ROTHAMSTED RESEARCH

Yields of the Field Experiments 1987

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Crop Sequences

Rothamsted Research

Rothamsted Research (1988) *Crop Sequences ;* Yields Of The Field Experiments 1987, pp 77 - 145 **- DOI: https://doi.org/10.23637/ERADOC-1-37**

87/R/CS/10 and 87/W/CS/10

LONG TERM LIMING

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

Sponsors: S.P. McGrath, J. McEwen, D.P. Yeoman.

The 26th year, Lupinus albus.

For previous years see 'Details' 1967, 1973 and 74-86/R&W/CS/10.

Design: 2 randomised blocks of 16 plots split into 2.

Whole plot dimensions: 6.40 x 18.3.

Treatments: All combinations of:-

Whole plots

1. CHALK — Residual effects of ground chalk (tonnes CaCO3) (total applied 1962-87):

R	W	Rothamsted total 1962-78	Rothamsted total 1982-87	Woburn total 1962-78	Woburn total 1982-87
0	0	0	0	0	0
15	9	7	8	6	3
24.5	25.5	15	9.5	14	11.5
52.5	45.5	30	22.5	23	22.5

2. P — Residual effects of P fertilizer applied:

	Until 1978 R & W	1981 R & W	1982 R & W	1983 R	1983 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

Sub plots

3. MANGNESE — Manganese applied in 1987:

0	None
MN	Manganese sprays

NOTES: (1) 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 (none in 1986 and 1987).
(2) On Sawyers I (R) manganese was applied as manganese lignin polycarboxylate ('Stoller Manganese' at 3.0 l in 200 l on 5 June, 1987 and at 9.0 l in 200 l on 11 Aug).
(3) On Stackyard C (W) manganese was applied at 0.19 kg Mn on 4 June, 1987 and 0.57 kg Mn on 4 Aug as manganese sulphate in 200 l.

https://doi.org/10.23637/ERADOC-1-37

87/R/CS/10 and 87/W/CS/10

Basal applications:-
Sawyers I (R): Weedkillers: Terbutryne at 0.98 kg with terbuthylazine at 0.42 kg in 200 l. Fungicide: Benomyl at 0.50 kg applied with the insecticide and a wetting agent ('Agral' at 0.06 l) in 200 l. Insecticide: Pirimicarb at 0.14 kg.
Stackyard C (W): Weedkillers: Glyphosate at 1.4 kg in 200 l. Terbutryne at 0.56 kg with terbuthylazine at 0.24 kg in 240 l. Fungicide: Benomyl at 1.0 kg applied with the pirimicarb and a wetting agent ('Enhance' at 0.06 l) in 200 l. Insecticides: Deltamethrin at 0.038 kg in 200 l. Pirimicarb at 0.15 kg.

Seed: Sawyers I (R): Vladimir, sown at 260 kg.
Stackyard C (W): Vladimir, sown at 250 kg.

Cultivations, etc.:-
Sawyers I (R): Chalk treatments applied: 13 Nov, 1986. Ploughed: 14 Nov. Spring-tine cultivated, rotary harrowed, seed sown, harrowed: 31 Mar, 1987. Weedkillers applied: 13 Apr. Fungicide and insecticide applied: 9 July. Combine harvested: 17 Nov.
Stackyard C (W): Glyphosate applied: 16 Sept, 1986. Chalk treatments applied: 13 Nov. Ploughed: 28 Nov. Spike harrowed with crumbler attached, seed sown: 6 Apr, 1987. Harrowed, terbutryne and terbuthylazine applied: 13 Apr. Deltamethrin applied: 8 May. Benomyl and pirimicarb applied: 13 July. Combine harvested: 18 Nov.

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

GRAIN TONNES/HECTARE

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

P	0	P1	P2	P3	Mean
CHALK					
0	0.71	1.33	2.28	2.97	1.82
15	2.86	2.25	3.47	2.65	2.81
24.5	2.98	2.24	3.69	2.56	2.87
52.5	2.87	2.31	4.04	3.17	3.10
Mean	2.36	2.03	3.37	2.84	2.65

MANGNESE	0	MN	Mean
CHALK			
0	1.89	1.76	1.82
15	2.69	2.92	2.81
24.5	2.98	2.75	2.87
52.5	3.04	3.15	3.10
Mean	2.65	2.64	2.65

