
GR LATE	NONE	ME LATE	NONE	ME LATE
AUT FUNG				
NONE	4.11	3.14	3.50	3.32
ETHIRIMO	3.44	4.62	3.58	3.66
FF 4050	4.65	3.92	3.46	3.59
FENPROPI	3.89	3.50	3.49	3.34
TRIADIME	3.34	3.92	4.17	2.56

STRAW MEAN DM% 80.2

PLOT AREA HARVESTED 0.00248

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85/W/B/1 BROAD MEAD I

GRAIN TONNES/HECTARE

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

GR EARLY AUT FUNG	NONE	ME EARLY	MEAN
NONE	7.79	8.03	7.91
ETHIRIMO	8.16	8.49	8.33
FF 4050	8.52	7.62	8.07
FENPROPI	8.23	8.27	8.25
TRIADIME	8.20	8.68	8.44
MEAN	8.18	8.22	8.20

GR LATE AUT FUNG	NONE	ME LATE	MEAN
NONE	7.52	8.30	7.91
ETHIRIMO	8.03	8.63	8.33
FF 4050	7.93	8.22	8.07
FENPROPI	7.78	8.71	8.25
TRIADIME	8.30	8.58	8.44
MEAN	7.91	8.49	8.20

GR LATE GR EARLY	NONE	ME LATE	MEAN
NONE	7.83	8.53	8.18
ME EARLY	7.99	8.45	8.22
MEAN	7.91	8.49	8.20

GR EARLY	NONE		ME EARLY	
GR LATE	NONE	ME LATE	NONE	ME LATE
AUT FUNG				
NONE	7.11	8.46	7.92	8.14
ETHIRIMO	7.89	8.43	8.16	8.82
FF 4050	9.07	7.98	6.78	8.46
FENPROPI	7.44	9.01	8.12	8.41
TRIADIME	7.63	8.77	8.96	8.40

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

TABLE	AUT FUNG	GR EARLY	GR LATE	AUT FUNG GR EARLY
SED	0.262	0.166	0.166	0.371

TABLE	AUT FUNG GR LATE	GR EARLY GR LATE	AUT FUNG GR EARLY GR LATE
SED	0.371	0.234	0.524

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

STRATUM	DF	SE	CV%
WP	20	0.524	6.4

GRAIN MEAN DM% 74.3

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85/W/B/1 BROAD MEAD I

STRAW TONNES/HECTARE

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

GR EARLY AUT FUNG	NONE	ME EARLY	MEAN
NONE	4.12	3.87	4.00
ETHIRIMO	3.71	3.93	3.82
FF 4050	4.47	3.95	4.21
FENPROPI	4.00	3.94	3.97
TRIADIME	4.13	4.04	4.08
MEAN	4.09	3.95	4.02

GR LATE AUT FUNG	NONE	ME LATE	MEAN
NONE	3.71	4.28	4.00
ETHIRIMO	3.64	4.00	3.82
FF 4050	4.37	4.05	4.21
FENPROPI	3.64	4.30	3.97
TRIADIME	4.04	4.12	4.08
MEAN	3.88	4.15	4.02

GR LATE GR EARLY	NONE	ME LATE	MEAN
NONE	3.84	4.33	4.09
ME EARLY	3.92	3.97	3.95
MEAN	3.88	4.15	4.02

GR EARLY	NONE		ME EARLY	
GR LATE AUT FUNG	NONE	ME LATE	NONE	ME LATE
NONE	3.67	4.57	3.75	3.99
ETHIRIMO	3.43	3.99	3.86	4.01
FF 4050	4.98	3.96	3.76	4.13
FENPROPI	3.42	4.58	3.86	4.02
TRIADIME	3.70	4.56	4.39	3.68

STRAW MEAN DM% 76.7

PLOT AREA HARVESTED 0.00248

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85/R/B/2

WINTER BARLEY

CONTROL OF BYDV

Object: To study the effects of insecticides and alarm pheromone derivatives and their interaction with control of autumn volunteers systems on the incidence of BYDV - Scout N.

Sponsors: D.C. Griffiths, G.R. Cayley, J.H. Stevenson, J.A. Pickett, R.T. Plumb.

Design: 2 whole plots divided into 3 replicates of 6 sub-plots.

Whole plot dimensions: 21.0 x 96.0.

Treatments: All combinations of:-

Whole plots

1. VOLNTEER	Control of volunteers prior to ploughing shortly before sowing:	
	KILLED	Maximum control of all green plant matter
	PRESENT	Volunteer germination and survival encouraged

Sub plots

2. SPRY INS	Sprays of insecticides and pheromone derivatives:	
	NONE	None
	CYP EL	Cypermethrin applied electrostatically
	CYP HY	Cypermethrin applied hydraulically
	PHA O EL	Pheromone 'A' in oil applied electrostatically
	PHA W EL	Pheromone 'A' in water applied electrostatically
	PHB W EL	Pheromone 'B' in water applied electrostatically

NOTES: (1) Paraquat was applied at 0.60 kg ion in 500 l on 22 Aug, 1984, to VOLNTEER KILLED plots.
(2) Electrostatic application was by a 'Jumbo' sprayer. This has spinning cone nozzles, spray was charged at 30 kv and applied in 9.2 l.
(3) Hydraulic application was made in 200 l on 26 Oct.
(4) Cypermethrin was applied at 0.025 kg on 26 Oct, 1984 and pheromones at 1.0 kg on 2 Oct, 1984 repeated on 12 Oct and 26 Oct.

Basal applications: Manures: (0:18:36) at 340 kg. 'Nitro-Chalk' (26% N) at 620 kg. Weedkillers: Isoproturon at 1.5 kg, clopyralid at 0.05 kg, bromoxynil octanoate at 0.24 kg and mecoprop (as 'CMPP' at 3.0 l) applied with the fungicides in 200 l. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg. Desiccant: Diquat at 0.80 kg ion with a wetting agent ('Agral' at 0.5 l) in 500 l.

Seed: Panda, sown at 150 kg.

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85/R/B/2

Cultivations, etc.:- Heavy spring-tine cultivated: 31 July, 1984. Disced: 2 Aug. PK applied: 8 Aug. Ploughed: 12 Sept. Disced: 14 Sept. Rotary harrowed, seed sown: 18 Sept. N applied, weedkillers and fungicides applied: 9 Apr, 1985. Desiccant with wetting agent applied: 24 July. Combine harvested: 6 Aug. Previous crops: W. barley 1983 and 1984.

NOTE: Aphid and virus counts were taken and beneficial insects assessed.

GRAIN TONNES/HECTARE

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

SPRY INS VOLNTEER	NONE	CYP EL	CYP HY PHA O EL	PHA W EL PHB W EL		MEAN
KILLED	6.97	8.01	7.22	7.19	7.41	6.96	7.29
PRESENT	5.97	7.37	7.16	7.27	7.16	6.18	6.85
MEAN	6.47	7.69	7.19	7.23	7.28	6.57	7.07

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

TABLE	SPRY INS	VOLNTEER* SPRY INS
SED	0.264	0.373

* WITHIN THE SAME LEVEL OF VOLNTEER ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	20	0.457	6.5

GRAIN MEAN DM% 80.1

SUB PLOT AREA HARVESTED 0.00163

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85/R/B/3

WINTER BARLEY

STUBBLE TREATMENT AND BYDV

Object: To study the effects of herbicides and insecticides applied to stubble at different times before ploughing on the incidence of BYDV - Scout N.

Sponsor: R.T. Plumb.

Design: 4 randomised blocks of 12 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. SPRAYS — Sprays of herbicides and insecticides:

GLYPHOSA	Glyphosate at 1.4 kg
PARAQUAT	Paraquat at 0.60 kg ion

2. TIMES — Times of applying sprays (ploughed 12 September):

20 AUG	3 weeks before ploughing
3 SEPT	1 week before ploughing
11 SEPT	1 day before ploughing

Plus four extra treatments:

EXTRA	
NONE	No sprays (triplicated)
CY 3 SEP	Cypermethrin applied on 3 September at 0.025 kg
DI 3 SEP	Dimethoate applied on 3 September at 0.34 kg
PI 3 SEP	Pirimicarb applied on 3 September at 0.14 kg

NOTE: Treatment sprays were applied in 500 l except for glyphosate on 20 Aug which was in 200 l.

Basal applications: Manures: (0:18:36) at 340 kg. 'Nitro-Chalk' (26% N) at 620 kg. Weedkillers: Isoproturon at 1.5 kg, clopyralid at 0.05 kg with bromoxynil octanoate at 0.24 kg and mecoprop (as 'CMPP' at 3.0 l) in 200 l with the fungicides. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg. Insecticide: Cypermethrin at 0.025 kg in 250 l. Desiccant: Diquat at 0.80 kg ion with a wetting agent ('Agral' at 0.5 l) in 500 l.

Seed: Panda, sown at 150 kg.

Cultivations, etc.:- Heavy spring-tine cultivated: 31 July, 1984. Disced: 2 Aug. PK applied: 8 Aug. Ploughed: 12 Sept. Disced: 14 Sept. Rotary harrowed, seed sown: 18 Sept. Insecticide applied: 31 Oct. N applied, weedkillers and fungicides applied: 9 Apr, 1985. Desiccant with wetting agent applied: 24 July. Combine harvested: 6 Aug. Previous crops: W. barley 1983 and 1984.

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85/R/B/3

NOTE: Barley yellow dwarf virus and aphid incidence were recorded on volunteers during August and September, 1984. Emergence counts and aphid counts were made in October. Barley yellow dwarf virus incidence was recorded in May 1985.

GRAIN TONNES/HECTARE

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

SPRAYS / TIMES	GLYPHOSA	PARAQUAT	MEAN
20 AUG	7.64	6.97	7.30
3 SEPT	5.89	6.38	6.13
11 SEPT	6.23	6.05	6.14
MEAN	6.59	6.47	6.53

EXTRA	NONE	CY 3 SEP	DI 3 SEP	PI 3 SEP	MEAN
	5.75	5.34	6.68	6.10	5.89

GRAND MEAN 6.21

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

TABLE	SPRAYS	TIMES	SPRAYS TIMES	EXTRA	
SED	0.353	0.432	0.611	0.611	MIN REP
				0.499	MIN-MAX

EXTRA
MIN-MAX 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	35	0.864	13.9

GRAIN MEAN DM% 80.0

PLOT AREA HARVESTED 0.00204

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85/R/B/5 and 85/W/B/5

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), Summerdells II and Woburn (W), Lansome III.

Sponsor: R. Moffitt.

Design: 2 randomised blocks of 3 plots split into 9(R), into 8(W).

Whole plot dimensions: (R) 51 x 10.0. (W) 44 x 10.0.

Treatments: All combinations of:-

Whole plots

1. N Nitrogen fertilizer (kg N) as 'Nitro-Chalk' (27.5% N):

75
113
150

Sub plots

2. VARIETY Varieties:

APEX
ATEM
CASINO
DELTA
DOUBLET
NATASHA
SCRI 8313
TRIUMPH
VISTA

NOTE: SCRI 8313 was omitted at Woburn.

Basal applications:
Summerdells II (R): Weedkillers: Clopyralid at 0.05 kg with bromoxynil octanoate at 0.24 kg and mecoprop at 1.8 kg with the fungicide in 200 l. Fungicide: Tridemorph at 0.52 kg.
Lansome III (W): Weedkillers: Clopyralid at 0.07 kg with bromoxynil octanoate at 0.34 kg and mecoprop at 2.1 kg with the fungicide in 250 l. Fungicide: Tridemorph at 0.52 kg.

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

Cultivations, etc.:-
Summerdells II (R): Ploughed: 30 Oct, 1984. Spring-tine cultivated: 14 Mar, 1985. Test N applied, rotary harrowed, seed sown: 15 Mar. Weedkillers and fungicide applied: 16 May. Combine harvested: 21 Aug. Previous crops: Potatoes 1983, w. wheat 1984.

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85/R/B/5 and 85/W/B/5

Cultivations, etc.:-
Lansome III (W): Disced: 14 Sept, 1984. Ploughed: 30 Nov. Spring-tine cultivated with crumbler attached, rotary harrowed, seed sown: 19 Mar, 1985. Test N applied: 17 Apr. Weedkillers and fungicide applied: 17 May. Combine harvested: 29 Aug. Previous crops: W. wheat 1983, s. barley 1984.

85/R/B/5 SUMMERDELLS II (R)

GRAIN TONNES/HECTARE

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

N	75	113	150	MEAN
VARIETY				
APEX	6.56	7.10	7.52	7.06
ATEM	6.72	7.32	7.21	7.08
CASINO	7.18	7.89	7.96	7.68
DELTA	7.16	7.86	7.81	7.61
DOUBLET	6.89	8.16	8.47	7.84
NATASHA	6.32	7.41	8.01	7.25
SCRI 8313	6.79	7.46	7.66	7.30
TRIUMPH	7.17	7.91	8.14	7.74
VISTA	6.97	7.78	7.86	7.53
MEAN	6.86	7.65	7.85	7.45

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

TABLE	N	VARIETY	N VARIETY
SED	0.056	0.087	0.152
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
N			0.150

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	24	0.150	2.0

GRAIN MEAN DM% 83.5

SUB PLOT AREA HARVESTED 0.00204

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85/W/B/5 LANSOME III (W)

GRAIN TONNES/HECTARE

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

N VARIETY	75	113	150	MEAN
APEX	5.95	6.65	6.59	6.40
ATEM	6.24	6.82	7.31	6.79
CASINO	5.90	6.62	6.64	6.39
DELTA	7.33	7.01	6.81	7.05
DOUBLET	5.77	6.85	5.45	6.03
NATASHA	5.84	6.00	6.98	6.27
TRIUMPH	5.70	6.30	6.04	6.01
VISTA	5.97	7.16	7.12	6.75
MEAN	6.09	6.68	6.62	6.46

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

TABLE	N	VARIETY	N VARIETY
SED	0.289	0.286	0.545
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
N			0.495

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	21	0.495	7.7

GRAIN MEAN DM% 85.0

SUB PLOT AREA HARVESTED 0.00275

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85/R/B/6

SPRING BARLEY

ELECTROSTATIC SPRAYING AND MILDEW

Object: To study the penetration of sprays and control of mildew with a range of sprayers - Bones Close.

Sponsors: G.R. Cayley, D.C. Griffiths, B.J. Pye, P. Etheridge, R.E. Goodchild.

Design: 3 randomised blocks of 26 plots.

Whole plot dimension: 3.0 x 13.0.

Treatments: All combinations of:-

1. SPRAYER — Sprayers applying fenpropimorph:

EL JUMBO	'Jumbo' electrostatic sprayer
EL NEW	'New' electrostatic sprayer
HYDRAUL	Hydraulic sprayer
ROT ATOM	Rotary atomiser sprayer

2. RATE — Rates of fenpropimorph:

THIRD	One third standard rate, at 0.25 kg
STANDARD	Standard rate, at 0.75 kg

3. TIMING — Timing of fenpropimorph:

EARLY	Early, on 23 May, 1985
LATE	Late, on 17 June
EA + LA	Early plus late as above

plus one extra treatment

EXTRA	
NONE	No fenpropimorph (duplicated)

NOTES: (1) Atem, dressed triadimenol and fuberidazole was sown on the headlands and surrounds at 160 kg.
(2) The 'Jumbo' electrostatic sprayer has spinning cone nozzles, spray was charged at 30 kv, and applied in 8.6 l.
(3) The 'New' electrostatic sprayer has inductively-charged vertically-mounted rotary atomisers and spray was applied in 7.9 l.
(4) Hydraulic application was made in 200 l.
(5) The rotary atomiser sprayer has uncharged vertically mounted rotary atomisers and spray was applied in 7.9 l.

Basal applications: Manures: (0:18:36) at 690 kg. 'Nitro-Chalk' (27.5% N) at 450 kg. Weedkillers: Mecoprop at 1.6 kg and cyanazine at 0.24 kg in 500 l.

Seed: Georgie, sown at 160 kg.

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85/R/B/6

Cultivations, etc.:- PK applied: 25 Sept, 1984. Ploughed: 31 Oct. Spring-tine cultivated: 13 Mar, 1985. Rotary harrowed, seed sown: 14 Mar. N applied: 19 Apr. Weedkillers applied: 10 May. Combine harvested: 21 Aug. Previous crops: Winter oilseed rape 1983, w. wheat 1984.

NOTE: Chemical deposits were observed after spraying and mildew assessments were made on two occasions.

GRAIN TONNES/HECTARE

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

RATE / SPRAYER	THIRD	STANDARD	MEAN
EL JUMBO	7.78	7.86	7.82
EL NEW	7.29	7.56	7.42
HYDRAUL	7.71	7.66	7.68
ROT ATOM	7.49	7.78	7.64
MEAN	7.57	7.72	7.64

TIMING / SPRAYER	EARLY	LATE	EA + LA	MEAN
EL JUMBO	7.96	7.26	8.24	7.82
EL NEW	7.38	7.15	7.73	7.42
HYDRAUL	7.80	7.15	8.11	7.68
ROT ATOM	7.54	7.30	8.07	7.64
MEAN	7.67	7.21	8.04	7.64

TIMING / RATE	EARLY	LATE	EA + LA	MEAN
THIRD	7.61	7.14	7.95	7.57
STANDARD	7.73	7.28	8.13	7.72
MEAN	7.67	7.21	8.04	7.64

SPRAYER	TIMING / RATE	EARLY	LATE	EA + LA
EL JUMBO	THIRD	7.87	7.35	8.13
	STANDARD	8.05	7.16	8.36
EL NEW	THIRD	7.20	6.93	7.73
	STANDARD	7.56	7.37	7.74
HYDRAUL	THIRD	7.93	7.12	8.07
	STANDARD	7.67	7.17	8.15
ROT ATOM	THIRD	7.44	7.16	7.87
	STANDARD	7.65	7.43	8.27

NONE 6.10

GRAND MEAN 7.52

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85/R/B/6

GRAIN TONNES/HECTARE

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

TABLE	SPRAYER	RATE	TIMING	SPRAYER RATE
SED	0.085	0.060	0.073	0.120

TABLE	SPRAYER TIMING	RATE TIMING	SPRAYER RATE TIMING
SED	0.146	0.104	0.207

SED FOR COMPARING NONE WITH ANY ITEM IN
SPRAYER.RATE.TIMING TABLE IS 0.179

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

STRATUM	DF	SE	CV%
BLOCK.WP	51	0.254	3.4

GRAIN MEAN DM% 77.1

PLOT AREA HARVESTED 0.00265

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85/R/B/8

SPRING BARLEY

NITROPHOSPHATES

Object: To study the effect of different amounts of water-soluble phosphate in nitrophosphate fertilizers on the growth and P uptake of spring barley - Highfield V.

Sponsor: K.G. Copestake.

Design: 3 randomised blocks of 13 plots.

Whole plot dimensions: 3.0 x 21.0.

Treatments: All combinations of:-

1. P SOL — Phosphate water solubility (%):

59	Compound fertilizer 16.4 : 14.2 : 17.5 with 59% of the P2O5 water soluble
73	Compound fertilizer 15.9 : 16.2 : 15.3 with 73% of the P2O5 water soluble
95	Compound fertilizer 15.0 : 15.0 : 15.0 with 95% of the P2O5 water soluble

2. P RATE — Rate of phosphate (kg P2O5):

20
40
60

plus one extra treatment:

EXTRA

NONE	No phosphate fertilizer (quadruplicated)

NOTE: The compound fertilizers used to apply the phosphate treatments supplied differing amounts of the total 120 kg N and 72.5 kg K2O required on all plots. Additional amounts of N (as 'Nitrotop' 33.5% N) and K2O (as muriate of potash 60% K2O) were applied as needed to achieve this total. Combinations with P SOL 59 received 74.0 kg K2O in error.