MANGNESE	0	MN	Mean
P			
0	2.38	2.33	2.36
P1	2.12	1.94	2.03
P2	3.32	3.42	3.37
P3	2.78	2.89	2.84
Mean	2.65	2.64	2.65

https://doi.org/10.23637/ERADOC-1-37

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

GRAIN TONNES/HECTARE

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

CHALK	MANGNESE P	0	MN
0	0	0.66	0.77
	P1	1.41	1.25
	P2	2.25	2.32
	P3	3.24	2.71
15	0	2.73	2.98
	P1	2.27	2.22
	P2	3.52	3.43
	P3	2.26	3.03
24.5	0	3.02	2.94
	P1	2.48	1.99
	P2	3.86	3.52
	P3	2.56	2.56
52.5	0	3.10	2.64
	P1	2.31	2.32
	P2	3.68	4.40
	P3	3.08	3.25

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

Table	CHALK	P	MANGNESE	CHALK P
s.e.d.	0.233	0.233	0.114	0.466

Table	CHALK MANGNESE	P MANGNESE	CHALK P MANGNESE
s.e.d.	0.283	0.283	0.567

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

CHALK	0.228		
P		0.228	
CHALK.P			0.456

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	0.466	17.6
BLOCK.WP.SP	16	0.456	17.2

GRAIN MEAN DM% 65.2

SUB PLOT AREA HARVESTED 0.00177

https://doi.org/10.23637/ERADOC-1-37

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

GRAIN TONNES/HECTARE

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

P	0	P1	P2	P3	Mean
CHALK					
0	2.17	1.99	1.87	1.81	1.96
9	1.91	1.72	1.66	1.55	1.71
25.5	2.04	1.44	1.38	1.57	1.61
45.5	1.98	1.49	1.68	1.31	1.62
Mean	2.03	1.66	1.65	1.56	1.72

MANGNESE	0	MN	Mean
CHALK			
0	2.09	1.83	1.96
9	1.72	1.70	1.71
25.5	1.57	1.64	1.61
45.5	1.68	1.56	1.62
Mean	1.77	1.68	1.72

MANGNESE	0	MN	Mean
P			
0	2.12	1.94	2.03
P1	1.73	1.60	1.66
P2	1.57	1.73	1.65
P3	1.66	1.46	1.56
Mean	1.77	1.68	1.72

	MANGNESE	0	MN
CHALK	P		
0	0	2.63	1.72
	P1	1.82	2.17
	P2	1.84	1.90
	P3	2.08	1.54
9	0	1.95	1.88
	P1	1.89	1.56
	P2	1.35	1.97
	P3	1.71	1.39
25.5	0	1.78	2.29
	P1	1.47	1.41
	P2	1.37	1.40
	P3	1.67	1.46
45.5	0	2.09	1.87
	P1	1.74	1.25
	P2	1.71	1.66
	P3	1.17	1.44

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

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

Table	CHALK	P	MANGNESE	CHALK P
s.e.d.	0.107	0.107	0.098	0.214

Table	CHALK MANGNESE	P MANGNESE	CHALK P MANGNESE
s.e.d.	0.175	0.175	0.351

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

CHALK	0.197	
P		0.197
CHALK.P		0.393

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	0.214	12.4
BLOCK.WP.SP	16	0.393	22.8

GRAIN MEAN DM% 60.3

SUB PLOT AREA HARVESTED 0.00172

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87/W/CS/34

NEMATICIDES IN CROP SEQUENCE

Object: To study the effects of a range of nematicides on the incidence of Globodera rostochiensis and the 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 19th year, potatoes, w. wheat, s. barley.

For previous years see 71/W/CS/34(t), 72/W/CS/34(t) and 73-86/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	86	87
Series I	P	P*	SB	B	P	P*	W	B	P	P*	B	B	P	P*	W	B	P	P
Series II	P	P	P*	SB	B	P	P*	W	B	P	P*	W	B	P	P*	B	B	P
Series III	B	P	P	P*	SB	B	P	P*	W	B	P	P*	W	B	P	P*	W	B
Series IV	B	P	P	P	P*	SB	B	P	P*	W	B	P	P*	W	B	P	P*	W

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

* Treatments applied to potatoes, subsequent crops test residual effects. In 1987 planned new treatments were not applied to Series I and yields were not taken.