Basal applications: Manures: Chalk at 5.0 t, on two occasions.
Weedkillers: Clopyralid at 0.05 kg and bromoxynil at 0.24 kg with mecoprop (as 'CMPP' at 3.0 l) applied with the fungicide in 200 l.
Fungicide: Tridemorph at 0.52 kg.

Seed: Klaxon, sown at 160 kg.

Cultivations, etc.:- Disced: 14 Aug, 1984. First chalk applied: 23 Aug. Ploughed: 11 Sept. Second chalk applied: 2 Oct. Fertilizer treatments applied, spring-tine cultivated, rotary harrowed, seed sown: 21 Mar, 1985. Weedkillers and fungicide applied: 16 May. Combine harvested: 23 Aug. Previous crops: S. barley 1983, w. oats 1984.

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85/R/B/8

NOTE: Soil was sampled for nutrient analysis before fertilizer application and again after harvest. Emergence and stem counts were made. Samples were taken for fresh and dry weight crop components throughout the season.

GRAIN TONNES/HECTARE

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

P RATE / P SOL	20	40	60	MEAN
59	7.92	7.76	7.94	7.87
73	7.75	7.91	8.00	7.88
95	8.01	7.56	8.22	7.93
MEAN	7.89	7.74	8.05	7.90

NONE 7.02

GRAND MEAN 7.63

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

TABLE	P SOL	P RATE	P SOL P RATE
SED	0.188	0.188	0.326

SED FOR COMPARING NONE WITH ANY ITEM
IN P SOL.P RATE TABLE IS 0.258

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

STRATUM	DF	SE	CV%
BLOCK.WP	27	0.400	5.2

GRAIN MEAN DM% 80.4

PLOT AREA HARVESTED 0.00224

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85/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 - Appletree.

Sponsors: J. McEwen, 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 19 Apr, 1985
FULL	Seed dressed with carbendazim and thiram Aldicarb at 10 kg on 15 Oct, 1984 Fosetyl-Al at 1.6 kg, benomyl at 0.56 kg and chlorothalonil at 1.0 kg on 7 Mar, 1985 Carbofuran at 1.7 kg on 19 Apr Chlorothalonil at 1.0 kg, benomyl at 0.56 kg and deltamethrin at 0.0075 kg on 22 May Propiconazole at 0.12 kg, benomyl at 0.56 kg and pirimicarb at 0.14 kg on 23 July

NOTES: (1) Treatment sprays were applied in 220 l.
(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: Simazine at 1.2 kg with propyzamide at 0.85 kg in 250 l. Fungicides: Chlorothalonil at 1.0 kg with benomyl at 0.50 kg and a wetting agent ('Agral' at 0.075 l) on three occasions in 240 l, 500 l and 200 l respectively.

Seed: Banner, undressed seed sown at 150 kg, dressed seed sown at 140 kg.

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85/R/BE/1

Cultivations, etc.:- Heavy spring-tine cultivated: 5 Sept, 1984. Ploughed: 14 Sept. Rotary harrowed: 19 Sept. Aldicarb treatment applied, spring-tine cultivated, seed sown: 15 Oct. Weedkillers applied: 31 Oct. Basal fungicides applied: 29 May, 11 June, 3 July, 1985. Combine harvested: 24 Sept. Previous crops: S. wheat 1983, w. wheat 1984.

NOTES: Plant counts were made after establishment and components of yield were measured at maturity. Migratory nematodes, root and foliar fungi, viruses and weevils were counted at intervals during the season. Total above-ground dry matter and N content were measured in August. N content of grain was measured.

GRAIN TONNES/HECTARE

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

PATHCONT	STANDARD	ENHANCED	FULL	MEAN
	4.34	4.49	4.97	4.60

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

TABLE	PATHCONT
SED	0.245

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.425	9.2

GRAIN MEAN DM% 78.3

PLOT AREA HARVESTED 0.00320

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85/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 - Appletree.

Sponsors: J. McEwen, D.P. Yeoman, R. Moffitt.

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:

26 SEP	26 September, 1984
1 NOV	1 November

3. POPULATN — Plant populations per hectare:

	Target Population	Mean population achieved
120	120,000	130,000
240	240,000	250,000
360	360,000	340,000

plus three extra treatments, duplicated, all with seed broadcast and ploughed in on 11 December:

PL 11DEC	Target Population	Population achieved
120	120,000	100,000
240	240,000	160,000
360	360,000	240,000

NOTE: The extra treatments replaced those planned for a third level of SOW DATE which could not be achieved because conditions were too wet to permit drilling.

Basal applications: Weedkillers: Trietazine at 1.2 kg with simazine at 0.17 kg in 250 l on SOW DATE, 26 SEP and 1 NOV and in 500 l on SOW DATE PL 11DEC. Fungicides: Chlorothalonil at 1.0 kg with benomyl at 0.50 kg and a wetting agent ('Agral' at 0.075 l) on three occasions in 240 l, 500 l and 200 l respectively. Insecticides: Deltamethrin at 0.0079 kg on two occasions, in 500 l and 200 l respectively; pirimicarb at 0.14 kg in 200 l.

Seed: Banner, dressed with carbendazim and thiram.

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85/R/BE/2

Cultivations, etc.:- Heavy spring-tine cultivated: 5 Sept, 1984. Ploughed: 14 Sept. Rotary harrowed: 19 Sept. SOWDATE 26 SEP seed sown or broadcast: 26 Sept. SOW DATE 26 SEP PLOUGH plots ploughed: 27 Sept. Weedkillers applied to SOWDATE 26 SEP: 9 Oct. SOWDATE 1 NOV plots seed sown or broadcast, broadcast plots ploughed: 1 Nov. Weedkillers applied to SOWDATE 1 NOV: 2 Nov. PL 11DEC plots seed broadcast and ploughed in: 11 Dec. Weedkillers applied to PL 11DEC plots: 1 Feb, 1985. Deltamethrin applied: 3 May, 23 May. Fungicides applied: 29 May, 11 June, 3 July. Pirimicarb applied: 23 July. Combine harvested: 24 Sept. Previous crops: S. wheat 1983, w. wheat 1984.

NOTE: Plant emergence counts were made and numbers of stems were counted in April and at maturity. Flowering dates were recorded, chocolate spot, rust and lodging were assessed. Components of yield were measured at maturity.

GRAIN TONNES/HECTARE

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

SOW DATE	26 SEP	1 NOV	MEAN
SOW METH			
DRILL	4.15	4.30	4.23
PLOUGH	4.72	4.59	4.66
MEAN	4.43	4.45	4.44

POPULATN	120	240	360	MEAN
SOW METH				
DRILL	4.23	4.44	4.01	4.23
PLOUGH	4.97	4.49	4.51	4.66
MEAN	4.60	4.47	4.26	4.44

POPULATN	120	240	360	MEAN
SOW DATE				
26 SEP	4.64	4.52	4.15	4.43
1 NOV	4.55	4.41	4.38	4.45
MEAN	4.60	4.47	4.26	4.44

	POPULATN	120	240	360
SOW METH	SOW DATE			
DRILL	26 SEPT	4.31	4.37	3.77
	1 NOV	4.14	4.50	4.26
PLOUGH	26 SEPT	4.97	4.67	4.52
	1 NOV	4.96	4.32	4.50

PL 11DEC	120	240	360
	3.30	3.81	4.20

GRAND MEAN 4.22

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85/R/BE/2

GRAIN TONNES/HECTARE

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

TABLE	PL 11DEC	SOW METH	SOW DATE	POPULATN
SED	0.134	0.077	0.077	0.095

TABLE	SOW METH SOW DATE	SOW METH POPULATN	SOW DATE POPULATN	SOW DATE SOW METH POPULATN
SED	0.110	0.134	0.134	0.190

SED FOR COMPARING ANY ITEM IN
PL 11DEC TABLE WITH ANY ITEM IN
SOW DATE.SOW METH.POPULATN IS 0.164

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

STRATUM	DF	SE	CV%
BLOCK.WP	20	0.190	4.5

GRAIN MEAN DM% 73.9

PLOT AREA HARVESTED 0.00310

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85/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 - Appletree.

Sponsors: R. Bardner, D.C. Griffiths.

Design: 4 randomised blocks of 8 plots.

Whole plot dimensions: 5.33 x 13.7.

Treatments:

INSCTCDE	Forms, rates and methods of applying insecticides:
NONE	None
CF 1 G	Carbofuran at 0.425 kg, as granules, applied on 19 April, 1985
CF 2 G	Carbofuran at 0.850 kg, as granules, applied on 19 April
CY DS	Cyfluthrin at 0.050 kg as a divided spray, half applied on 10 May, half on 22 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
PE SS	Permethrin at 0.050 kg as a single spray applied on 10 May
PH 1 G	Phorate at 0.850 kg, as granules, applied on 19 April
PH 2 G	Phorate at 1.700 kg, as granules, applied on 19 April

Basal applications: Weedkillers: Simazine at 1.2 kg with propyzamide at 0.85 kg in 250 l. Fungicides: Chlorothalonil at 1.0 kg with benomyl at 0.50 kg and a wetting agent ('Agral' at 0.075 l) on three occasions in 240 l, 500 l and 200 l respectively.

Seed: Banner, dressed with carbendazim and thiram, sown at 150 kg.

Cultivations, etc.:- Heavy spring-tine cultivated: 5 Sept, 1984. Ploughed: 14 Sept. Rotary harrowed: 19 Sept. Spring-tine cultivated, seed sown: 15 Oct. Weedkillers applied: 31 Oct. Fungicides applied: 29 May, 1985, 11 June and 3 July. Combine harvested: 24 Sept. Previous crops: S. wheat 1983, w. wheat 1984.

NOTE: Leaf damage by Sitona was assessed in May.

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85/R/BE/3

GRAIN TONNES/HECTARE

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

INSCTCDE	
NONE	4.45
CF 1 G	4.61
CF 2 G	4.82
CY DS	4.40
PE DS	4.74
PE SS	4.45
PH 1 G	4.73
PH 2 G	4.58
MEAN	4.60

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

TABLE	INSCTCDE
SED	0.192

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

STRATUM	DF	SE	CV%
BLOCK.WP	21	0.271	5.9

GRAIN MEAN DM% 79.1

PLOT AREA HARVESTED 0.00293

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85/R/BE/4

WINTER BEANS

VARIETIES

Object: To compare agronomic characters and yields of three varieties of w. beans sown at two populations - Long Hoos VI/VII 1.

Sponsors: J. McEwen, D.P. Yeoman.

Design: 3 randomised blocks of 6 plots.

Whole plot dimensions: 2.03 x 2.13.

Treatments: All combinations of:-

1. VARIETY — Varieties:

BANNER	Banner
BEAGLE	Maris Beagle
BOURDON	Bourdon

2. POPULATN — Plant populations per hectare:

	Target population	Mean population achieved
130	130,000	120,000
390	390,000	360,000

NOTE: Seed was sown by hand in rows 51 cm apart.

Basal applications: Manures: Chalk at 2.9 t. Muriate of potash at 520 kg. Weedkillers: Glyphosate at 1.4 kg in 220 l; trietazine at 1.2 kg with simazine at 0.17 kg in 220 l. Fungicides: Benomyl at 0.56 kg plus chlorothalonil at 1.0 kg applied with the second application of deltamethrin; propiconazole at 0.12 kg in 220 l on two occasions. Insecticides: Deltamethrin at 0.0075 kg in 220 l on two occasions; pirimicarb at 0.14 kg in 220 l.

Cultivations, etc.:- Chalk applied: 11 Sept, 1984. K applied: 25 Sept. Glyphosate applied: 26 Sept. Ploughed: 15 Oct. Spring-tine cultivated twice, seed sown, trietazine and simazine applied: 16 Oct. Deltamethrin applied: 2 May, 1985. Deltamethrin with benomyl and chlorothalonil applied: 22 May. Propiconazole applied: 3 June. Pirimicarb applied: 20 June. Propiconazole applied: 9 July. Harvested by hand: 5 Sept. Previous crops: Potatoes 1983, s. barley 1984.

NOTE: Plant counts were made after establishment. Components of yield were measured at maturity. N content of grain was measured. Plant height was measured at the end of May.

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85/R/BE/4

GRAIN TONNES/HECTARE

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

POPULATN VARIETY	130	390	MEAN
BANNER	4.43	5.20	4.81
BEAGLE	5.23	5.03	5.13
BOURDON	5.23	5.48	5.36
MEAN	4.96	5.24	5.10

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

TABLE	VARIETY	POPULATN	VARIETY POPULATN
SED	0.365	0.298	0.515

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

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.631	12.4

GRAIN MEAN DM% 81.0

PLOT AREA HARVESTED 0.00015

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85/R/BE/6

SPRING BEANS

CONTROL OF PRATYLENCHUS

Object: To study the effects of aldicarb, carbofuran and phorate on numbers of Pratylenchus nematodes and on the yield of s. beans - Great Harpenden II.

Sponsor: R.M. Webb.

Design: 4 randomised blocks of 8 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
	Phorate applied to seed furrows at sowing:
PH 1 CD	At 3.0 kg
PH 2 CD	At 4.5 kg
PH 3 CD	At 6.0 kg

Basal applications: Manures: Chalk at 5.0 t. Weedkiller: Simazine at 1.2 kg in 200 l.

Seed: Minden, sown at 260 kg.

Cultivations, etc.:- Chalk applied: 23 Aug, 1984. Ploughed: 9 Nov. Heavy spring-tine cultivated, spring-tine cultivated: 18 Mar, 1985. Aldicarb treatment applied, harrowed in, seed sown: 20 Mar. Weedkiller applied: 25 Mar. Combine harvested: 25 Sept. Previous crops: S. wheat 1983, s. barley 1984.

NOTE: Soil was sampled for nematodes just before treatments were applied, and both soil and plant roots were sampled in April and June.

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85/R/BE/6

GRAIN TONNES/HECTARE

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

NEMACIDE	
NONE	4.90
AL BC	4.91
CA 1 CD	5.21
CA 2 CD	5.07
CA 3 CD	5.14
PH 1 CD	4.88
PH 2 CD	4.94
PH 3 CD	5.12
MEAN	5.02

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

TABLE	NEMACIDE
SED	0.136

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

STRATUM	DF	SE	CV%
BLOCK.WP	21	0.193	3.8

GRAIN MEAN DM% 83.2

PLOT AREA HARVESTED 0.00293

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85/R/BE/7

SPRING BEANS

CONTROL OF STEM NEMATODE

Object: To study the effects of rates, times and methods of applying nematicides on the control of seed-borne infestation by stem nematode (Ditylenchus dipsaci) and on the yield of s. beans - Little Knott I.

Sponsor: A.G. Whitehead.

Design: 3 randomised blocks of 17 plots.

Whole plot dimensions: 2.29 x 4.57.

Treatments: All combinations of:-

1. NEMACIDE	Nematicides:
ALDICARB	Aldicarb
CARBOFUR	Carbofuran
2. NEM RATE	Rates of nematicides (kg):
1	1 to seed furrows at sowing
2	2 to seed furrows at sowing
4	4 to seed furrows at sowing
2+2	2 to seed furrows at sowing + 2 post emergence on 11 June, 1985

plus eight extra treatments:

EXTRA	
NONE	None (duplicated)
	Post-emergence sprays, applied at 1.5 kg, in addition to carbofuran at 2 kg to seed furrow at sowing:
CA2 TB C	Thiabendazole applied by conventional sprayer
CA2 TB E	Thiabendazole applied by electrostatic sprayer
CA2 CZ C	Carbendazim applied by conventional sprayer
CA2 CZ E	Carbendazim applied by electrostatic sprayer
CA2 TD C	Thiodicarb applied by conventional sprayer
CA2 TD E	Thiodicarb applied by electrostatic sprayer
CA2 DI C	Dimethoate applied by conventional sprayer

NOTE: Conventional sprayer treatments were applied in 310 l on 24 June, and electrostatic sprays in 5.7 l on 25 June.

Basal applications: Manures: (0:24:24) at 450 kg. Weedkiller: Simazine at 1.1 kg in 620 l. Fungicide: Benomyl at 0.56 kg in 280 l. Insecticide: Pirimicarb at 0.14 kg in 280 l on two occasions.

Seed: Maris Bead, sown at 260 kg.

Cultivations, etc.:- Cultivated by rotary digger: 18 Dec, 1984. PK applied: 11 Mar, 1985. Seed sown and seedbed treatments applied: 12 Mar. Weedkiller applied: 15 Mar. Pirimicarb applied: 2 July, 25 July. Benomyl applied: 3 July. Harvested by hand: 4 Sept. Previous crops: W. wheat 1983, sugar beet 1984.

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85/R/BE/7

NOTES: (1) Because of a harvesting error yields of four plots were lost. Those with treatment combinations

NEMACIDE	CARBOFUR	ALDICARB	ALDICARB
NEM RATE	2	4	2+2

and EXTRA CA2 TD C. Estimated values were used in the analysis.

(2) Stem nematode infestations were assessed in the stems after flowering and in the seed after harvest.

GRAIN TONNES/HECTARE

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

NEM RATE	1	2	4	2+2	MEAN
NEMACIDE					
ALDICARB	5.77	5.78	5.47	6.53	5.89
CARBOFUR	5.93	6.02	5.86	5.35	5.79
MEAN	5.85	5.90	5.67	5.94	5.84

EXTRA	
NONE	5.34
CA2 TB C	5.56
CA2 TB E	5.76
CA2 CZ C	5.62
CA2 CZ E	5.99
CA2 TD C	6.44
CA2 TD E	5.51
CA2 DI C	5.44
MEAN	5.67

GRAND MEAN 5.75

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

TABLE	NEMACIDE	NEM RATE	NEMACIDE NEM RATE	EXTRA	
SED	0.210	0.296	0.419	0.419	MIN REP
				0.314	MAX-MIN

	EXTRA
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	29	0.513	8.9

GRAIN MEAN DM% 76.7

PLOT AREA HARVESTED 0.00035

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85/R/BE/8

SPRING BEANS

ERYNIA AND APHID CONTROL

Object: To study the effects of two methods of applying the aphid-pathogenic fungus Erynia neoaphidis on the number of black aphids (Aphis fabae) and on the yield of s. beans - Little Knott I.

Sponsor: S.K. Mardell.

Design: 5 randomised blocks of 4 plots.

Whole plot dimensions: 2.67 x 2.13.

Treatments:

APH CONT	Chemical and biological aphid control:
NONE	None
EN CULT	E. neoaphidis culture, applied as mycelium
EN APHID	E. neoaphidis applied as mummified aphids
PIRIMICA	Pirimicarb at 0.22 kg in 530 l on 2 July, 1985

NOTES: (1) The culture was applied as 2.23 kg dry mycelium in suspension of water at 970 l on 14 July, 1985. Mummified aphids were applied at 0.5 mg per plant on 1 July, repeated on 8 July.
(2) Basal irrigation was applied as follows (mm water):

4 May	12.5
9 May	12.5
18 May	12.5
3 June	12.5
17 June	12.5
5 July	12.5
14 July	12.5
Total	87.5 mm

Basal applications: Weedkiller: Simazine at 1.2 kg in 200 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Cultivated by rotary digger: 28 Nov, 1984. Deep spring-tine cultivated, spring-tine cultivated, seed sown: 19 Mar, 1985. Weedkiller applied: 25 Mar. Combine harvested: 27 Sept. Previous crops: S. barley 1983, potatoes 1984.

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.

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85/R/BE/8

GRAIN TONNES/HECTARE

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

APH CONT	NONE	EN CULT	EN APHID	PIRIMICA	MEAN
	4.52	4.41	4.74	4.87	4.64

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

TABLE	APH CONT
SED	0.292

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

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.461	9.9

GRAIN MEAN DM% 89.6

PLOT AREA HARVESTED 0.00024

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85/R/BE/9

SPRING BEANS

VARIETIES

Object: To compare agronomic characters and yields of four varieties of s. beans - Long Hoos VI/VII 4.

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
TICOL
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: Trietazine at 1.2 kg with simazine at 0.17 kg and paraquat at 0.40 kg ion in 220 l. Fungicides: Benomyl at 0.55 kg in 220 l; propiconazole at 0.12 kg in 220 l on two occasions. Insecticides: Deltamethrin at 0.0075 kg in 220 l on two occasions; pirimicarb at 0.14 kg in 220 l.

Cultivations, etc.:- Chalk applied: 12 Sept, 1984. Ploughed: 12 Nov. Spring-tine cultivated, seed sown: 14 Mar, 1985. Weedkillers applied: 18 Mar. Deltamethrin applied: 2 May, 23 May. Pirimicarb applied: 1 July. Benomyl applied: 2 July. Propiconazole applied: 17 July, 22 Aug. Harvested by hand, ALFRED & TROY: 11 Sept; MINDEN & TICOL: 16 Sept. Previous crops: W. wheat 1983 & 1984.

NOTE: Plant counts were made after establishment. Components of yield were measured at maturity. N content of grain was measured.

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85/R/BE/9

GRAIN TONNES/HECTARE

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

VARIETY	ALFRED	MINDEN	TICOL	TROY	MEAN
	5.78	5.91	4.39	5.11	5.30

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

TABLE	VARIETY
SED	0.193

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

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.274	5.2

GRAIN MEAN DM% 86.5

PLOT AREA HARVESTED 0.00015

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85/R/BE/10

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 VI/VII 4.

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	170,000
400	400,000	350,000
600	600,000	480,000

2. PATHCONT — Pest and pathogen control:

STANDARD	Pirimicarb at 0.14 kg in 220 l on 1 July, 1985
ENHANCED	Deltamethrin at 0.0075 kg in 220 l on 2 May, 23 May
	Pirimicarb at 0.14 kg in 220 l on 1 July
	Benomyl at 0.56 kg in 220 l on 2 July
	Propiconazole at 0.12 kg in 220 l on 18 July, 22 Aug

Basal applications: Manures: Chalk at 2.9 t. Weedkillers: Trietazine at 1.2 kg with simazine at 0.17 kg and paraquat at 0.40 kg ion in 220 l.

Seed: Minden.

Cultivations, etc.:- Chalk applied: 12 Sept, 1984. Ploughed: 12 Nov. Spring-tine cultivated, seed sown: 14 Mar, 1985. Weedkillers applied: 18 Mar. Harvested by hand: 19 Sept. Previous crops: W. wheat 1983 and 1984.

NOTE: Plant counts were made after establishment and components of yield were measured at maturity.

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85/R/BE/10

GRAIN TONNES/HECTARE

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

PATHCONT POPULATN	STANDARD	ENHANCED	MEAN
200	5.19	5.69	5.44
400	5.01	5.79	5.40
600	4.98	6.05	5.51
MEAN	5.06	5.85	5.45

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

TABLE	POPULATN	PATHCONT	POPULATN PATHCONT
SED	0.241	0.197	0.341

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

STRATUM	DF	SE	CV%
BLOCK.WP	15	0.482	8.8

GRAIN MEAN DM% 91.0

PLOT AREA HARVESTED 0.00015

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85/R/BE/11

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 VI/VII I.

Sponsors: 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 (33 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 1 July, 1985, 31 July
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:
	DOUBLE	1 July, 1985, 31 July
	QUADRUP	1 July, 15 July, 31 July, 12 Aug

plus two extra sub plot treatments:

EXTRA	
NONE	No fungicides (duplicated)
BENOMYL	Benomyl at 0.56 kg in 220 l on 1 July, 31 July (duplicated)

NOTE: Irrigation was applied to lessen a post-flowering soil-moisture deficit from 50 mm to 25 mm. This was necessary on only one occasion, on 18 July, when 33 mm was applied.

Basal applications: Manures: Chalk at 2.9 t. Muriate of potash at 520 kg. Weedkillers: Glyphosate at 1.4 kg in 220 l; trietazine at 1.2 kg with simazine at 0.17 kg and paraquat at 0.40 kg ion in 220 l. Insecticides: Deltamethrin at 0.0075 kg in 220 l on two occasions; pirimicarb at 0.14 kg in 220 l on two occasions.

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85/R/BE/11

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Chalk applied: 11 Sept, 1984. K applied: 25 Sept. Glyphosate applied: 26 Sept. Ploughed: 15 Oct. Spring-tine cultivated, seed sown: 13 Mar, 1985. Trietazine, simazine and paraquat applied: 19 Mar. Deltamethrin applied: 2 May, 23 May. Pirimicarb applied: 20 June, 17 July. Harvested by hand: 18 Sept. Previous crops: Potatoes 1983, s. barley 1984.

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 / IRRIGATN	NONE	BENOMYL	MEAN
0	5.80	5.46	5.63
I	5.95	6.11	6.03
MEAN	5.87	5.78	5.83

RUSTFUNG / IRRIGATN	MAN+MANC	PROPICON	MEAN
0	6.03	5.24	5.63
I	5.89	6.16	6.03
MEAN	5.96	5.70	5.83

RUSTFUNG / C S FUNG	MAN+MANC	PROPICON	MEAN
NONE	6.00	5.75	5.87
BENOMYL	5.92	5.65	5.78
MEAN	5.96	5.70	5.83

RFNGTIME / IRRIGATN	DOUBLE	QUADRUP	MEAN
0	5.28	5.99	5.63
I	6.02	6.03	6.03
MEAN	5.65	6.01	5.83

RFNGTIME / C S FUNG	DOUBLE	QUADRUP	MEAN
NONE	5.57	6.18	5.87
BENOMYL	5.73	5.84	5.78
MEAN	5.65	6.01	5.83

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85/R/BE/11

GRAIN TONNES/HECTARE

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

RFNGTIME	DOUBLE	QUADRUP	MEAN
RUSTFUNG			
MAN+MANC	5.77	6.15	5.96
PROPICON	5.53	5.87	5.70
MEAN	5.65	6.01	5.83

C S FUNG	NONE		BENOMYL	
RUSTFUNG	MAN+MANC	PROPICON	MAN+MANC	PROPICON
IRRIGATN				
0	6.11	5.50	5.94	4.98
I	5.89	6.00	5.89	6.33

C S FUNG	NONE		BENOMYL	
RFNGTIME	DOUBLE	QUADRUP	DOUBLE	QUADRUP
IRRIGATN				
0	5.47	6.14	5.08	5.84
I	5.68	6.22	6.37	5.85

RUSTFUNG	MAN+MANC		PROPICON	
RFNGTIME	DOUBLE	QUADRUP	DOUBLE	QUADRUP
IRRIGATN				
0	5.85	6.20	4.70	5.78
I	5.68	6.10	6.36	5.97

RUSTFUNG	MAN+MANC		PROPICON	
RFNGTIME	DOUBLE	QUADRUP	DOUBLE	QUADRUP
C S FUNG				
NONE	5.56	6.44	5.58	5.92
BENOMYL	5.97	5.86	5.48	5.83

	RUSTFUNG	MAN+MANC		PROPICON	
	RFNGTIME	DOUBLE	QUADRUP	DOUBLE	QUADRUP
IRRIGATN	C S FUNG				
0	NONE	5.65	6.57	5.28	5.71
	BENOMYL	6.06	5.83	4.11	5.84
I	NONE	5.48	6.31	5.88	6.12
	BENOMYL	5.89	5.89	6.85	5.81

IRRIGATN	0	I	MEAN
EXTRA			
NONE	4.74	5.10	4.92
BENOMYL	5.00	5.22	5.11
MEAN	4.87	5.16	5.02

GRAND MEAN 5.56

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85/R/BE/11

GRAIN TONNES/HECTARE

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

TABLE	EXTRA	C S FUNG	RUSTFUNG	RFNGTIME
SED	0.265	0.188	0.188	0.188

TABLE	IRRIGATN* C S FUNG	IRRIGATN* RUSTFUNG	C S FUNG RUSTFUNG	IRRIGATN* RFNGTIME
SED	0.265	0.265	0.265	0.265

TABLE	C S FUNG RFNGTIME	RUSTFUNG RFNGTIME	IRRIGATN* EXTRA	IRRIGATN* C S FUNG RUSTFUNG
SED	0.265	0.265	0.375	0.375

TABLE	IRRIGATN* C S FUNG RFNGTIME	IRRIGATN* RUSTFUNG RFNGTIME	C S FUNG RUSTFUNG RFNGTIME	IRRIGATN* C S FUNG RUSTFUNG RFNGTIME
SED	0.377	0.375	0.375	0.531

* WITHIN THE SAME LEVEL OF IRRIGATN ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	26	0.531	9.5

GRAIN MEAN DM% 90.7

PLOT AREA HARVESTED 0.00015

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85/R/BE/12

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 VI/VII 1.

Sponsors: J. McEwen, D.P. Yeoman.

Design: 2 randomised blocks of 21 plots.

Whole plot dimensions: 2.03 x 2.13.

Treatments: All combinations of:-

1. RUSTFUNG — Fungicides to control rust:

BENODANI	Benodanil at 1.1 kg
FENPROP	Fenpropimorph at 0.75 kg
MANEB	Maneb at 0.80 kg
MANCOZEB	Mancozeb at 0.80 kg
MAN+MANC	Maneb at 0.80 kg plus mancozeb at 0.80 kg
PROPICON	Propiconazole at 0.12 kg
THIRAM	Thiram at 2.50 kg
TRIADIME	Triadimefon at 0.50 kg
ZIN+TRID	Zineb polyethylene thiram disulphide at 1.60 kg plus tridemorph at 0.53 kg

2. RFNGTIME — Times of applying fungicides to control rust:

ONCE	Once on 1 July, 1985
TWICE	Twice, on 1 July, 12 Aug

plus one extra treatment:

EXTRA

NONE	No fungicides to control rust (triplicated)

NOTES: (1) All sprays were applied in 220 l.
(2) Irrigation was applied to lessen a post-flowering soil moisture deficit from 50 mm to 25 mm. This was necessary on only one occasion on 18 July, when 33 mm was applied.

Basal applications: Manures: Chalk at 2.9 t. Muriate of potash at 520 kg. Weedkillers: Glyphosate at 1.4 kg in 220 l; trietazine at 1.2 kg with simazine at 0.17 kg and paraquat at 0.40 kg ion in 220 l. Fungicide: Benomyl at 0.56 kg in 220 l. Insecticides: Deltamethrin at 0.0075 kg in 220 l on two occasions; pirimicarb at 0.14 kg in 220 l on two occasions.

Seed: Minden, sown at 220 kg.

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Cultivations, etc.:- Chalk applied: 11 Sept, 1984. K applied: 25 Sept. Glyphosate applied: 26 Sept. Ploughed: 15 Oct. Spring-tine cultivated, seed sown: 13 Mar, 1985. Trietazine, simazine and paraquat applied: 19 Mar. Deltamethrin applied: 2 May, 23 May. Pirimicarb applied: 20 June, 17 July. Fungicide applied: 2 July. Harvested by hand: 17 Sept. Previous crops: Potatoes 1983, s. barley 1984.

NOTES: 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.

GRAIN TONNES/HECTARE

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

RFNGTIME RUSTFUNG	ONCE	TWICE	MEAN
BENODANI	6.99	6.99	6.99
FENPROP	6.92	6.80	6.86
MANEB	6.42	5.69	6.06
MANCOZEB	7.30	5.97	6.63
MAN+MANC	7.67	7.17	7.42
PROPICON	5.68	5.65	5.66
THIRAM	6.15	5.94	6.05
TRIADIME	6.51	7.28	6.90
ZIN+TRID	6.91	6.42	6.67
MEAN	6.73	6.43	6.58

EXTRA NONE 5.59

GRAND MEAN 6.44

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

TABLE	RUSTFUNG	RFNGTIME	RUSTFUNG RFNGTIME
SED	0.524	0.247	0.741

SED FOR COMPARING EXTRA NONE WITH ANY ITEM
IN RUSTFUNG.RFNGTIME TABLE IS 0.605

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

STRATUM	DF	SE	CV%
BLOCK.WP	22	0.741	11.5

GRAIN MEAN DM% 88.1

PLOT AREA HARVESTED 0.00015

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85/R/BE/14

SPRING BEANS

INSECT GROWTH REGULATOR

Object: To study the effects of three rates of a juvenile hormone mimic on black aphids (Aphis fabae) and on yield of spring beans - Long Hoos III 1.

Sponsors: D.C. Griffiths, J.H. Stevenson.

Design: 4 randomised blocks of 4 plots.

Whole plot dimensions: 2.4 x 6.0.

Treatments:

GROW REG	Rates of 'S 31183' juvenile hormone mimic:
NONE	None
S 10	10 g a.i
S 50	50 g a.i
S 250	250 g a.i

NOTE: Treatments were applied with a knapsack sprayer in 200 l on 4 July, 1985 repeated on 11 July.

Basal applications: Weedkillers: MCPB at 1.7 kg with glyphosate at 0.50 kg in 220 l. Trietazine at 1.2 kg with simazine at 0.17 kg and paraquat at 0.40 kg ion in 220 l. Insecticide: Permethrin at 0.052 kg in 220 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- MCPB and glyphosate applied: 29 Aug, 1984. Ploughed: 15 Nov. Spring-tine cultivated: 12 Mar, 1985. Seed sown: 13 Mar. Trietazine, simazine and paraquat applied: 18 Mar. Insecticide applied: 23 May. Combine harvested: 23 Sept. Previous crops: W. oats 1983, w. wheat 1984.

NOTE: Estimates of aphid populations were made on seven occasions during the season.

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85/R/BE/14

GRAIN TONNES/HECTARE

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

GROW REG	NONE	S 10	S 50	S 250	MEAN
	3.65	3.60	3.79	3.64	3.67

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

TABLE	GROW REG
SED	0.124

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

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.176	4.8

GRAIN MEAN DM% 83.5

PLOT AREA HARVESTED 0.00086

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85/R/PE/1

PEAS

CONTROL OF STEM NEMATODE

Oject: To study the effects of a range of rates of aldicarb and carbofuran on the incidence of stem nematode (Ditylenchus dipsaci) and on the yield of peas grown for grain - Highfield O and E III.

Sponsor: A.G. Whitehead.

Design: 3 randomised blocks of 10 plots.

Whole plot dimensions: 2.03 x 4.57.

Treatments: All combinations of:-

1. NEMACIDE — Nematicides, applied to seed furrows at sowing:

   ALDICARB — Aldicarb
   CARBOFUR — Carbofuran

2. NEM RATE — Rates of nematicides (kg):

   0.5
   1.0
   2.0
   4.0

plus one extra treatment (duplicated):

   EXTRA

   NONE — No nematicides

Basal applications: Manures: (0:24:24) at 450 kg. Weedkillers: Prometryn at 1.7 kg in 280 l.

Seed: Progreta, sown at 260 kg.

Cultivations, etc.:- Ploughed: 4 Jan, 1985. PK applied: 14 Mar. Spring-tine cultivated twice: 18 Mar. Seed sown and treatments applied: 19 Mar. Weedkiller applied: 20 Mar. Harvested by hand: 19 Aug. Previous crops: W. beans 1983 and 1984.

NOTES: (1) One plot received the wrong treatments. This plot should have had treatment CARBOFUR at rate 4.0. An estimated value was used in the analysis.
(2) Numbers of stem nematode in the soil were estimated after harvest.

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85/R/PE/1

GRAIN TONNES/HECTARE

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

NEM RATE / NEMACIDE	0.5	1.0	2.0	4.0	MEAN
ALDICARB	5.85	5.48	5.47	6.45	5.81
CARBOFUR	5.22	5.99	5.68	6.18	5.77
MEAN	5.53	5.73	5.58	6.32	5.79

NONE 4.61

GRAND MEAN 5.55

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

TABLE	NEMACIDE	NEM RATE	NEMACIDE NEM RATE
SED	0.308	0.436	0.617

SED FOR COMPARING NONE WITH ANY ITEM IN
NEMACIDE.NEM RATE TABLE IS 0.534

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.755	13.6

GRAIN MEAN DM% 56.8

PLOT AREA HARVESTED 0.00058

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85/R/LP/2

LUPINS

DESICCANTS

Object: To study the effects of forms, rates and times of applying desiccants on grain quality and yield of lupins - Long Hoos III 6.

Sponsor: H.L. Jones.

Design: 2 randomised blocks of 14 plots.

Whole plot dimensions: 2.4 x 6.0.

Treatments: All combinations of:-

1. DESICCNT	Forms and rates of desiccants:
DIQUAT 1	Diquat at 0.15 kg ion
DIQUAT 4	Diquat at 0.60 kg ion
NACL 1	Sodium chloride at 6.25 kg
NACL 4	Sodium chloride at 25 kg
GLYPHOS	Glyphosate at 1.1 kg
METAMIT	Metamitron at 2.8 kg
2. DES DATE	Dates of applying desiccants:
4 SEPT	4 Sept, 1985
20 SEPT	20 Sept

plus two extra treatments:

EXTRA	
NONE	No desiccant applied
UREA L	Urea at 50 kg on 20 Sept

NOTE: Treatment sprays were applied in 220 l water.

Basal applications: Manures: Chalk at 2.9 t. Muriate of potash at 520 kg. Weedkillers: Glyphosate at 1.4 kg in 220 l; monolinuron at 0.75 kg with paraquat at 0.55 kg ion in 220 l; metamitron at 2.8 kg in 220 l. Fungicide: Benomyl at 0.56 kg in 220 l.

Seed: Vladimir, dressed drazoxolon, sown at 250 kg.

Cultivations, etc.:- Chalk applied: 12 Sept, 1984. Muriate of potash applied: 25 Sept. Glyphosate applied: 26 Sept. Ploughed: 28 Nov. Spring-tine cultivated, seed sown: 2 Apr, 1985. Paraquat and monolinuron applied: 9 Apr. Metamitron applied: 31 May. Fungicide applied: 28 June. Combine harvested: 17 Oct. Previous crops: Sugar beet 1983, s. barley 1984.

NOTE: Observations were made from mid-August on lodging, leaf and pod senescence, stem and pod diseases, plant population, pod numbers per plant, dry matter, shed seed, germinability of seed and seed appearance.

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85/R/LP/2

GRAIN TONNES/HECTARE

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

DES DATE DESICCNT	4 SEPT	20 SEPT	MEAN
DIQUAT 1	3.62	4.28	3.95
DIQUAT 4	3.06	4.01	3.54
NACL 1	3.78	4.14	3.96
NACL 4	3.92	4.04	3.98
GLYPHOS	4.06	3.88	3.97
METAMIT	3.74	4.07	3.90
MEAN	3.70	4.07	3.88

EXTRA	NONE	UREA L	MEAN
	4.08	3.72	3.90

GRAND MEAN 3.89

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

TABLE	EXTRA	DESICCNT	DES DATE	DESICCNT DES DATE
SED	0.245	0.173	0.100	0.245

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

STRATUM	DF	SE	CV%
BLOCK.WP	13	0.245	6.3

GRAIN MEAN DM% 67.6

PLOT AREA HARVESTED 0.00086

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85/R/RA/1

WINTER OILSEED RAPE

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. oilseed rape - Black Horse II.