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

1. NEMACIDE[84] Residues of nematicides applied 1984:

   ALDICARB
   SDS38697
   SDS46995

2. RATE Rates of nematicide (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

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87/W/CS/34

Treatments to s. barley (Series III): All combinations of:-

1.	NEMACIDE[85]	Residues of nematicides applied 1985:
	OXAMYL	Oxamyl
	SDS46995	'SDS 46995'
	THIODICA	Thiodicarb
2.	RATE	Rates of nematicide (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 w. wheat (Series IV):

1.	NEMACIDE[86]	Residues of nematicides and rates (a.i.) applied 1986:
	AL 3.3	Aldicarb at 3.3 kg
	AL 6.6	Aldicarb at 6.6 kg
	AL S 3.3	Aldicarb, slow release formulation at 3.3 kg
	AL S 6.6	Aldicarb, slow release formulation at 6.6 kg
	ETH 7.5	Ethoprophos at 7.5 kg
	MB 5.0	'MB 41380' at 5.0 kg
	MB 7.5	'MB 41380' at 7.5 kg
	MB 10.0	'MB 41380' at 10.0 kg
	OX 5.0	Oxamyl at 5.0 kg
	NONE	None

Standard applications:

Potatoes (Series I and II): Manures: (10:10:15+4.5 Mg) at 2300 kg. Weedkillers: Glyphosate at 1.4 kg in 200 l to Series II only. Linuron at 1.6 kg in 200 l. Fungicides: Mancozeb at 1.4 kg on four occasions in 200 l, applied with the pirimicarb on the second. Fentin hydroxide at 0.28 kg on two occasions in 200 l. Nematicide: Oxamyl at 5.6 kg to Series I only. Insecticide: Pirimicarb at 0.14 kg. Desiccant: Diquat at 0.80 kg ion in 200 l.

W. wheat (Series IV): Manures: N at 210 kg as 'Nitram'. Weedkillers: Clopyralid at 0.05 kg, bromoxynil at 0.24 kg with mecoprop at 2.5 kg applied with the tridemorph in 200 l. Fungicides: Tridemorph at 0.52 kg. Triadimenol at 0.062 kg with tridemorph at 0.38 kg in 200 l.

S. barley (Series III): Manures: (20:10:10) at 630 kg. Weedkillers: Glyphosate at 1.4 kg in 200 l. Clopyralid at 0.05 kg, bromoxynil at 0.24 kg with mecoprop at 2.5 kg applied with the tridemorph in 200 l. Fungicides: Tridemorph at 0.52 kg. Triadimenol at 0.062 kg with tridemorph at 0.38 kg in 200 l.

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87/W/CS/34

Seed: Potatoes: Pentland Crown.
W. wheat: Avalon, sown at 210 kg.
S. barley: Klaxon, sown at 160 kg.

Cultivations, etc.:-
Potatoes (Series I and II): Glyphosate applied (Series II only): 19 Sept, 1986. Ploughed (Series II only): 21 Nov. Spring-tine cultivated: 18 Feb, 1987. NPK Mg applied: 21 Apr. Oxamyl applied (Series I only), rotary cultivated, potatoes planted: 27 Apr. Rotary ridged: 15 May. Linuron applied: 25 May. Mancozeb applied: 24 June, 8 July, 26 July, 5 Aug. Pirimicarb applied: 8 July. Fentin hydroxide applied: 18 Aug, 4 Sept. Desiccant applied: 18 Sept. Haulm mechanically destroyed: 1 Oct. Lifted; (Series I): 12 Oct, (Series II): 13 Oct.
W. wheat (Series IV): Spring-tine cultivated, rotary harrowed with crumbler attached, seed sown, harrowed: 4 Dec, 1986. N applied: 5 May, 1987. Weedkillers and tridemorph applied: 29 May. Triadimenol and tridemorph applied: 4 July. Combine harvested: 15 Sept.
S. barley (Series III): Glyphosate applied: 19 Sept, 1986. Ploughed: 21 Nov. Spring-tine cultivated: 18 Feb, 1987. NPK applied, spike harrowed with crumbler attached, seed sown: 19 Mar. Clopyralid, bromoxynil, mecoprop and tridemorph applied: 29 May. Triadimenol and tridemorph applied: 4 July. Combine harvested: 21 Aug.