Sponsors: C.J. Rawlinson, R.J. Darby, P.G.N. Digby, K. Evans, J.E. Leach, I.H. Williams, D.P. Yeoman.

Associate sponsors: P.B. Barraclough, D.S. Jenkinson, J. Lacey, D.S. Powlson, G.A. Rodgers, J.H. Stevenson, A.J. Thomasson, G.N. Thorne, A.H. Weir.

Design: A half replicate of 2 x 2 x 2 x 2 x 2 x 2 x 2 + 2 x 4 + 2 separate half replicates of 2 x 2 x 2 x 2 + 8 extra plots.

Whole plot dimensions: 3.0 x 17.0.

Treatments: Combinations of:-

1. SOW DATE	Dates of sowing:	
	16 AUG	16 August, 1984
	6 SEP	6 September
2. N RATE	Amounts of N fertilizer (kg N), as 'Nitro-Chalk', (27.5% N) in addition to a basal application of 50 kg N to the seedbed:	
	175	
	275	
3. N DIVIS	Division of N fertilizer application:	
	SINGLE	All on 25 February, 1985
	DIVIDED	One third on 25 February, two thirds on 25 March
4. GROWREG	Growth regulator:	
	NONE	None
	2-CHLORO	2-Chloroethylphosphonic acid applied at 1.0 l in 220 l on 23 May to early-sown plots and 29 May to late-sown plots with a wetter ('Agral' at 0.1 l)
5. INSCTCDE	Insecticides:	
	NONE	None
	DE+TR	Deltamethrin at 7.5 g in 220 l on 4 October, 1984 and 28 November, triazophos at 0.4 l in 220 l on 17 June, 1985

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6. AUT FUNG		Autumn fungicide, in addition to gamma HCH + thiram seed dressing:
	NONE	None
	PROCHLOR	Fenpropimorph seed dressing plus prochloraz at 0.5 kg in 220 l on 26 Nov
7. S FUNG		Spring and summer fungicides:
	NONE	None
	PRO+IPR	Prochloraz at 0.4 kg in 220 l on 4 April, 1985, iprodione at 1.0 kg in 220 l on 17 June

plus combinations of the following (all given growth regulator, insecticides and fungicides as above):

1. SOWDAT N		Dates of sowing:
	16 AUG	16 August, 1984
	6 SEP	6 September
2. N RATE N		Amounts of N fertilizer (kg N), as 'Nitro-Chalk', (27.5% N) in addition to a basal application of 50 kg N to the seedbed. Applied as a single dressing on 25 February, 1985:
	0	
	125	
	225	
	325	

plus combinations of the following (all given insecticides and fungicides as above, combinations chosen are those not provided by the main factorial):

1. SOWDAT P		Dates of sowing:
	16 AUG	16 August, 1984
	6 SEP	6 September
2. N RATE P		Amounts of N fertilizer (kg N), as 'Nitro-Chalk', (27.5% N) in addition to a basal application of 50 kg N to the seedbed:
	175	
	275	
3. N DIV P		Division of N fertilizer application:
	SINGLE	All on 25 February, 1985
	DIVIDED	One third on 25 February, two thirds on 25 March
4. GROREG P		Growth regulator:
	NONE	None
	2-CHLORO	2-Chloroethylphosphonic acid applied at 1.0 l in 220 l on 23 May to early sown plots and 29 May to late-sown plots with a wetter ('Agral' at 0.1 l)

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plus combinations of the following (all given fungicides as above and oxamyl at 5 kg to the seedbed):

1. SODATE OX	Dates of sowing:
16 AUG	16 August, 1984
6 SEP	6 September
2. NRATE OX	Amounts of N fertilizer (kg N), as 'Nitro-Chalk', (27.5% N) in addition to a basal application of 50 kg N to the seedbed. Applied as a single dressing on 25 February, 1985:
175	
225	
3. GRORG OX	Growth regulator:
NONE	None
2-CHLORO	2-Chloroethylphosphonic acid applied at 1.0 l in 220 l on 23 May to early-sown plots and 29 May to late-sown plots with a wetter ('Agral' at 0.1 l)
4. INSCT OX	Insecticides:
NONE	None
DE+TR	Deltamethrin at 7.5 g in 220 l on 4 October, 1984 and 28 November, triazophos at 0.4 l in 220 l on 17 June, 1985

plus three extra treatments:

EXTRA	
SE275D T	Sown 16 August, 1984 given 275 kg N, divided as above, given triapenthenol at 0.7 kg in 220 l on 17 Apr, 1985 but none of the other chemical treatments above
SE NONE	Sown 16 August, given none of the chemical treatments above
SL NONE	Sown 6 September, given none of the chemical treatments above

Three additional plots were used for 15N studies, and two for root studies, yields not taken.

Basal applications: Manures: (0:24:24) at 200 kg. 'Nitro-Chalk' (26% N) at 190 kg. Weedkillers: Paraquat at 0.60 kg ion in 200 l. Propyzamide with clopyralid (as 'Matrikerb' at 1.6 kg) in 500 l. Desiccant: Diquat at 0.60 kg ion with a wetting agent, ('Agral' at 0.5 l) in 500 l.

Seed: Bienvenu sown at 8.0 kg.

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85/R/RA/1

Cultivations, etc.:- Disced twice: 31 July, 1984. PK applied: 8 Aug. N applied: 10 Aug. Paraquat applied: 15 Aug. Nematicide applied to early-sown plots, rotary harrowed in, seed sown on these plots: 16 Aug. Heavy spring-tine cultivated late-sown plots: 5 Sept. Nematicide applied to late-sown plots, rotary harrowed in, seed sown on these plots: 6 Sept. 'Matrikerb' applied: 30 Oct. Desiccant applied: 25 July, 1985. Combine harvested: 12 Aug. Previous crops: W. barley 1983 and 1984.

NOTE: Detailed observations were made during the season on diseases, pests, N in plants and soil, dry matter accumulation, leaf areas, soil water, light interception, lodging and seed shedding. Percentage of oil in grain was measured.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

NRATE SOWDATE	175	275	MEAN
16 AUG	3.69	3.57	3.63
6 SEP	4.18	4.38	4.28
MEAN	3.94	3.97	3.95

N DIVIS SOWDATE	SINGLE	DIVIDED	MEAN
16 AUG	3.72	3.54	3.63
6 SEP	4.23	4.34	4.28
MEAN	3.97	3.94	3.95

N DIVIS N RATE	SINGLE	DIVIDED	MEAN
175	3.86	4.01	3.94
275	4.08	3.87	3.97
MEAN	3.97	3.94	3.95

GROWREG SOWDATE	NONE	2-CHLORO	MEAN
16 AUG	3.87	3.38	3.63
6 SEP	4.19	4.37	4.28
MEAN	4.03	3.88	3.95

GROWREG N RATE	NONE	2-CHLORO	MEAN
175	4.10	3.78	3.94
275	3.96	3.98	3.97
MEAN	4.03	3.88	3.95

GROWREG N DIVIS	NONE	2-CHLORO	MEAN
SINGLE	4.11	3.83	3.97
DIVIDED	3.95	3.93	3.94
MEAN	4.03	3.88	3.95

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85/R/RA/1

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

INSCTCDE SOWDATE	NONE	DE+TR	MEAN
16 AUG	3.64	3.62	3.63
6 SEP	4.23	4.33	4.28
MEAN	3.93	3.97	3.95

INSCTCDE N RATE	NONE	DE+TR	MEAN
175	3.85	4.03	3.94
275	4.02	3.92	3.97
MEAN	3.93	3.97	3.95

INSCTCDE N DIVIS	NONE	DE+TR	MEAN
SINGLE	3.92	4.02	3.97
DIVIDED	3.94	3.93	3.94
MEAN	3.93	3.97	3.95

INSCTCDE GROWREG	NONE	DE+TR	MEAN
NONE	3.90	4.16	4.03
2-CHLORO	3.97	3.79	3.88
MEAN	3.93	3.97	3.95

AUT FUNG SOWDATE	NONE	PROCHLOR	MEAN
16 AUG	3.66	3.60	3.63
6 SEP	4.26	4.30	4.28
MEAN	3.96	3.95	3.95

AUT FUNG N RATE	NONE	PROCHLOR	MEAN
175	3.92	3.95	3.94
275	4.00	3.95	3.97
MEAN	3.96	3.95	3.95

AUT FUNG N DIVIS	NONE	PROCHLOR	MEAN
SINGLE	3.98	3.97	3.97
DIVIDED	3.94	3.93	3.94
MEAN	3.96	3.95	3.95

AUT FUNG GROWREG	NONE	PROCHLOR	MEAN
NONE	4.01	4.05	4.03
2-CHLORO	3.91	3.85	3.88
MEAN	3.96	3.95	3.95

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85/R/RA/1

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

AUT FUNG INSCTCDE	NONE	PROCHLOR	MEAN
NONE	3.85	4.02	3.93
DE+TR	4.07	3.88	3.97
MEAN	3.96	3.95	3.95

S FUNG SOWDATE	NONE	PRO+IPR	MEAN
16 AUG	3.64	3.62	3.63
6 SEP	4.27	4.29	4.28
MEAN	3.95	3.96	3.95

S FUNG N RATE	NONE	PRO+IPR	MEAN
175	4.02	3.85	3.94
275	3.89	4.06	3.97
MEAN	3.95	3.95	3.95

S FUNG N DIVIS	NONE	PRO+IPR	MEAN
SINGLE	4.12	3.82	3.97
DIVIDED	3.79	4.09	3.94
MEAN	3.95	3.95	3.95

S FUNG GROWREG	NONE	PRO+IPR	MEAN
NONE	4.05	4.01	4.03
2-CHLORO	3.86	3.90	3.88
MEAN	3.95	3.95	3.95

S FUNG INSCTCDE	NONE	PRO+IPR	MEAN
NONE	3.98	3.89	3.93
DE+TR	3.92	4.02	3.97
MEAN	3.95	3.95	3.95

S FUNG AUT FUNG	NONE	PRO+IPR	MEAN
NONE	3.95	3.97	3.96
PROCHLOR	3.96	3.94	3.95
MEAN	3.95	3.95	3.95

N RATE N SOWDAT N	0	125	225	325	MEAN
16 AUG	3.18	3.01	3.76	3.32	3.32
6 SEP	2.68	2.98	4.50	4.17	3.58
MEAN	2.93	3.00	4.13	3.74	3.45

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85/R/RA/1

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

N RATE P	175	275	MEAN
SOWDAT P			
16 AUG	3.61	3.35	3.48
6 SEP	4.26	4.42	4.34
MEAN	3.93	3.89	3.91

N DIV P	SINGLE	DIVIDED	MEAN
SOWDAT P			
16 AUG	3.41	3.55	3.48
6 SEP	3.94	4.74	4.34
MEAN	3.67	4.14	3.91

N DIV P	SINGLE	DIVIDED	MEAN
N RATE P			
175	3.51	4.36	3.93
275	3.84	3.93	3.89
MEAN	3.67	4.14	3.91

GROREG P	NONE	2-CHLORO	MEAN
SOWDAT P			
16 AUG	3.79	3.17	3.48
6 SEP	4.50	4.18	4.34
MEAN	4.14	3.68	3.91

GROREG P	NONE	2-CHLORO	MEAN
N RATE P			
175	4.19	3.67	3.93
275	4.09	3.68	3.89
MEAN	4.14	3.68	3.91

GROREG P	NONE	2-CHLORO	MEAN
N DIV P			
SINGLE	3.92	3.43	3.67
DIVIDED	4.36	3.92	4.14
MEAN	4.14	3.68	3.91

NRATE OX	175	275	MEAN
SODATE OX			
16 AUG	3.59	3.51	3.55
6 SEP	3.89	3.98	3.93
MEAN	3.74	3.74	3.74

GRORG OX	NONE	2-CHLORO	MEAN
SODATE OX			
16 AUG	3.88	3.22	3.55
6 SEP	3.98	3.89	3.93
MEAN	3.93	3.56	3.74

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85/R/RA/1

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

GRORG OX	NONE	2-CHLORO	MEAN
NRATE OX			
175	3.95	3.52	3.74
275	3.90	3.59	3.74
MEAN	3.93	3.56	3.74

INSCT OX	NONE	DE+TR	MEAN
SODATE OX			
16 AUG	3.72	3.38	3.55
6 SEP	3.93	3.93	3.93
MEAN	3.82	3.66	3.74

INSCT OX	NONE	DE+TR	MEAN
NRATE OX			
175	3.82	3.66	3.74
275	3.83	3.66	3.74
MEAN	3.82	3.66	3.74

INSCT OX	NONE	DE+TR	MEAN
GRORG OX			
NONE	3.99	3.86	3.93
2-CHLORO	3.65	3.46	3.56
MEAN	3.82	3.66	3.74

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

(NOT INCLUDING EXTRA PLOTS)

MARGIN OF TWO FACTOR TABLES	0.086
TWO FACTOR TABLES	0.122

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

STRATUM	DF	SE	CV%
WP	35	0.344	8.7

GRAIN MEAN DM% 85.9

PLOT AREA HARVESTED 0.00227

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85/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 - Black Horse II.

Sponsors: G.A. Rodgers, A. Penny, M.V. Hewitt.

Design: 2 randomised blocks of 18 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' (26% N)), 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 3 September, 1984):
	0	
	50	
3. SPRING N		Nitrogen rates (kg N) and times in spring:
	75E+75L	75 on 6 Feb, 1985 and 75 on 21 Mar.
	150M	150 on 8 Mar.

plus two extra treatments:

EXTRA	
SBD ONLY	50 kg N to seedbed only as 'Nitro-Chalk' (26% N), no inhibitor, no N in spring
NONE	No nitrogen fertilizer or inhibitor

NOTE: Dicyandiamide and hydroquinone were applied at 12.5 kg and 10 kg respectively in combination with SEEDBD N 0 and at 18 kg and 13 kg with SEEDBD N 50.

Basal applications: Manures: (0:24:24) at 200 kg. Weedkillers: Propyzamide with clopyralid (as 'Matrikerb' at 1.6 kg) in 500 l; benazolin ethyl ester at 0.30 kg with clopyralid at 0.05 kg in 200 l. Desiccant: Diquat at 0.60 kg ion with a wetting agent ('Agral' at 0.5 l) in 500 l.

Seed: Jet Neuf, seed dressed gamma HCH, thiram and fenpropimorph sown at 8 kg.

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Cultivations, etc.:- Disced twice: 31 July, 1984. PK applied: 8 Aug. Heavy spring-tine cultivated: 5 Sept. Seed sown: 6 Sept. 'Matrikerb' applied: 30 Oct. Benazolin ethyl ester with clopyralid applied: 6 Mar, 1985. Desiccant applied: 25 July. Combine harvested: 12 Aug. Previous crops: W. barley 1983 and 1984.

NOTE: Dry matter and N contents of plants were measured in February, May and June. Oil and protein contents of grain were measured. Nitrate and ammonium levels in the soil, ammonium losses from main dressings and soil pH measurements were taken during the season. Disease incidence and severity was assessed once in April.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

SEEDBD N	0	50	MEAN
N INHIB			
AN 0	2.51	2.71	2.61
PU 0	2.10	2.19	2.14
PU DIC	2.17	2.34	2.25
PU HYD	2.25	2.52	2.38
MEAN	2.26	2.44	2.35

SPRING N	75E+75L	150M	MEAN
N INHIB			
AN 0	2.66	2.56	2.61
PU 0	2.36	1.93	2.14
PU DIC	2.33	2.18	2.25
PU HYD	2.58	2.19	2.38
MEAN	2.48	2.21	2.35

SPRING N	75E+75L	150M	MEAN
SEEDBD N			
0	2.44	2.07	2.26
50	2.52	2.36	2.44
MEAN	2.48	2.21	2.35

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85/R/RA/2

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

SEEDBD N	0		50	
SPRING N	75E+75L	150M	75E+75L	150M
N INHIB				
AN 0	2.58	2.43	2.73	2.69
PU 0	2.49	1.70	2.23	2.15
PU DIC	2.25	2.08	2.40	2.28
PU HYD	2.44	2.06	2.72	2.31

EXTRA	SBD ONLY	NONE	MEAN
	1.57	1.27	1.42

GRAND MEAN 2.24

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

TABLE	EXTRA	N INHIB	SEEDBD N	SPRING N
SED	0.190	0.095	0.067	0.067

TABLE	N INHIB SEEDBD N	N INHIB SPRING N	SEEDBD N SPRING N	N INHIB SEEDBD N SPRING N
SED	0.135	0.135	0.095	0.190

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

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.190	8.5

MEAN DM% 82.1

PLOT AREA HARVESTED 0.00472

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85/R/RA/3

WINTER OILSEED RAPE

VARIETIES AND FUNGICIDES

Object: To study the effects of times of applying fungicides on the incidence of diseases and on the yield of three varieties of w. oilseed rape - Black Horse II.

Sponsor: C.J. Rawlinson.

Design: 2 randomised blocks of 8 plots split into 3.

Whole plot dimensions: 9.0 x 17.0.

Treatments: All combinations of:-

Whole plots

1. AUT FUNG		Fungicide in autumn:
	NONE	None
	PROCHLOR	Prochloraz at 0.50 kg in 200 l on 26 Nov, 1984
2. SPR FUNG		Fungicide in spring:
	NONE	None
	PROCHLOR	Prochloraz at 0.50 kg in 500 l on 4 Apr, 1985
3. SUM FUNG		Fungicide in summer:
	NONE	None
	IPRODION	Iprodione at 1.0 kg in 500 l on 14 June

Sub plots

4. VARIETY		Varieties:
	BIENVENU	
	DARMOR	
	JET NEUF	

Basal applications: Manures: (0:24:24) at 200 kg. 'Nitro-Chalk' (26% N) at 190 kg followed by 'Nitro-Chalk' (27.5% N) at 900 kg. Weedkillers: Propyzamide with clopyralid (as 'Matrikerb' at 1.6 kg) in 500 l. Benazolin ethyl ester at 0.30 kg with clopyralid at 0.05 kg in 200 l. Desiccant: Diquat at 0.60 kg ion with a wetting agent ('Agral' at 0.5 l) in 500 l.

Seed: Varieties sown at 8 kg.

Cultivations, etc.:- Disced twice: 31 July, 1984. PK applied: 8 Aug. First N applied: 10 Aug. Seed sown: 5 Sept. 'Matrikerb' applied: 30 Oct. Second N applied: 27 Feb, 1985. Benazolin ethyl ester with clopyralid applied: 6 Mar. Desiccant with wetter applied: 25 July. Combine harvested: 12 Aug. Previous crops: W. barley 1983 and 1984.

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85/R/RA/3

NOTE: Establishment counts were made in October. Dry weights and leaf areas were measured in November, March and April. Disease incidence and severity were assessed on four occasions between January and July. Seed shedding on plots was assessed from germinated grain after harvest.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

SUM FUNG / AUT FUNG	NONE	IPRODION	MEAN
NONE	3.60	3.73	3.67
PROCHLOR	3.83	3.81	3.82
MEAN	3.72	3.77	3.74

SUM FUNG / SPR FUNG	NONE	IPRODION	MEAN
NONE	3.60	3.73	3.67
PROCHLOR	3.83	3.81	3.82
MEAN	3.72	3.77	3.74

VARIETY / AUT FUNG	BIENVENU	DARMOR	JET NEUF	MEAN
NONE	4.12	3.37	3.51	3.67
PROCHLOR	4.48	3.52	3.46	3.82
MEAN	4.30	3.44	3.49	3.74

VARIETY / SPR FUNG	BIENVENU	DARMOR	JET NEUF	MEAN
NONE	4.21	3.41	3.39	3.67
PROCHLOR	4.39	3.48	3.59	3.82
MEAN	4.30	3.44	3.49	3.74

VARIETY / SUM FUNG	BIENVENU	DARMOR	JET NEUF	MEAN
NONE	4.18	3.49	3.48	3.72
IPRODION	4.42	3.39	3.50	3.77
MEAN	4.30	3.44	3.49	3.74

AUT FUNG / SUM FUNG	NONE	IPRODION
NONE / NONE	3.47	3.69
NONE / PROCHLOR	3.73	3.78
PROCHLOR / NONE	3.74	3.78
PROCHLOR / PROCHLOR	3.93	3.84

AUT FUNG / VARIETY	BIENVENU	DARMOR	JET NEUF
NONE / NONE	3.93	3.37	3.42
NONE / PROCHLOR	4.30	3.36	3.60
PROCHLOR / NONE	4.48	3.44	3.35
PROCHLOR / PROCHLOR	4.48	3.60	3.58

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85/R/RA/3

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

AUT FUNG	VARIETY SUM FUNG	BIENVENU	DARMOR	JET NEUF
NONE	NONE	3.99	3.36	3.45
	IPRODION	4.24	3.37	3.58
PROCHLOR	NONE	4.37	3.63	3.50
	IPRODION	4.59	3.42	3.43

SPR FUNG	VARIETY SUM FUNG	BIENVENU	DARMOR	JET NEUF
NONE	NONE	4.09	3.43	3.29
	IPRODION	4.33	3.39	3.48
PROCHLOR	NONE	4.27	3.56	3.66
	IPRODION	4.51	3.40	3.52

AUT FUNG	SPR FUNG	VARIETY SUM FUNG	BIENVENU	DARMOR	JET NEUF
NONE	NONE	NONE	3.73	3.33	3.34
		IPRODION	4.13	3.42	3.51
	PROCHLOR	NONE	4.25	3.39	3.56
		IPRODION	4.36	3.32	3.64
PROCHLOR	NONE	NONE	4.44	3.53	3.25
		IPRODION	4.52	3.36	3.45
	PROCHLOR	NONE	4.30	3.73	3.75
		IPRODION	4.66	3.47	3.40

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

TABLE	AUT FUNG	SPR FUNG	SUM FUNG	VARIETY
SED	0.056	0.056	0.056	0.090

TABLE	AUT FUNG SPR FUNG	AUT FUNG SUM FUNG	SPR FUNG SUM FUNG	AUT FUNG VARIETY
SED	0.079	0.079	0.079	0.118
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
AUT FUNG				0.127

TABLE	SPR FUNG VARIETY	SUM FUNG VARIETY	AUT FUNG SPR FUNG SUM FUNG	AUT FUNG SPR FUNG VARIETY
SED	0.118	0.118	0.111	0.167
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SPR FUNG	0.127			
SUM FUNG		0.127		
AUT FUNG.SPR FUNG				0.180

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85/R/RA/3

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

TABLE	AUT FUNG SUM FUNG VARIETY	SPR FUNG SUM FUNG VARIETY	AUT FUNG SPR FUNG SUM FUNG VARIETY
SED	0.167	0.167	0.236
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
AUT FUNG.SUM FUNG	0.180		
SPR FUNG.SUM FUNG		0.180	
AUT FUNG.SPR FUNG.SUM FUNG			0.254

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

STRATUM	DF	SE	CV%
BLOCK.WP	7	0.111	3.0
BLOCK.WP.SP	16	0.254	6.8

GRAIN MEAN DM% 88.4

SUB PLOT AREA HARVESTED 0.00389

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85/R/RA/5

WINTER OILSEED RAPE

FUNGICIDES AND SPRAY ADDITIVE

Object: To study the effects of times of applying a spray additive and two fungicides, singly and together, on the incidence of diseases and on the yield of w. oilseed rape - Black Horse II.

Sponsor: C.J. Rawlinson.

Design: 2 randomised blocks of 18 plots.

Whole plot dimensions: 3.0 x 12.0.

Treatments: All combinations of:-

1. ADDITIVE	Spray additive:	
	NONE	None
	MIN OIL	Mineral oil, 'Actipron' at 5.0 l
2. FUNGCIDE	Fungicides, applied at 0.5 kg:	
	BENOMYL	Benomyl
	PROCHLOR	Prochloraz
3. APP TIME	Times of applying fungicide:	
	AUTUMN	Autumn, on 26 Nov, 1984
	SPRING	Spring, on 4 Apr, 1985
	AUT+SPNG	Autumn and spring as above

plus four extra treatments:

EXTRA	
NONE	None (triplicated)
MINOIL A	Mineral oil as above in autumn
MINOIL S	Mineral oil as above in spring
MINOILAS	Mineral oil as above in autumn and spring

NOTE: Fungicide and mineral oil treatments were applied in 200 l of water in autumn and 500 l in spring.

Basal applications: Manures: (0:24:24) at 200 kg. 'Nitro-Chalk' (26% N) at 190 kg followed by 'Nitro-Chalk' (27.5% N) at 900 kg. Weedkillers: Propyzamide with clopyralid (as 'Matrikerb' at 1.6 kg) in 500 l. Benazolin ethyl ester at 0.30 kg with clopyralid at 0.05 kg in 200 l. Desiccant: Diquat at 0.60 kg ion with a wetting agent ('Agral' at 0.5 l) in 500 l.

Seed: Jet Neuf, seed dressed gamma HCH, thiram and fenpropimorph, sown at 8 kg.

Cultivations, etc.:- Disced twice: 31 July, 1984. PK applied: 8 Aug. First N applied: 10 Aug. Seed sown: 6 Sept. 'Matrikerb' applied: 30 Oct. Second N applied: 27 Feb, 1985. Benazolin ethyl ester with clopyralid applied: 6 Mar. Desiccant applied: 25 July. Combine harvested: 12 Aug. Previous crops: W. barley 1983 and 1984.

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85/R/RA/5

NOTE: Establishment counts were made in November. Disease incidence and severity were assessed on five occasions between January and July. Seed shedding on plots was assessed from germinated grain after harvest.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

FUNGCIDE ADDITIVE	BENOMYL	PROCHLOR	MEAN
NONE	3.50	3.63	3.57
MIN OIL	3.68	3.43	3.56
MEAN	3.59	3.53	3.56

APP TIME ADDITIVE	AUTUMN	SPRING	AUT+SPNG	MEAN
NONE	3.42	3.46	3.82	3.57
MIN OIL	3.47	3.55	3.65	3.56
MEAN	3.45	3.51	3.73	3.56

APP TIME FUNGCIDE	AUTUMN	SPRING	AUT+SPNG	MEAN
BENOMYL	3.56	3.44	3.79	3.59
PROCHLOR	3.33	3.58	3.68	3.53
MEAN	3.45	3.51	3.73	3.56

FUNGCIDE	BENOMYL			PROCHLOR		
APP TIME	AUTUMN	SPRING	AUT+SPNG	AUTUMN	SPRING	AUT+SPNG
ADDITIVE						
NONE	3.48	3.29	3.75	3.37	3.64	3.89
MIN OIL	3.64	3.58	3.83	3.30	3.52	3.46

EXTRA	NONE	MINOIL A	MINOIL S	MINOILAS	MEAN
	3.62	3.67	3.68	3.24	3.57

GRAND MEAN 3.57

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85/R/RA/5

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

TABLE	EXTRA	ADDITIVE	FUNGCIDE	APP TIME	
SED	0.404 0.297	0.165	0.165	0.202	MIN REP MAX-MIN

TABLE	ADDITIVE FUNGCIDE	ADDITIVE APP TIME	FUNGCIDE APP TIME	ADDITIVE FUNGCIDE APP TIME
SED	0.233	0.286	0.286	0.404

	EXTRA
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	19	0.404	11.3

GRAIN MEAN DM% 86.8

PLOT AREA HARVESTED 0.00271

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85/R/RA/6

WINTER OILSEED RAPE

GROWTH REGULATORS

Object: To study the effects of a range of materials on the control of fungi and on the growth and the yield of w. oilseed rape - Black Horse II.

Sponsors: C.J. Rawlinson, D.P. Yeoman.

Design: 3 randomised blocks of 7 plots.

Whole plot dimensions: 3.0 x 10.0.

Treatments:

CHEMICAL	Chemicals:
NONE	None
BAS11100	'BAS 11100W' at 6.7 l
MEPIQUAT	Mepiquat chloride + ethephon (as 'Terpal' at 3.0 l)
MEP+PROP	Mepiquat chloride + ethephon + propiconazole
PROPICON	Propiconazole at 0.12 kg
PROCHLOR	Prochloraz at 0.40 kg
TRIAPENT	Triapenthenol (as 'UK 140' at 0.7 kg)

NOTES: (1) Treatments were applied in 220 l on 17 Apr, 1985.
(2) Mepiquat chloride + ethephon were applied with a wetting agent ('Citowett' at 0.1 l).

Basal applications: Manures: (0:24:24) at 200 kg. 'Nitro-Chalk' (26% N) at 190 kg followed by 'Nitro-Chalk' (27.5% N) at 900 kg. Weedkillers: Propyzamide with clopyralid (as 'Matrikerb' at 1.6 kg) in 500 l. Benazolin ethyl ester at 0.30 kg with clopyralid at 0.05 kg in 200 l. Desiccant: Diquat at 0.60 kg ion with a wetting agent ('Agral' at 0.5 l) in 500 l.

Seed: Jet Neuf, seed dressed gamma HCH, thiram and fenpropimorph, sown at 8 kg.

Cultivations, etc.:- Disced twice: 31 July, 1984. PK applied: 8 Aug. First N applied: 10 Aug. Seed sown: 6 Sept. 'Matrikerb' applied: 30 Oct. Second N applied: 27 Feb, 1985. Benazolin ethyl ester with clopyralid applied: 6 Mar. Desiccant with wetter applied: 25 July. Combine harvested: 12 Aug. Previous crops: W. barley 1983 and 1984.

NOTE: Disease incidence and severity was assessed on four occasions between April and July. Plant height, internode length, branch number and length, growth stage, flowering and petal size measurements were made in May and July. Lodging was assessed in July. Seed shedding on plots was assessed from germinated grain after harvest.

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85/R/RA/6

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

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

CHEMICAL	NONE	BAS11100	MEPIQUAT	MEP+PROP	PROPICON	PROCHLOR	TRIAPENT	ME
	3.00	2.89	2.99	3.49	3.32	3.21	3.28	3.

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

TABLE	CHEMICAL
SED	0.180

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

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.220	6.9

GRAIN MEAN DM% 87.7

PLOT AREA HARVESTED 0.00231

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85/R/SU/1

SUNFLOWERS

VARIETIES

Object: To compare six varieties of sunflower with and without control of pests and diseases - Garden Plot 9.

Sponsor: C.J. Rawlinson.

Design: 4 randomised blocks of 12 plots.

Whole plot dimensions: 2.13 x 3.05.

Treatments: All combinations of:-

1. VARIETY	Varieties:	
	ASM 077	ASM 077
	EXP 8504	EXP 8504
	FRNKASOL	Frankasol
	KOFLOR 2	Koflor 2
	S8283580	SV 8283580
	WW 2135	WW 2135
2. PATHCONT	Pest and pathogen control:	
	NONE	None
	FULL	Full: Carbendazim at 0.25 kg with vinclozolin at 0.38 kg applied on 18 June, 8 Aug and 4 Sept, 1985. Pirimicarb at 0.14 kg on 4 June and 2 July.

NOTE: (1) Pest and pathogen control treatments were applied by hand sprayer in 220 l.
(2) Seed was sown by hand in rows 53 cm apart, seed spaced 7.6 cm apart in the row. Plants were thinned to 22.8 cm on 31 May.
(3) The crop was protected against bird damage throughout the season.
(4) At harvest, heads were removed by hand, dried, seeds removed by hand, and cleaned on a Rober seed cleaner.

Basal applications: Manures: Chalk at 2.9 t. Muriate of potash at 520 kg. 'Nitro-Chalk' (27.5% N) at 440 kg. Weedkillers: Trifluralin at 1.1 kg in 220 l. Paraquat at 0.56 kg ion in 220 l. Molluscicide: Methiocarb at 0.22 kg.

Cultivations, etc.:- Chalk applied: 11 Sept, 1984. Muriate of potash applied: 27 Sept. Ploughed: 17 Oct. Spring-tine cultivated, trifluralin applied, spring-tine cultivated in, seed sown: 10 Apr, 1985. N applied: 16 Apr. Paraquat applied: 18 Apr. Methiocarb applied: 29 May. Harvested: 30 Sept. Previous crops: Potatoes 1983, fallow 1984.

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85/R/SU/1

NOTE: Time to 50% emergence, date of first anther ring, and number of days for anthesis were noted. Neck circumference measurements were taken on three occasions from late July until late August. Plant height measurements and disease assessments were made throughout the season. The percentage of oil in the seed was measured by N.M.R. analysis.

GRAIN TONNES/HECTARE

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

PATHCONT VARIETY	NONE	FULL	MEAN
ASM 077	3.50	3.58	3.54
EXP 8504	4.34	4.65	4.50
FRNKASOL	3.78	4.16	3.97
KOFLOR 2	4.70	4.91	4.80
S8283580	1.19	1.40	1.29
WW 2135	1.49	1.57	1.53
MEAN	3.17	3.38	3.27

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

TABLE	VARIETY	PATHCONT	VARIETY PATHCONT
SED	0.139	0.080	0.197

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

STRATUM	DF	SE	CV%
BLOCK.WP	33	0.278	8.5

GRAIN MEAN DM% 92.9

PLOT AREA HARVESTED 0.00033

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85/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: 1.6 x 10.4.

Treatments: All combinations of:-

1. VARIETY	Varieties:	
	BASTILLE	
	FRONICA	
	LEADER	
2. SOW DATE	Dates of sowing:	
	10 APR	10 April, 1985
	10 MAY	10 May
3. COVERS	Covers to seedbed after sowing:	
	NONE	None
	POLYTHNE	Polythene sheet

NOTES: The covers were photo-degradable and were laid by hand, within 7 days of sowing, and then perforated at about 10 cm intervals over the drill rows to allow seedling emergence.

Basal applications: Manures: Muriate of potash at 520 kg. 'Nitro-Chalk' (27.5% N) at 550 kg. Weedkiller: Atrazine at 2.8 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 220 l.

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

Cultivations, etc.:- Muriate of potash applied: 11 Dec, 1984. N applied: 10 Apr, 1985. Early-sown plots spring-tine cultivated and sown: 10 Apr. Atrazine and polythene treatments applied to early-sown plots: 16 Apr. Late-sown plots power-harrowed and sown: 10 May. Atrazine applied to late-sown plots: 15 May. Polythene treatment applied to late-sown plots: 17 May. Insecticide applied: 24 July. Harvested by hand: Forage harvest: 15 Oct. Grain harvest: (Cobs picked by hand, threshed by stationary combine harvester). Early-sown with polythene: 14 Oct. Early-sown no polythene: 24 Oct. Late-sown: 7 Nov. Previous crops: Potatoes 1983, maize 1984.

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85/R/MA/1

NOTES: (1) Plant counts were made at establishment, mid-season and pre-harvest. Growth rates, plant heights and lengths of selected leaves were measured.

(2) Weedkiller was not applied to two plots, those with treatment combinations

VARIETY	SOW DATE	COVERS
LEADER	10 APR	POLYTHNE
BASTILLE	10 APR	POLYTHNE

The yields of these plots were treated as missing and estimated values were used in the analysis.

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85/R/MA/1

FORAGE DRY MATTER TONNES/HECTARE

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

SOW DATE VARIETY	10 APR	10 MAY	MEAN
BASTILLE	14.02	14.42	14.22
FRONICA	14.95	13.99	14.47
LEADER	13.26	13.54	13.40
MEAN	14.07	13.99	14.03

COVERS VARIETY	NONE	POLYTHNE	MEAN
BASTILLE	15.63	12.80	14.22
FRONICA	16.18	12.76	14.47
LEADER	14.19	12.61	13.40
MEAN	15.33	12.73	14.03

COVERS SOW DATE	NONE	POLYTHNE	MEAN
10 APR	15.76	12.39	14.07
10 MAY	14.91	13.06	13.99
MEAN	15.33	12.73	14.03

SOW DATE	10 APR		10 MAY	
COVERS	NONE	POLYTHNE	NONE	POLYTHNE
VARIETY				
BASTILLE	16.10	11.93	15.16	13.68
FRONICA	17.49	12.41	14.87	13.12
LEADER	13.68	12.83	14.70	12.39

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

TABLE	VARIETY	SOW DATE	COVERS	VARIETY SOW DATE
SED	1.008	0.823	0.823	1.426

TABLE	VARIETY COVERS	SOW DATE COVERS	VARIETY SOW DATE COVERS
SED	1.426	1.164	2.017

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

STRATUM	DF	SE	CV%
BLOCK.WP	20	2.470	17.6

GRAIN MEAN DM% 23.0

PLOT AREA HARVESTED 0.00028

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85/R/MA/1

GRAIN YIELD

GRAIN TONNES/HECTARE

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

SOW DATE VARIETY	10 APR	10 MAY	MEAN
BASTILLE	5.57	4.55	5.06
FRONICA	5.45	4.13	4.79
LEADER	5.61	6.01	5.81
MEAN	5.54	4.89	5.22

COVERS VARIETY	NONE	POLYTHNE	MEAN
BASTILLE	4.96	5.16	5.06
FRONICA	4.02	5.56	4.79
LEADER	4.82	6.80	5.81
MEAN	4.60	5.84	5.22

COVERS SOW DATE	NONE	POLYTHNE	MEAN
10 APR	4.99	6.09	5.54
10 MAY	4.21	5.58	4.89
MEAN	4.60	5.84	5.22

SOW DATE	10 APR		10 MAY	
COVERS	NONE	POLYTHNE	NONE	POLYTHNE
VARIETY				
BASTILLE	5.31	5.82	4.60	4.50
FRONICA	5.05	5.86	2.99	5.26
LEADER	4.61	6.60	5.02	7.00

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

TABLE	VARIETY	SOW DATE	COVERS	VARIETY SOW DATE
SED	0.436	0.356	0.356	0.617

TABLE	VARIETY COVERS	SOW DATE COVERS	VARIETY SOW DATE COVERS
SED	0.617	0.504	0.872

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

STRATUM	DF	SE	CV%
BLOCK.WP	19	1.068	20.5

GRAIN MEAN DM% 55.1

PLOT AREA HARVESTED 0.00028

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85/R/MA/2

MAIZE

DAZOMET, SOWING DATES AND POLYTHENE COVERS

Object: To study the effects of dazomet, two sowing dates and polythene covers on the growth, pathogens and yield of maize grown for forage - Long Hoos IV 4.

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

Design: 3 randomised blocks of 16 plots.

Whole plot dimensions: 1.6 x 5.49.

Treatments: All combinations, duplicated, of:-

1. STERILNT	Soil sterilant:	
	NONE	None
	DAZOMET	Dazomet at 450 kg
2. SOW DATE	Dates of sowing:	
	15 APR	15 April, 1985
	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 10 days of sowing and then perforated at about 10 cm intervals over the drill rows to allow seedling emergence.

Basal applications: Manures: Muriate of potash at 520 kg. 'Nitro-Chalk' (27.5% N) at 550 kg. Weedkillers: Glyphosate at 1.4 kg in 220 l. Atrazine at 2.8 kg in 220 l. Insecticide: Pirimicarb at 0.14 kg in 220 l.