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87/W/CS/34

POTATOES SERIES II

TOTAL TUBERS TONNES/HECTARE

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

RATE NEMACIDE[84]	SINGLE	DOUBLE	QUAD	Mean
ALDICARB	38.4	37.7	40.7	38.9
SDS38697	29.1	38.2	38.8	35.3
SDS46995	36.1	35.2	34.8	35.4
Mean	34.5	37.0	38.1	36.5

RATE NONE 30.6

Grand mean 35.9

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

Table	NEMACIDE[84]	RATE NEMACIDE[84]	RATE & RATE NONE
s.e.d.	1.22	1.22	2.11

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	18	2.58	7.2

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

RATE NEMACIDE[84]	SINGLE	DOUBLE	QUAD	Mean
ALDICARB	86.3	83.8	86.0	85.4
SDS38697	85.9	85.1	84.7	85.2
SDS46995	86.6	86.0	83.8	85.5
Mean	86.2	84.9	84.8	85.3

RATE NONE 83.7

Grand mean 85.2

PLOT AREA HARVESTED 0.00130

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87/W/CS/34

W. WHEAT SERIES IV

GRAIN TONNES/HECTARE

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

NEMACIDE[86]	
AL 3.3	4.39
AL 6.6	4.67
AL S 3.3	4.19
AL S 6.6	5.36
ETH 7.5	4.45
MB 5.0	4.39
MB 7.5	4.94
MB 10.0	5.39
OX 5.0	4.60
NONE	4.21
Mean	4.66

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

Table	NEMACIDE[86]
s.e.d.	0.498

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	18	0.610	13.1

GRAIN MEAN DM% 81.3

PLOT AREA HARVESTED 0.00251

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87/W/CS/34

S. BARLEY SERIES III

GRAIN TONNES/HECTARE

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

RATE NEMACIDE[85]	SINGLE	DOUBLE	QUAD	Mean
OXAMYL	5.10	4.79	4.86	4.92
SDS46995	5.16	4.96	4.88	5.00
THIODICA	4.98	4.92	5.23	5.04
Mean	5.08	4.89	4.99	4.99

RATE NONE 4.22

Grand mean 4.91

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

Table	NEMACIDE[85]	RATE NEMACIDE[85]	RATE & RATE NONE
s.e.d.	0.237	0.237	0.411

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	18	0.504	10.3

GRAIN MEAN DM% 88.1

PLOT AREA HARVESTED 0.00251

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87/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, D.J. Hooper, D. Hornby, R.T. Plumb.

The 14th year, forage maize.

For previous years see 74-86/R/CS/133.

Design: 3 randomised blocks of 9 plots.

Whole plot dimensions: 2.13 x 18.3.

Treatments:-

CHEM RES	Residual effect of chemicals applied annually in previous years (except as stated), none in 1987:
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, 1981 and 1986)
PERMETH	Permethrin, as foliar spray (in 1979, 1984 and 1985 only)
PHORATE	Phorate, 1.68 kg as granules to seedbed
PIRIMICA	Pirimicarb, as foliar spray (in 1979, 1984 and 1985 only)
BE+DA+PH	Benomyl + dazomet (not applied 1975, 1979, 1981, and 1986) + phorate, at above rates and times

Basal applications: Manure: 'Nitro-Chalk' at 550 kg. Weedkiller: Atrazine at 1.7 kg in 220 l.

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

Cultivations, etc.:- Ploughed: 24 Dec, 1986. N applied, spring-tine cultivated twice, seed sown: 6 May, 1987. Rolled, weedkiller applied: 7 May. Harvested by hand: 3 Nov.

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87/R/CS/133

FORAGE DRY MATTER TONNES/HECTARE

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

CHEM RES	
NONE	9.04
ALDICARB	9.30
BENOMYL	8.98
DAZOMET	10.06
PERMETH	9.05
PHORATE	9.00
PIRIMICA	8.85
BE+DA+PH	8.61
Mean	9.10

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

Table	CHEM RES	
s.e.d.	0.763	min.rep
	0.661	max-min

	CHEM RES
max-min	NONE v any of remainder
min.rep	any of remainder

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	17	0.935	10.3

FORAGE MEAN DM% 20.8

PLOT AREA HARVESTED 0.00065

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87/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: R.H. Bromilow, R. Macdonald.

The 14th year, s. barley.