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

Cultivations, etc.:- Glyphosate applied: 26 Sept, 1984. Muriate of potash applied: 11 Dec. Ploughed: 13 Dec. Dazomet applied and worked in by hand-controlled spiked cultivator: 12 Mar, 1985. N applied: 10 Apr. Early-sown plots spring-tine cultivated and seed sown: 15 Apr. Atrazine and polythene treatments applied to early-sown plots: 16 Apr. Late-sown plots power harrowed and sown: 10 May. Atrazine applied to late-sown plots: 15 May. Polythene treatments applied to late-sown plots: 20 May. Insecticide applied: 24 July. Harvested by hand: 16 Oct. Previous crops: Fenugreek 1983, potatoes 1984.

NOTE: Plant counts were made at establishment, mid-season and pre-harvest. Growth rates, plant heights and length of selected leaves were measured. The crop was inspected for disease on four occasions throughout the season.

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85/R/MA/2

FORAGE DRY MATTER TONNES/HECTARE

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

SOW DATE	15 APR	10 MAY	MEAN
STERILNT			
NONE	14.54	15.73	15.13
DAZOMET	15.58	16.23	15.90
MEAN	15.06	15.98	15.52

COVERS	NONE	POLYTHNE	MEAN
STERILNT			
NONE	15.24	15.03	15.13
DAZOMET	15.33	16.48	15.90
MEAN	15.28	15.75	15.52

COVERS	NONE	POLYTHNE	MEAN
SOW DATE			
15 APR	14.88	15.23	15.06
10 MAY	15.69	16.28	15.98
MEAN	15.28	15.75	15.52

SOW DATE	15 APR		10 MAY	
COVERS	NONE	POLYTHNE	NONE	POLYTHNE
STERILNT				
NONE	14.60	14.47	15.88	15.59
DAZOMET	15.17	15.99	15.50	16.96

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

TABLE	STERILNT	SOW DATE	COVERS	STERILNT SOW DATE
SED	0.468	0.468	0.468	0.661

TABLE	STERILNT COVERS	SOW DATE COVERS	STERILNT SOW DATE COVERS
SED	0.661	0.661	0.935

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

STRATUM	DF	SE	CV%
BLOCK.WP	37	1.620	10.4

FORAGE MEAN DM% 24.4

PLOT AREA HARVESTED 0.00029

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85/R/P/1

POTATOES

VARIETIES AND STEM CANKER

Object: To study the effects of stem canker (Rhizoctonia solani) on plant growth and yield of three early and three maincrop potato varieties using small and large chitted and unchitted seed - Highfield IV.

Sponsors: G.A. Hide, P.J. Read, J.P. Sandison.

Design: Early varieties: 3 randomised blocks of 12 plots.
Maincrop varieties: 3 randomised blocks of 24 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
	WILJA	Wilja
2.	INOCULUM	Inoculum to seed at planting:
	NONE	None
	RHIZOCT	R. solani inoculum
3.	SD SIZE	Mean seed sizes per tuber:
	LARGE	134 g
	SMALL	50 g

To MAINCROP varieties, all combinations of:-

1.	VARIETY	Varieties:
	DESIREE	Desiree
	M PIPER	Maris Piper
	P SQUIRE	Pentland Squire
2.	INOCULUM	Inoculum to seed at planting:
	NONE	None
	RHIZOCT	R. solani inoculum
3.	SD SIZE	Mean seed sizes per tuber
	LARGE	134 g
	SMALL	50 g

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85/R/P/1

4. SD TREAT Seed treatment:

NONE
CHITTED

NOTES: (1) Rhizoctonia inoculum was grown on horticultural vermiculite and sprinkled over seed tubers at planting before covering.
(2) Large seed was spaced at 51 cm in the row and small seed at 30 cm.

Basal applications: Manures: (0:18:36) at 690 kg. (10:10:15+4.5Mg) at 1960 kg. Weedkillers: Linuron at 1.3 kg with paraquat at 0.50 kg ion in 200 l. Fungicides: Mancozeb at 1.4 kg in 200 l on four occasions applied with the insecticide on the second and third occasions. Fentin hydroxide at 0.28 kg in 200 l on two occasions. Insecticide: Pirimicarb at 0.14 kg on two occasions. Haulm desiccant: BOV at 170 l.

Cultivations, etc.:- PK applied: 10 Oct, 1984. Ploughed: 19 Nov. NPK Mg applied: 4 Apr, 1985. Rotary harrowed: 17 Apr. Planted by hand: 19 Apr. Weedkillers applied: 16 May. Mancozeb applied: 20 June, 6 Aug. Mancozeb with pirimicarb applied: 4 July, 23 July. Fentin hydroxide applied: 21 Aug, 11 Sept. Desiccant applied: 10 Oct. Lifted: 21 Oct. Previous crops: S. barley 1983, w. beans 1984.

NOTE: Plant samples were taken from all varieties in June and July, and an extra sample in August from early varieties, to assess stem canker, weight of foliage and weight and number of tubers.

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85/R/P/1 EARLY VARIETIES

TOTAL TUBERS TONNES/HECTARE

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

INOCULUM VARIETY	NONE	RHIZOCT	MEAN
A COMET	56.8	53.4	55.1
ESTIMA	74.3	69.5	71.9
WILJA	73.4	58.2	65.8
MEAN	68.2	60.4	64.3

SD SIZE VARIETY	LARGE	SMALL	MEAN
A COMET	56.6	53.7	55.1
ESTIMA	73.0	70.8	71.9
WILJA	65.8	65.8	65.8
MEAN	65.1	63.4	64.3

SD SIZE INOCULUM	LARGE	SMALL	MEAN
NONE	68.7	67.7	68.2
RHIZOCT	61.5	59.2	60.4
MEAN	65.1	63.4	64.3

INOCULUM	NONE		RHIZOCT	
SD SIZE	LARGE	SMALL	LARGE	SMALL
VARIETY				
A COMET	58.2	55.5	55.0	51.9
ESTIMA	74.2	74.4	71.8	67.2
WILJA	73.8	73.1	57.8	58.5

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

TABLE	VARIETY	INOCULUM	SD SIZE	VARIETY INOCULUM
SED	2.38	1.94	1.94	3.36

TABLE	VARIETY SD SIZE	INOCULUM SD SIZE	VARIETY INOCULUM SD SIZE
SED	3.36	2.74	4.75

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

STRATUM	DF	SE	CV%
BLOCK.WP	22	5.82	9.1

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85/R/P/1 EARLY VARIETIES

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

INOCULUM VARIETY	NONE	RHIZOCT	MEAN
A COMET	63.5	78.1	70.8
ESTIMA	89.5	89.7	89.6
WILJA	79.4	80.1	79.7
MEAN	77.5	82.6	80.0

SD SIZE VARIETY	LARGE	SMALL	MEAN
A COMET	71.1	70.5	70.8
ESTIMA	90.1	89.2	89.6
WILJA	79.8	79.6	79.7
MEAN	80.3	79.7	80.0

SD SIZE INOCULUM	LARGE	SMALL	MEAN
NONE	77.6	77.4	77.5
RHIZOCT	83.1	82.1	82.6
MEAN	80.3	79.7	80.0

INOCULUM	NONE		RHIZOCT	
SD SIZE	LARGE	SMALL	LARGE	SMALL
VARIETY				
A COMET	63.9	63.1	78.3	77.8
ESTIMA	90.2	88.9	90.0	89.4
WILJA	78.7	80.0	81.0	79.2

PLOT AREA HARVESTED	SD SIZE	LARGE	0.00061
		SMALL	0.00096

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85/R/P/1 MAIN CROP VARIETIES

TOTAL TUBERS TONNES/HECTARE

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

INOCULUM	NONE	RHIZOCT	MEAN
VARIETY			
DESIREE	66.4	60.3	63.3
M PIPER	72.0	62.0	67.0
P SQUIRE	74.2	58.7	66.5
MEAN	70.9	60.3	65.6

SD SIZE	LARGE	SMALL	MEAN
VARIETY			
DESIREE	64.2	62.4	63.3
M PIPER	69.3	64.7	67.0
P SQUIRE	69.3	63.6	66.5
MEAN	67.6	63.6	65.6

SD SIZE	LARGE	SMALL	MEAN
INOCULUM			
NONE	72.2	69.6	70.9
RHIZOCT	63.0	57.6	60.3
MEAN	67.6	63.6	65.6

SD TREAT	NONE	CHITTED	MEAN
VARIETY			
DESIREE	61.5	65.2	63.3
M PIPER	66.4	67.6	67.0
P SQUIRE	65.0	67.9	66.5
MEAN	64.3	66.9	65.6

SD TREAT	NONE	CHITTED	MEAN
INOCULUM			
NONE	68.9	72.9	70.9
RHIZOCT	59.7	60.9	60.3
MEAN	64.3	66.9	65.6

SD TREAT	NONE	CHITTED	MEAN
SD SIZE			
LARGE	65.5	69.7	67.6
SMALL	63.1	64.1	63.6
MEAN	64.3	66.9	65.6

	SD SIZE	LARGE	SMALL
VARIETY	INOCULUM		
DESIREE	NONE	65.8	67.1
	RHIZOCT	62.7	57.8
M PIPER	NONE	74.4	69.6
	RHIZOCT	64.1	59.8
P SQUIRE	NONE	76.3	72.2
	RHIZOCT	62.4	55.1

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85/R/P/1 MAIN CROP VARIETIES

TOTAL TUBERS TONNES/HECTARE

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

VARIETY	SD TREAT / INOCULUM	NONE	CHITTED
DESIREE	NONE	64.5	68.3
	RHIZOCT	58.4	62.1
M PIPER	NONE	71.2	72.9
	RHIZOCT	61.6	62.3
P SQUIRE	NONE	70.9	77.6
	RHIZOCT	59.2	58.3

VARIETY	SD TREAT / SD SIZE	NONE	CHITTED
DESIREE	LARGE	62.4	66.1
	SMALL	60.5	64.4
M PIPER	LARGE	66.9	71.6
	SMALL	65.9	63.6
P SQUIRE	LARGE	67.2	71.4
	SMALL	62.8	64.4

INOCULUM	SD TREAT / SD SIZE	NONE	CHITTED
NONE	LARGE	69.6	74.7
	SMALL	68.1	71.1
RHIZOCT	LARGE	61.4	64.7
	SMALL	58.0	57.1

	SD SIZE	LARGE		SMALL	
	SD TREAT	NONE	CHITTED	NONE	CHITTED
VARIETY	INOCULUM				
DESIREE	NONE	64.2	67.4	64.8	69.3
	RHIZOCT	60.6	64.7	56.2	59.5
M PIPER	NONE	71.2	77.7	71.2	68.1
	RHIZOCT	62.6	65.6	60.6	59.1
P SQUIRE	NONE	73.5	79.1	68.3	76.0
	RHIZOCT	60.9	63.8	57.4	52.8

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85/R/P/1 MAIN CROP VARIETIES

TOTAL TUBERS TONNES/HECTARE

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

TABLE	VARIETY	INOCULUM	SD SIZE	SD TREAT
SED	1.26	1.03	1.03	1.03

TABLE	VARIETY INOCULUM	VARIETY SD SIZE	INOCULUM SD SIZE	VARIETY SD TREAT
SED	1.78	1.78	1.46	1.78

TABLE	INOCULUM SD TREAT	SD SIZE SD TREAT	VARIETY INOCULUM SD SIZE	VARIETY INOCULUM SD TREAT
SED	1.46	1.46	2.52	2.52

TABLE	VARIETY SD SIZE SD TREAT	INOCULUM SD SIZE SD TREAT	VARIETY INOCULUM SD SIZE SD TREAT
SED	2.52	2.06	3.57

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

STRATUM	DF	SE	CV%
BLOCK.WP	46	4.37	6.7

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85/R/P/1 MAIN CROP VARIETIES

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

INOCULUM	NONE	RHIZOCT	MEAN
VARIETY			
DESIREE	84.4	85.7	85.0
M PIPER	83.3	83.7	83.5
P SQUIRE	90.8	92.1	91.5
MEAN	86.2	87.2	86.7

SD SIZE	LARGE	SMALL	MEAN
VARIETY			
DESIREE	85.2	84.9	85.0
M PIPER	84.6	82.4	83.5
P SQUIRE	90.8	92.1	91.5
MEAN	86.9	86.5	86.7

SD SIZE	LARGE	SMALL	MEAN
INOCULUM			
NONE	86.0	86.3	86.2
RHIZOCT	87.8	86.6	87.2
MEAN	86.9	86.5	86.7

SD TREAT	NONE	CHITTED	MEAN
VARIETY			
DESIREE	84.7	85.4	85.0
M PIPER	83.4	83.6	83.5
P SQUIRE	91.0	91.9	91.5
MEAN	86.4	87.0	86.7

SD TREAT	NONE	CHITTED	MEAN
INOCULUM			
NONE	85.8	86.5	86.2
RHIZOCT	86.9	87.4	87.2
MEAN	86.4	87.0	86.7

SD TREAT	NONE	CHITTED	MEAN
SD SIZE			
LARGE	87.0	86.8	86.9
SMALL	85.8	87.1	86.5
MEAN	86.4	87.0	86.7

	SD SIZE	LARGE	SMALL
VARIETY	INOCULUM		
DESIREE	NONE	84.0	84.8
	RHIZOCT	86.3	85.1
M PIPER	NONE	84.2	82.4
	RHIZOCT	85.0	82.5
P SQUIRE	NONE	89.7	91.8
	RHIZOCT	92.0	92.3

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85/R/P/1 MAIN CROP VARIETIES

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

VARIETY	SD TREAT INOCULUM	NONE	CHITTED
DESIREE	NONE	84.1	84.8
	RHIZOCT	85.4	86.0
M PIPER	NONE	83.0	83.5
	RHIZOCT	83.8	83.7
P SQUIRE	NONE	90.4	91.2
	RHIZOCT	91.6	92.6

VARIETY	SD TREAT SD SIZE	NONE	CHITTED
DESIREE	LARGE	84.7	85.6
	SMALL	84.7	85.1
M PIPER	LARGE	85.3	83.9
	SMALL	81.5	83.3
P SQUIRE	LARGE	90.9	90.8
	SMALL	91.1	93.0

INOCULUM	SD TREAT SD SIZE	NONE	CHITTED
NONE	LARGE	85.9	86.0
	SMALL	85.7	86.9
RHIZOCT	LARGE	88.0	87.5
	SMALL	85.9	87.3

	SD SIZE	LARGE		SMALL	
	SD TREAT	NONE	CHITTED	NONE	CHITTED
VARIETY	INOCULUM				
DESIREE	NONE	84.2	83.9	83.9	85.6
	RHIZOCT	85.3	87.3	85.5	84.6
M PIPER	NONE	84.2	84.2	81.9	82.8
	RHIZOCT	86.4	83.6	81.1	83.8
P SQUIRE	NONE	89.4	90.0	91.3	92.4
	RHIZOCT	92.3	91.6	91.0	93.6

PLOT AREA HARVESTED SD SIZE LARGE 0.00099
SMALL 0.00119

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85/W/P/1

POTATOES

VARIETIES AND PCN TOLERANCE

Object: To study the effects of differing amounts of potato cyst nematode (PCN) infestation on four varieties differing in susceptibility - Woburn Horsepool.

Sponsors: A.G. Whitehead, K. Evans.

Design: 2 randomised blocks of 24 plots.

Whole plot dimensions: 2.84 x 6.10.

Treatments: All combinations of:-

1. PCN — Potato cyst nematode infestation:

MUCH	311 eggs per g of soil
LITTLE	8 eggs per g of soil (duplicated)

2. VARIETY — Varieties:

CROWN	Pentland Crown
DELL	Pentland Dell
DESIREE	Desiree
PIPER	Maris Piper

3. NEMACIDE — Nematicide applied to the seedbed:

NONE	None
OXAMYL	Oxamyl at 5.6 kg

Basal applications: Manures: FYM at 50 t. (0:18:36) at 780 kg. (10:10:15+4.5Mg) at 2330 kg. Weedkillers: Linuron at 0.90 kg with paraquat at 0.50 kg ion in 500 l. Fungicides: Mancozeb at 1.4 kg in 250 l on six occasions, with the insecticide on the second occasion. Fentin acetate with maneb (as 'Brestan 60' at 0.5 kg) in 250 l. Insecticide: Pirimicarb at 0.14 kg.

Cultivations, etc.:- Straw burnt: 13 Aug, 1984. Heavy spring-tine cultivated: 14 Aug. FYM applied: 8-11 Jan, 1985. PK applied: 24 Jan. Ploughed: 31 Jan. NPK Mg applied: 9 Apr. Heavy spring-tine cultivated: 12 Apr. Oxamyl applied, rotary cultivated, potatoes planted: 22 Apr. Weedkillers applied: 29 May. Mancozeb applied: 20 June, 3 July, 23 July, 6 Aug, 14 Aug, 7 Sept. Insecticide applied: 3 July. 'Brestan 60' applied: 21 Aug. Haulm mechanically destroyed: 26 Sept. Lifted: 7 Oct. Previous crops: S. barley 1983, W. oats: 1984.

NOTE: Soil samples were taken before treatments were applied and after harvest for cyst and egg counts of PCN.

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85/W/P/1

TOTAL TUBERS TONNES/HECTARE

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

VARIETY	CROWN	DELL	DESIREE	PIPER	MEAN
PCN					
MUCH	30.7	27.3	31.0	42.2	32.8
LITTLE	45.2	40.6	42.6	44.0	43.1
MEAN	40.4	36.1	38.7	43.4	39.7

NEMACIDE	NONE	OXAMYL	MEAN
PCN			
MUCH	20.6	45.0	32.8
LITTLE	38.9	47.2	43.1
MEAN	32.8	46.5	39.7

NEMACIDE	NONE	OXAMYL	MEAN
VARIETY			
CROWN	33.6	47.2	40.4
DELL	25.8	46.5	36.1
DESIREE	31.4	46.0	38.7
PIPER	40.4	46.4	43.4
MEAN	32.8	46.5	39.7

	NEMACIDE	NONE	OXAMYL
PCN	VARIETY		
MUCH	CROWN	19.5	41.9
	DELL	11.0	43.7
	DESIREE	15.9	46.1
	PIPER	35.9	48.4
LITTLE	CROWN	40.6	49.8
	DELL	33.3	47.8
	DESIREE	39.1	46.0
	PIPER	42.6	45.4

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85/W/P/1

TOTAL TUBERS TONNES/HECTARE

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

TABLE	PCN	VARIETY	NEMACIDE	PCN VARIETY	
SED				4.91	MIN REP
	2.13	2.84	2.01	4.25	MAX-MIN
				3.47	MAX REP

TABLE	PCN NEMACIDE	VARIETY NEMACIDE	PCN VARIETY NEMACIDE	
SED	3.47		6.95	MIN REP
	3.01	4.01	6.02	MAX-MIN
	2.46		4.91	MAX REP

	PCN
MIN REP	WITHIN MUCH ONLY
MAX-MIN	MUCH V LITTLE
MAX REP	WITHIN LITTLE ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP	31	6.95	17.5

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85/W/P/1

PERCENTAGE WARE 4.44 CM (1.75 INCH) RIDDLE

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

VARIETY	CROWN	DELL	DESIREE	PIPER	MEAN
PCN					
MUCH	94.7	85.9	85.6	95.4	90.4
LITTLE	96.1	93.6	94.3	95.3	94.8
MEAN	95.6	91.0	91.4	95.4	93.3

NEMACIDE	NONE	OXAMYL	MEAN
PCN			
MUCH	86.2	94.7	90.4
LITTLE	94.1	95.5	94.8
MEAN	91.5	95.2	93.3

PERCENTAGE WARE 4.44 CM (1.75 INCH) RIDDLE

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

NEMACIDE	NONE	OXAMYL	MEAN
VARIETY			
CROWN	95.3	95.9	95.6
DELL	86.7	95.4	91.0
DESIREE	87.7	95.1	91.4
PIPER	96.2	94.5	95.4
MEAN	91.5	95.2	93.3

	NEMACIDE	NONE	OXAMYL
PCN	VARIETY		
MUCH	CROWN	93.8	95.6
	DELL	77.4	94.5
	DESIREE	76.8	94.5
	PIPER	96.8	94.1
LITTLE	CROWN	96.1	96.1
	DELL	91.4	95.8
	DESIREE	93.1	95.4
	PIPER	95.9	94.8

PLOT AREA HARVESTED 0.00087

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85/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 - Road Piece E.

Sponsors: G.R. Cayley, G.A. Hide, R. Lewthwaite, B.J. Pye.

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, 120 g tolclofos methyl
	2	10 g imazalil, 240 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: (0:18:36) at 690 kg. (10:10:15+4.5 Mg) at 1960 kg. Weedkillers: Linuron at 1.3 kg with paraquat at 0.50 kg ion in 200 l. Fungicides: Mancozeb at 1.4 kg in 200 l on four occasions, applied with the insecticide on the second and third occasions. Fentin hydroxide at 0.28 kg in 200 l on two occasions. Insecticide: Pirimicarb at 0.14 kg on two occasions. Haulm desiccant: BOV at 170 l.

Seed: Desiree.

Cultivations, etc.:- PK applied: 10 Oct, 1984. Ploughed: 19 Nov. NPK Mg applied: 4 Apr, 1985. Rotary harrowed: 17 Apr. Planted by hand: 22 Apr. Weedkillers applied: 16 May. Mancozeb applied: 20 June, 6 Aug. Mancozeb with pirimicarb applied: 4 July, 23 July. Fentin hydroxide applied: 21 Aug, 11 Sept. Desiccant applied: 11 Oct. Lifted: 22 Oct. Previous crops: S. barley 1983, w. beans 1984.

NOTE: Assessments of stem base infections were made from samples taken in early August.

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85/R/P/2

TOTAL TUBERS TONNES/HECTARE

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

FUNGRATE	1	2	MEAN
FUNGCIDE			
IMAZALIL	66.2	65.6	65.9
TOLC MET	64.8	63.6	64.2
MEAN	65.5	64.6	65.0

FUNGMETH	CNVNTIAL	SP DS	SP DS ES	MEAN
FUNGCIDE				
IMAZALIL	65.5	66.5	65.6	65.9
TOLC MET	64.4	64.0	64.2	64.2
MEAN	64.9	65.3	64.9	65.0

FUNGMETH	CNVNTIAL	SP DS	SP DS ES	MEAN
FUNGRATE				
1	65.4	65.9	65.2	65.5
2	64.5	64.7	64.7	64.6
MEAN	64.9	65.3	64.9	65.0

	FUNGMETH	CNVNTIAL	SP DS	SP DS ES
FUNGCIDE	FUNGRATE			
IMAZALIL	1	66.1	68.1	64.4
	2	64.9	65.0	66.8
TOLC MET	1	64.7	63.7	66.0
	2	64.0	64.4	62.5

NONE 63.2

GRAIN MEAN 64.8

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

TABLE	FUNGCIDE	FUNGRATE	FUNGMETH	FUNGCIDE FUNGRATE
SED	1.15	1.15	1.41	1.62

TABLE	FUNGCIDE FUNGMETH	FUNGRATE FUNGMETH	FUNGCIDE FUNGRATE FUNGMETH
SED	1.99	1.99	2.81

SED FOR COMPARING NONE WITH ANY ITEM IN
FUNGCIDE.FUNGRATE.FUNGMETH TABLE IS 2.44

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

STRATUM	DF	SE	CV%
BLOCK.WP	40	3.98	6.1

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85/R/P/2

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

FUNGRATE	1	2	MEAN
FUNGCIDE			
IMAZALIL	89.7	89.1	89.4
TOLC MET	88.8	88.9	88.8
MEAN	89.2	89.0	89.1

FUNGMETH	CNVNTIAL	SP DS	SP DS ES	MEAN
FUNGCIDE				
IMAZALIL	90.1	89.9	88.2	89.4
TOLC MET	88.6	88.8	89.0	88.8
MEAN	89.4	89.4	88.6	89.1

FUNGMETH	CNVNTIAL	SP DS	SP DS ES	MEAN
FUNGRATE				
1	89.4	89.6	88.7	89.2
2	89.3	89.2	88.5	89.0
MEAN	89.4	89.4	88.6	89.1

	FUNGMETH	CNVNTIAL	SP DS	SP DS ES
FUNGCIDE	FUNGRATE			
IMAZALIL	1	90.1	90.4	88.5
	2	90.2	89.4	87.8
TOLC MET	1	88.7	88.8	88.8
	2	88.5	88.9	89.2

NONE 88.0

GRAND MEAN 88.9

PLOT AREA HARVESTED 0.00143

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85/R/P/3

POTATOES

SEED HEALTH

Object: To study the effects of three amounts of pest and disease control on two potato varieties grown for seed - Whittlocks.

Sponsors: R.W. Gibson, R. Harrington, G.A. Hide, G.R. Cayley.

Design: 2 randomised blocks of 3 plots split into 6 plus 1 plot split into 4.

Whole plot dimensions: 108.0 x 7.62.

Treatments: All combinations of:-

Whole plots

1. VARIETY	Varieties:
R EDWARD	Rothamsted once-grown King Edward
S EDWARD	Scots F.S. King Edward
S PIPER	Scots F.S. Maris Piper

Sub plots

2. PATHCONT	Pest and pathogen control (in addition to basals) cumulative to 1984 for Rothamsted seed:
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 14 June, 1985. Plants with 'virus' symptoms were removed on 4 June and 25 June
FULL	As for ENHANCED plus:- The imazalil was applied by charged electrostatic sprayer. Cypermethrin at 0.04 kg with oil at 7.0 l in 500 l was also applied on 28 June, 11 July, 26 July and (to HAULM D LATER plots only) 14 Aug
3. HAULM D	Dates of destroying haulm and of lifting:
EARLY	Haulm mechanically destroyed, 12 Aug, 1985. Haulm desiccant applied 14 Aug and potatoes lifted 18 Sept
LATER	Haulm mechanically destroyed 4 Sept. Haulm desiccant applied 5 Sept and potatoes lifted 11 Oct

Plus one whole plot of Rothamsted once-grown Maris Piper divided for all combinations of:-

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85/R/P/3

1. PTHCT RP Pest and pathogen control, as above:

   ENHANCED
   FULL

2. HLM D RP Dates of destroying haulm and of lifting, as above:

   EARLY
   LATER

NOTE: PATHCONT FULL provided for removal of plants with 'blackleg' symptoms. This was done in 1984 but not in 1985 because symptoms were not found.

Basal applications: Manures: (0:18:36) at 690 kg. FYM at 35 t. (10:10:15+4.5 Mg) at 1960 kg. Weedkillers: Paraquat at 0.60 kg ion in 250 l. Linuron at 1.3 kg with paraquat at 0.50 kg ion in 200 l. Fungicide: Mancozeb at 1.4 kg in 200 l on five occasions, applied with the pirimicarb on all but the first. Insecticides: Phorate at 1.7 kg. Pirimicarb at 0.14 kg on four occasions. Haulm desiccant: Diquat at 0.80 kg ion in 500 l.

Cultivations, etc.:- Paraquat applied: 19 Sept, 1984. PK applied: 10 Oct. FYM applied: 27 Nov. Ploughed: 6 Dec. Heavy spring-tine cultivated: 19 Mar, 1985. NPK Mg applied: 3 Apr. Rotary harrowed: 10 Apr. Potatoes planted by hand, phorate applied: 15 Apr. Linuron and paraquat applied: 16 May. Mancozeb applied: 20 June. Mancozeb with pirimicarb applied: 3 July, 23 July, 6 Aug and 21 Aug. Previous crops: W. barley 1983, w. oilseed rape 1984.

NOTE: Aphid counts were made and virus infection assessed throughout the season. Plants were sampled in early August for stem infections and tuber samples were taken at harvest for observations on storage diseases.

TOTAL TUBERS TONNES/HECTARE

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

PATHCONT VARIETY	STANDARD	ENHANCED	FULL	MEAN
R EDWARD	48.0	47.3	44.8	46.7
S EDWARD	51.0	47.4	44.8	47.7
S PIPER	56.8	51.5	50.6	53.0
MEAN	51.9	48.8	46.7	49.1

HAULM D VARIETY	EARLY	LATER	MEAN
R EDWARD	38.8	54.5	46.7
S EDWARD	40.0	55.5	47.7
S PIPER	46.6	59.4	53.0
MEAN	41.8	56.5	49.1

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85/R/P/3

TOTAL TUBERS TONNES/HECTARE

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

HAULM D PATHCONT	EARLY	LATER	MEAN
STANDARD	45.1	58.8	51.9
ENHANCED	41.0	56.5	48.8
FULL	39.3	54.1	46.7
MEAN	41.8	56.5	49.1

PATHCONT	STANDARD		ENHANCED		FULL	
HAULM D	EARLY	LATER	EARLY	LATER	EARLY	LATER
VARIETY						
R EDWARD	40.7	55.3	38.9	55.7	36.9	52.6
S EDWARD	43.3	58.7	39.6	55.3	37.1	52.5
S PIPER	51.2	62.4	44.5	58.6	44.0	57.3

HLM D RP PATHCT RP	EARLY	LATER	MEAN
ENHANCED	42.5	55.9	49.2
FULL	40.6	51.6	46.1
MEAN	41.6	53.7	47.6

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

TABLE	PATHCONT	HAULM D	VARIETY* PATHCONT
SED	0.76	0.62	1.32

TABLE	VARIETY* HAULM D	PATHCONT HAULM D	VARIETY* PATHCONT HAULM D
SED	1.07	1.07	1.86

* ONLY WITHIN THE SAME LEVEL OF PATHCONT

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	15	1.86	3.8

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85/R/P/3

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

PATHCONT VARIETY	STANDARD	ENHANCED	FULL	MEAN
R EDWARD	67.4	63.8	62.0	64.4
S EDWARD	78.9	68.6	65.0	70.8
S PIPER	78.8	75.7	75.4	76.6
MEAN	75.1	69.4	67.5	70.6

HAULM D VARIETY	EARLY	LATER	MEAN
R EDWARD	50.5	78.3	64.4
S EDWARD	62.0	79.7	70.8
S PIPER	70.4	82.9	76.6
MEAN	61.0	80.3	70.6

HAULM D PATHCONT	EARLY	LATER	MEAN
STANDARD	67.0	83.1	75.1
ENHANCED	59.4	79.3	69.4
FULL	56.5	78.4	67.5
MEAN	61.0	80.3	70.6

PATHCONT	STANDARD		ENHANCED		FULL	
HAULM D	EARLY	LATER	EARLY	LATER	EARLY	LATER
VARIETY						
R EDWARD	54.9	79.9	50.0	77.5	46.6	77.5
S EDWARD	73.0	84.8	59.1	78.0	53.9	76.2
S PIPER	73.1	84.6	69.0	82.4	69.1	81.6

HLM D RP PATHCT RP	EARLY	LATER	MEAN
ENHANCED	49.4	72.9	61.1
FULL	55.2	75.6	65.4
MEAN	52.3	74.2	63.3

SUB PLOT AREA HARVESTED 0.00457

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85/R/P/4

POTATOES

SEED HEALTH PROGENY

Object: To compare the health and yields of two varieties grown for seed in 1984, under three sets of treatments, with the same varieties grown to AA standard in Scotland in 1984 - Road Piece E.

Sponsors: R.W. Gibson, G.A. Hide, G.R. Cayley.

Design: 4 randomised blocks of 16 plots.

Whole plot dimensions: 1.5 x 15.2.

Treatments: All combinations of:-

1. VARIETY	Varieties:	
	EDWARD	King Edward
	PIPER	Maris Piper
2. PATHCONT(84)	Pest and pathogen control in 1984 (in addition to basals in 1984):	
	STANDARD	None
	ENHANCED	Seed treatment with tolclofos methyl at 0.24 kg and imazalil at 0.01 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' symptoms were removed on 11 June, 20 June and 5 July. Cypermethrin at 0.04 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(84) LATER plots only) 13 Aug
3. HAULM D(84)	Dates of destroying haulm and of lifting in 1984:	
	EARLY	Haulm mechanically destroyed on 3 Aug. Haulm desiccant applied on 6 Aug and potatoes lifted on 6 Sept
	LATER	Haulm mechanically destroyed on 8 Sept. Haulm desiccant applied on 22 Sept and potatoes lifted on 11 Oct

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85/R/P/4

plus two extra treatments:

XTR SCOT	Scottish AA seed varieties:
EDWARD	King Edward (duplicated)
PIPER	Maris Piper

NOTE: Basal pest and pathogen control in 1984 (other than to XTR SCOT for which it is not known) was phorate at 1.7 kg with the seed, fentin hydroxide at 0.28 kg with pirimicarb at 0.14 kg on 19 June, 3 July, 17 July and 30 July. The above rate of fentin hydroxide was applied in addition to HAULM D(84) LATER on 13 Aug and with pirimicarb at the above rate, on 28 Aug.

Basal applications: Manures: (0:18:36) at 690 kg. (10:10:15+4.5 Mg) at 1960 kg. Weedkillers: Linuron at 1.3 kg with paraquat at 0.50 kg ion in 200 l. Fungicides: Mancozeb at 1.4 kg in 200 l on four occasions, with the pirimicarb on the second and third occasions. Fentin hydroxide at 0.28 kg in 200 l on two occasions. Insecticides: Phorate at 1.7 kg. Pirimicarb at 0.14 kg on two occasions. Haulm desiccant: BOV at 170 l.

Cultivations, etc.:- PK applied: 10 Oct, 1984. Ploughed: 19 Nov. NPK Mg applied: 4 Apr, 1985. Rotary harrowed: 17 Apr. Potatoes planted by hand, phorate applied: 18 Apr. Weedkillers applied: 16 May. Mancozeb applied: 20 June, 6 Aug. Mancozeb with pirimicarb applied: 4 July, 23 July. Fentin hydroxide applied: 21 Aug, 11 Sept. Haulm desiccant applied: 11 Oct. Lifted: 22 Oct. Previous crops: S. barley 1983, w. beans 1984.

NOTE: Viruses were assessed throughout the season. Tuber samples were taken at harvest to observe storage diseases.

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85/R/P/4

TOTAL TUBERS TONNES/HECTARE

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

PATHCONT(84) VARIETY	STANDARD	ENHANCED	FULL	MEAN
EDWARD	69.8	71.9	71.7	71.1
PIPER	74.1	76.5	76.6	75.8
MEAN	72.0	74.2	74.2	73.4

HAULM D(84) VARIETY	EARLY	LATER	MEAN
EDWARD	70.7	71.6	71.1
PIPER	76.5	75.0	75.8
MEAN	73.6	73.3	73.4

HAULM D(84) PATHCONT(84)	EARLY	LATER	MEAN
STANDARD	73.2	70.7	72.0
ENHANCED	73.2	75.2	74.2
FULL	74.3	74.0	74.2
MEAN	73.6	73.3	73.4

PATHCONT(84)	STANDARD		ENHANCED		FULL	
HAULM D(84) VARIETY	EARLY	LATER	EARLY	LATER	EARLY	LATER
EDWARD	69.7	70.0	70.1	73.8	72.4	71.0
PIPER	76.8	71.4	76.4	76.7	76.2	77.0

XTR SCOT	EDWARD	PIPER	MEAN
	73.7	79.0	76.3

GRAND MEAN 74.2

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

TABLE	XTR SCOT	VARIETY	PATHCONT(84)	HAULM D(84)
SED	1.68	0.97	1.19	0.97

TABLE	VARIETY PATHCONT(84)	VARIETY HAULM D(84)	PATHCONT(84) HAULM D(84)	VARIETY PATHCONT(84) HAULM D(84)
SED	1.68	1.37	1.68	2.38

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

STRATUM	DF	SE	CV%
BLOCK.WP	47	3.36	4.5

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85/R/P/4

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

PATHCONT(84) VARIETY	STANDARD	ENHANCED	FULL	MEAN
EDWARD	80.6	81.9	83.8	82.1
PIPER	78.6	79.6	83.0	80.4
MEAN	79.6	80.7	83.4	81.3

HAULM D(84) VARIETY	EARLY	LATER	MEAN
EDWARD	80.0	84.2	82.1
PIPER	78.5	82.3	80.4
MEAN	79.3	83.2	81.3

HAULM D(84) PATHCONT(84)	EARLY	LATER	MEAN
STANDARD	78.2	81.1	79.6
ENHANCED	78.4	83.0	80.7
FULL	81.2	85.6	83.4
MEAN	79.3	83.2	81.3

PATHCONT(84)	STANDARD		ENHANCED		FULL	
HAULM D(84) VARIETY	EARLY	LATER	EARLY	LATER	EARLY	LATER
EDWARD	79.2	82.1	78.8	85.0	82.2	85.4
PIPER	77.2	80.1	78.1	81.1	80.3	85.8

XTR SCOT	EDWARD	PIPER	MEAN
	86.5	86.9	86.7

GRAND MEAN 82.6

PLOT AREA HARVESTED 0.00229

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85/R/P/5

POTATOES

NITROPHOSPHATES

Object: To study the effects of different amounts of water soluble phosphate in nitrophosphate fertilizers on growth and P uptake of potatoes - Highfield V.

Sponsor: K.G. Copestake.

Design: 3 randomised blocks of 13 plots.

Whole plot dimensions: 3.0 x 21.0.

Treatments: All combinations of:-

1. P SOL — Phosphate water solubility (%):

59	Compound fertilizer 16.4 : 14.2 : 17.5 with 59% of the P205 water soluble
73	Compound fertilizer 15.9 : 16.2 : 15.3 with 73% of the P205 water soluble
95	Compound fertilizer 15.0 : 15.0 : 15.0 with 95% of the P205 water soluble

2. P RATE — Rate of phosphate (kg P205):

50
100
150
200

plus one extra treatment:

EXTRA

NONE — No phosphate fertilizer

NOTE: The compound fertilizers used to apply the phosphate treatments supplied differing amounts of the total 231 kg N and 242 kg K20 required on all plots. Additional amounts of N (as 'Nitrotop' 33.5% N) and K20 (as muriate of potash 60% K20) were applied as needed to achieve this total. Combinations of P SOL 59 with P RATE 150 and 200 each received a total of 247 kg of K20 in error.

Basal applications: Manures: Chalk at 5.0 t, on two occasions. Sulphate of magnesium (as Epsom salts at 470 kg). Weedkillers: Linuron at 1.3 kg with paraquat at 0.50 kg ion in 500 l. Fungicides: Mancozeb at 1.4 kg in 200 l on four occasions with the pirimicarb on the second and third occasions. Fentin hydroxide at 0.28 kg in 200 l on two occasions. Insecticide: Pirimicarb at 0.14 kg on two occasions. Desiccant: Diquat at 0.80 kg ion in 200 l.

Seed: Pentland Crown.

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85/R/P/5

Cultivations, etc.:- Disced: 14 Aug, 1984. First chalk applied: 23 Aug. Ploughed: 11 Sept. Second chalk applied: 2 Oct. N, P and K applied: 23 Apr, 1985. Mg applied, rotary harrowed, potatoes planted: 24 Apr. Weedkillers applied: 16 May. Mancozeb alone applied: 20 June, 6 Aug. Mancozeb with pirimicarb applied: 4 July, 23 July. Fentin hydroxide applied: 21 Aug, 11 Sept. Haulm mechanically destroyed: 18 Sept. Desiccant applied: 12 Oct. Lifted: 25 Oct. Previous crops: S. barley 1983, w. oats 1984.

NOTE: Emergence and stem counts were made. Samples were taken for fresh and dry weight of crop components in summer and at maturity.

TOTAL TUBERS TONNES/HECTARE

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

P RATE / P SOL	50	100	150	200	MEAN
55	51.2	53.9	53.9	55.2	53.5
73	52.0	51.7	55.0	55.7	53.6
95	48.6	55.1	56.4	56.3	54.1
MEAN	50.6	53.6	55.1	55.7	53.7

NONE 39.3

GRAND MEAN 52.6

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

TABLE	P SOL	P RATE	P SOL P RATE &NONE
SED	2.47	2.86	4.95

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

STRATUM	DF	SE	CV%
BLOCK.WP	24	6.06	11.5

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85/R/P/5

PERCENTAGE WARE 4.44CM (1.75) INCH RIDDLE

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

P RATE / P SOL	50	100	150	200	MEAN
55	98.6	98.1	98.1	97.1	98.0
73	98.1	97.9	97.7	97.4	97.8
95	98.2	97.8	98.2	97.0	97.8
MEAN	98.3	97.9	98.0	97.2	97.8

NONE 98.5

GRAND MEAN 97.9

PLOT AREA HARVESTED 0.00165

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85/R/P/6

POTATOES

RATES AND METHODS OF APPLYING PYRETHROID SPRAYS

Object: To study the effects of a pyrethroid insecticide applied electrostatically or conventionally - Long Hoos III 5.

Sponsors: D.C. Griffiths, J.A. Pickett, G.R. Cayley, G. Dawson, M. Woodcock.

Design: 4 randomised blocks of 9 plots.

Whole plot dimensions: 2.28 x 5.0.

Treatments:

INSCTCDE	Insecticide, applied on 23 July, 1985:
0	None (duplicated)
FMC 2 E	'FMC 5800' at 2 g a.i. applied electrostatically (duplicated)
FMC 4 E	'FMC 5800' at 4 g a.i. applied electrostatically (duplicated)
FMC 8 E	'FMC 5800' at 8 g a.i. applied electrostatically (duplicated)
FMC 8 C	'FMC 5800' at 8 g a.i. applied conventionally in 200 l

NOTES: (1) A planned treatment with a pheromone spray was not applied because of machine failure.
(2) Electrostatic treatments were applied with an inductively charged, vertically mounted, electrostatic sprayer in 8.4 l.

Basal applications: Manures: (10:10:15+4.5 Mg) at 2500 kg. Weedkillers: Paraquat at 0.56 kg ion in 220 l. Linuron at 1.3 kg with paraquat at 0.28 kg ion in 220 l. Fungicide: Mancozeb at 1.3 kg in 220 l on seven occasions. Desiccant: Diquat at 0.60 kg ion in 220 l.

Seed: King Edward.

Cultivations, etc.:- Ploughed: 13 Nov, 1984. Paraquat applied: 17 Apr, 1985. NPK Mg applied: 18 Apr. Deep-tine cultivated, spring-tine cultivated, rotary cultivated: 22 Apr. Planted by hand: 23 Apr. Linuron with paraquat applied: 16 May. Fungicide applied: 1 July, 10 July, 23 July, 6 Aug, 20 Aug, 29 Aug, and 5 Sept. Desiccant applied: 20 Sept. Haulm mechanically destroyed, potatoes lifted: 26 Sept. Previous crops: S. and w. beans 1983, s. wheat 1984.

NOTE: Aphid counts were made after the application of treatment sprays.

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85/R/P/6

TOTAL TUBERS TONNES/HECTARE

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

INSCTCDE	0	FMC 2 E	FMC 4 E	FMC 8 E	FMC 8 C	MEAN
	57.6	60.3	57.9	57.5	60.8	58.6

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

TABLE	INSCTCDE	
SED	3.52	MAX-MIN
	2.87	MAX REP

	INSCTCDE
MAX-MIN	FMC 8 C V ANY OF REMAINDER
MAX-REP	ANY OF REMAINDER

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

STRATUM	DF	SE	CV%
BLOCK.WP	28	5.74	9.8

PLOT AREA HARVESTED 0.000381

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85/R/P/23 and 85/W/P/23

POTATOES

VARIETIES

Object: To compare the quality and yield of some of the newer varieties of potato with current standards on two soil types - Rothamsted Highfield IV (R), Woburn Great Hill Bottom I (W).

Sponsor: R. Moffitt.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 3.0 x 6.1.

Treatments:

VARIETY	Varieties:
CARA	Cara
CROWN	Pentland Crown
DESIREE	Desiree
ROMANO	Romano
WILJA	Wilja

Basal applications:

Highfield IV (R): Manures: (0:18:36) at 690 kg. (10:10:15+4.5 Mg) at 1960 kg. Weedkillers: Linuron at 1.3 kg with paraquat at 0.50 kg ion in 200 l. Fungicides: Mancozeb at 1.4 kg in 200 l on four occasions, with the insecticide on the second and third occasion. Fentin hydroxide at 0.28 kg on two occasions in 200 l. Insecticide: Pirimicarb at 0.14 kg on two occasions. Desiccant: BOV at 170 l.

Great Hill Bottom I (W): Manures: (0:18:36) at 690 kg. FYM at 50 t. (10:10:15+4.5 Mg) at 2470 kg. Weedkillers: Linuron at 1.0 kg with paraquat at 0.40 kg ion in 250 l. Metribuzin at 0.70 kg in 500 l. Fungicides: Mancozeb at 1.4 kg in 250 l on six occasions with the insecticide on the second occasion. Fentin acetate with maneb (as 'Brestan 60' in 0.5 kg) in 250 l. Insecticide: Pirimicarb at 0.14 kg. Desiccant: Diquat at 0.56 kg ion in 250 l.

Cultivations, etc.:-

Highfield IV (R): PK applied: 10 Oct, 1984. Ploughed: 19 Nov. NPK Mg applied: 4 Apr, 1985. Rotary harrowed: 17 Apr. Potatoes hand planted: 19 Apr. Ridged: 30 Apr. Weedkillers applied: 16 May. Mancozeb applied: 20 June, 4 July, 23 July, 6 Aug. Insecticide applied: 4 July, 23 July. Fentin hydroxide applied: 21 Aug, 11 Sept. Haulm desiccant applied: 10 Oct. Lifted: 21 Oct. Previous crops: S. barley 1983, w. beans 1984.

Great Hill Bottom I (W): Disced: 7 Sept, 1984. PK applied: 18 Sept. Sub-soiled, tines 142 cm apart, 56 cm deep: 24 Sept. FYM applied: 15 Nov. Ploughed: 20 Dec. NPK Mg applied: 4 Apr, 1985. Power harrowed, potatoes planted by hand: 23 Apr. Rotary ridged: 29 Apr. Linuron and paraquat applied: 20 May. Metribuzin applied: 31 May. Rotary ridged: 19 June. Mancozeb applied: 20 June, 3 July, 23 July, 6 Aug, 13 Aug, 7 Sept. Insecticide applied: 3 July. 'Brestan 60' applied: 21 Aug. Haulm mechanically destroyed: 26 Sept. Haulm desiccant applied: 9 Oct. Lifted: 17 Oct. Previous crops: S. barley 1983, w. oats 1984.

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85/R/P/23

TOTAL TUBERS TONNES/HECTARE HIGHFIELD IV (R)

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

VARIETY	CARA	CROWN	DESIREE	ROMANO	WILJA	MEAN
	74.3	67.9	61.9	57.6	59.6	64.3

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

TABLE	VARIETY
SED	2.38

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

STRATUM	DF	SE	CV%
BLOCK.WP	12	3.37	5.2

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

VARIETY	CARA	CROWN	DESIREE	ROMANO	WILJA	MEAN
	98.6	98.4	96.4	97.7	97.1	97.7

PLOT AREA HARVESTED 0.00091

85/W/P/23

TOTAL TUBERS TONNES/HECTARE GREAT HILL BOTTOM I (W)

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

VARIETY	CARA	CROWN	DESIREE	ROMANO	WILJA	MEAN
	68.1	52.7	49.6	43.1	42.9	51.3

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

TABLE	VARIETY
SED	4.08

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

STRATUM	DF	SE	CV%
BLOCK.WP	12	5.77	11.2

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

VARIETY	CARA	CROWN	DESIREE	ROMANO	WILJA	MEAN
	90.5	87.7	78.7	89.5	71.2	83.5

PLOT AREA HARVESTED 0.00091

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85/R/ON/1

ONIONS

CONTROL OF STEM NEMATODE

Object: To study the effects of rates, times and methods of applying nematicides on the control of stem nematode and on the yield of onions - Fosters O and E VI.

Sponsor: A.G. Whitehead.

Design: 2 randomised blocks of 15 plots.

Whole plot dimensions: 2.29 x 7.32.

Treatments: All combinations of:-

1. NEM S — Nematicides to seed furrow:

ALDICARB	Aldicarb
CARBOFUR	Carbofuran

2. NEM S RT — Rates of nematicides to seed furrow (kg):

1
2

3. NEM F — Foliar nematicide, applied by electrostatic sprayer, at 1.5 kg:

NONE	None
THIABEND	Thiabendazole
THIODICA	Thiodicarb

plus one extra treatment:

EXTRA

NONE	None (triplicated)

NOTE: The foliar nematicides were applied in 5.7 l on 2 June, 1985.

Basal applications: Manures: (13:13:20) at 1880 kg. Weedkillers: Glyphosate at 1.4 kg in 280 l. Propachlor at 4.4 kg in 280 l.

Seed: Robusta, dressed benomyl and thiram, sown at 6.7 kg.

Cultivations, etc.:- Glyphosate applied: 25 Sept, 1984. Ploughed: 16 Nov. NPK applied: 11 Mar, 1985. Rotary harrowed: 13 Mar. Seed sown, seed furrow treatments applied: 14 Mar. Propachlor applied: 21 Mar. Lifted: 24 Sept. Previous crops: S. oats 1983, w. oats 1984.

NOTE: Stem nematode damage to onions stored after harvest was assessed.

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85/R/ON/1

FRESH WEIGHT TONNES/HECTARE

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

NEM S RT	1	2	MEAN
NEM S			
ALDICARB	54.1	56.4	55.3
CARBOFUR	44.0	53.6	48.8
MEAN	49.1	55.0	52.0

NEM F	NONE	THIABEND	THIODICA	MEAN
NEM S				
ALDICARB	55.3	55.3	55.2	55.3
CARBOFUR	47.4	49.8	49.2	48.8
MEAN	51.4	52.5	52.2	52.0

NEM F	NONE	THIABEND	THIODICA	MEAN
NEM S RT				
1	44.9	50.8	51.5	49.1
2	57.8	54.3	53.0	55.0
MEAN	51.4	52.5	52.2	52.0

NEM S RT	1			2		
NEM F	NONE	THIABEND	THIODICA	NONE	THIABEND	THIODICA
NEM S						
ALDICARB	48.9	55.4	58.0	61.7	55.1	52.4
CARBOFUR	40.8	46.1	45.0	53.9	53.5	53.5

EXTRA NONE 0.5

GRAND MEAN 41.7

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

TABLE	NEM S	NEM S RT	NEM F	NEM S NEM S RT
SED	2.52	2.52	3.09	3.56

TABLE	NEM S NEM F	NEM S RT NEM F	NEM S NEM S RT NEM F
SED	4.37	4.37	6.17

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

STRATUM	DF	SE	CV%
BLOCK.WP	11	6.17	11.9

PLOT AREA HARVESTED 0.00084

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85/R/M/5

SPRING BEANS, PEAS AND LUPINS

COMPARISON OF SPRING-SOWN GRAIN LEGUMES

Object: To compare yields and other attributes of three spring-sown grain legumes - Garden Plot 2.

Sponsors: J. McEwen, D.P. Yeoman.

Design: 6 randomised blocks of 3 plots.

Whole plot dimensions: 2.5 x 10.0.

Treatments:

SPECIES	Species of spring-sown grain legume:
BEANS	Field beans, Vicia faba, cv. Minden
PEAS	Peas, Pisum sativum, cv. Progreta
LUPINS	Lupins, Lupinus albus, cv. Vladimir

Standard applications:
All crops: Manures: Chalk at 2.9 t. Muriate of potash at 520 kg. Weedkiller: Glyphosate at 1.4 kg in 220 l. Fungicide: Benomyl at 0.56 kg in 220 l. Insecticides: Deltamethrin at 0.0075 kg in 220 l; pirimicarb at 0.14 kg in 220 l on two occasions.
Peas and beans only: Weedkillers: Trietazine at 1.2 kg with simazine at 0.17 kg and paraquat at 0.40 kg ion in 220 l. Insecticide: Deltamethrin at 0.0075 kg in 220 l on a second occasion.
Lupins only: Weedkillers: Monolinuron at 0.77 kg with paraquat at 0.55 kg ion in 220 l. Metamitron at 2.8 kg in 220 l;

Seed: Beans: Minden, sown at 260 kg.
Peas: Progreta, sown at 200 kg.
Lupins: Vladimir, sown at 250 kg.

Cultivations, etc.:-
All crops: Chalk applied: 11 Sept, 1984. K applied: 25 Sept. Glyphosate applied: 26 Sept. Ploughed: 1 Nov. Spring-tine cultivated, seed sown: 3 Apr, 1985. Deltamethrin applied: 2 May. Pirimicarb applied: 1 July. Benomyl applied: 2 July. Second pirimicarb applied: 9 July. Previous crops: Potatoes 1983, s. barley 1984.
Peas and beans only: Weedkillers applied: 9 Apr, 1985. Second deltamethrin applied: 23 May. Combine harvested: 6 Sept (peas), 20 Sept (beans).
Lupins only: Paraquat and monolinuron applied: 9 Apr, 1985. Metamitron applied: 23 May. Combine harvested: 17 Oct.

NOTES: (1) Plant counts were made at establishment.
(2) The experiment was netted against birds from April to May. Pea plots had additional protection against birds when needed for the remainder of the season.

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85/R/M/5

BEANS, PEAS, LUPINS

GRAIN TONNES/HECTARE

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

SPECIES	BEANS	PEAS	LUPINS	MEAN
	5.48	2.71	3.99	4.06

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

TABLE	SPECIES
SED	0.286

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

STRATUM	DF	SE	CV%
BLOCK	5	0.236	5.8
BLOCK.WP	10	0.496	12.2

GRAIN MEAN DM% 73.8

PLOT AREA HARVESTED 0.00156

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METEOROLOGICAL RECORDS 1985 - 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	43 (-7)	0.0 (-2.8)	-1.9	2.9	6.1
FEB	82 (+20)	1.7 (-1.4)	-1.4	3.6	5.4
MAR	98 (-10)	4.3 (-0.9)	2.2	4.7	5.2
APR	144 (+4)	8.2 (+0.5)	4.4	8.3	7.0
MAY	163 (-26)	10.4 (-0.6)	10.0	10.6	8.8
JUNE	165 (-32)	12.6 (-1.5)	9.3	14.0	11.6
JULY	221 (+41)	15.9 (+0.3)	12.7	16.3	13.9
AUG	181 (+14)	14.7 (-1.0)	11.5	15.3	14.3
SEPT	134 (-7)	14.4 (+0.8)	11.7	14.5	13.9
OCT	110 (+10)	10.9 (+0.8)	8.7	12.6	13.2
NOV	81 (+19)	3.5 (-2.5)	1.6	7.7	10.3
DEC	38 (-8)	6.3 (+2.3)	5.1	7.4	8.6
YEAR*	1460 (+19)	8.6 (-0.5)	6.1	9.8	9.9

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	29	58 (-5)	17	54	9.7
FEB	24	29 (-23)	6	55	9.2
MAR	23	38 (-14)	17	22	8.6
APR	11	31 (-17)	14	8	11.5
MAY	10	49 (-2)	11	10	7.9
JUNE	3	102 (+44)	18	48	7.0
JULY	0	48 (-3)	14	0	5.6
AUG	0	64 (+2)	19	16	7.8
SEPT	1	18 (-41)	7	0	6.3
OCT	12	22 (-37)	8	0	5.5
NOV	22	51 (-19)	17	11	9.1
DEC	13	108 (+39)	20	95	10.4
YEAR*	148	618 (-75)	168	320	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 1985 - WOBURN

(Departure from long-period means in brackets)

Mean temperature: C

MONTH	Total sunshine: hours	Air(1)	Dew point	In ground under grass 30 cm	In ground under grass 100 cm	Ground frosts (2)	Total rainfall: mm 12.7 cm (5in) gauge	Rain days (3)	Wind km per hour (4)
JAN	36 (-14)	0.3 (-3.0)	1.1	3.0	6.5	29	49 (-5)	14	7.8
FEB	68 (+7)	1.3 (-2.0)	-1.1	3.4	5.5	24	20 (-22)	6	6.7
MAR	105 (-2)	4.7 (-0.7)	2.5	4.9	5.5	23	36 (-13)	17	8.2
APR	130 (-2)	8.4 (+0.8)	4.5	8.4	7.3	9	21 (-24)	16	10.5
MAY	148 (-35)	10.5 (-0.5)	7.5	10.9	8.9	12	71 (+21)	11	6.4
JUNE	158 (-34)	12.6 (-1.4)	9.0	14.1	11.6	6	117 (+62)	20	7.7
JULY	212 (+36)	16.2 (+0.4)	12.5	16.9	14.0	0	77 (+26)	14	7.2
AUG	171 (+9)	15.1 (-0.5)	12.2	15.8	14.7	0	50 (-17)	17	10.1
SEPT	138 (+2)	14.7 (+1.1)	13.0	14.9	14.3	2	23 (-31)	6	7.2
OCT	102 (+2)	10.9 (+0.6)	8.6	12.9	13.6	11	29 (-24)	10	4.9
NOV	78 (+16)	3.6 (-2.6)	2.8	7.2	10.5	20	43 (-16)	17	7.3
DEC	30 (-15)	6.8 (+2.5)	5.4	7.4	8.9	8	102 (+44)	18	11.2
YEAR*	1376 (-32)	8.8 (-0.4)	6.5	10.0	10.1	144	638 (+2)	166	7.9

METEOROLOGICAL RECORDS 1985 - SAXMUNDHAM

Mean temperature: C

MONTH	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	0.9 (-3.4)	1.1	3.1	29	90 (+30)	21	12.9
FEB	1.9 (-2.1)	0.6	3.2	22	25 (-18)	9	11.7
MAR	4.1 (-1.5)	1.7	4.0	11	50 (+2)	20	12.7
APR	7.7 (+0.5)	3.9	8.2	3	58 (+19)	17	12.6
MAY	10.3 (-0.5)	8.3	11.2	5	53 (+10)	14	9.6
JUNE	12.4 (-1.7)	8.9	14.1	2	116 (+72)	26	7.7
JULY	16.8 (+0.5)	12.8	17.8	0	43 (-7)	13	7.6
AUG	15.3 (-1.1)	12.8	15.6	0	67 (+26)	18	9.8
SEPT	14.9 (+0.5)	11.7	14.9	1	14 (-53)	7	7.8
OCT	11.6 (+0.9)	8.9	12.3	7	13 (-38)	9	8.5
NOV	5.5 (-1.3)	3.9	6.1	8	41 (-28)	13	11.5
DEC	9.8 (+5.2)	6.7	6.9	7	62 (+7)	20	13.2
YEAR*	9.3 (-0.3)	6.8	9.8	95	632 (+21)	187	10.5

(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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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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