For previous years see 74-86/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 from 1979 to 1984 at 0.72 kg in 1985 and at 0.54 kg in 1986
2.	FUNGCIDE[1]	Fungicide in autumn:
	NONE	None
	TRIADIM	Triadimefon at 0.25 kg in autumn 1981, 1982, 1984, 1985 and 1986, 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

NOTE: Glyphosate and triadimefon were applied in 220 l on 22 Sept, 1986 and 13 Oct respectively. Other treatments were applied on 19 Mar, 1987.

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Basal applications: Manures: (0:18:36) at 1060 kg, 'Nitro-Chalk' at 550 kg. Weedkillers: Bentazone at 0.80 kg, dichlorprop at 1.08 kg, and MCPA at 0.64 kg in 220 l applied with the fungicide. Fungicide: Tridemorph at 0.52 kg.

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

Cultivations, etc.:- PK applied: 16 Sept, 1986. Rotary cultivated: 13 Oct. Ploughed: 26 Nov. Spring-tine cultivated, seedbed treatments applied, rotary harrowed, seed sown and N applied: 19 Mar, 1987. Weedkillers and fungicide applied: 6 May. Combine harvested: 21 Aug.

GRAIN TONNES/HECTARE

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

FUNGCIDE[1]	NONE	TRIADIM	Mean
WEEDKLLR			
NONE	5.26	5.40	5.33
GLYPHOS	5.13	5.24	5.18
Mean	5.19	5.32	5.26

FUNGCIDE[2]	NONE	BENOMYL	Mean
WEEDKLLR			
NONE	5.42	5.24	5.33
GLYPHOS	5.26	5.10	5.18
Mean	5.34	5.17	5.26

FUNGCIDE[2]	NONE	BENOMYL	Mean
FUNGCIDE[1]			
NONE	5.35	5.04	5.19
TRIADIM	5.34	5.30	5.32
Mean	5.34	5.17	5.26

INSCTCDE	NONE	CHLORFEN	Mean
WEEDKLLR			
NONE	5.31	5.35	5.33
GLYPHOS	5.26	5.10	5.18
Mean	5.29	5.23	5.26

INSCTCDE	NONE	CHLORFEN	Mean
FUNGCIDE[1]			
NONE	5.31	5.08	5.19
TRIADIM	5.26	5.37	5.32
Mean	5.29	5.23	5.26

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87/R/CS/140

GRAIN TONNES/HECTARE

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

INSCTCDE / FUNGCIDE[2]	NONE	CHLORFEN	Mean
NONE	5.33	5.36	5.34
BENOMYL	5.24	5.09	5.17
Mean	5.29	5.23	5.26

NEMACIDE / WEEDKLLR	NONE	ALDICARB	Mean
NONE	5.45	5.21	5.33
GLYPHOS	5.21	5.15	5.18
Mean	5.33	5.18	5.26

NEMACIDE / FUNGCIDE[1]	NONE	ALDICARB	Mean
NONE	5.23	5.16	5.19
TRIADIM	5.42	5.21	5.32
Mean	5.33	5.18	5.26

NEMACIDE / FUNGCIDE[2]	NONE	ALDICARB	Mean
NONE	5.46	5.23	5.34
BENOMYL	5.20	5.14	5.17
Mean	5.33	5.18	5.26

NEMACIDE / INSCTCDE	NONE	ALDICARB	Mean
NONE	5.38	5.19	5.29
CHLORFEN	5.27	5.18	5.23
Mean	5.33	5.18	5.26

WEEDKLLR	FUNGCIDE[2] / FUNGCIDE[1]	NONE	BENOMYL
NONE	NONE	5.41	5.11
	TRIADIM	5.44	5.36
GLYPHOS	NONE	5.29	4.96
	TRIADIM	5.23	5.24

WEEDKLLR	INSCTCDE / FUNGCIDE[1]	NONE	CHLORFEN
NONE	NONE	5.22	5.30
	TRIADIM	5.40	5.40
GLYPHOS	NONE	5.39	4.86
	TRIADIM	5.13	5.34

https://doi.org/10.23637/ERADOC-1-37

87/R/CS/140

GRAIN TONNES/HECTARE

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

	INSCTCDE	NONE	CHLORFEN
WEEDKLLR	FUNGCIDE[2]		
NONE	NONE	5.40	5.45
	BENOMYL	5.22	5.26
GLYPHOS	NONE	5.26	5.27
	BENOMYL	5.27	4.93

	INSCTCDE	NONE	CHLORFEN
FUNGCIDE[1]	FUNGCIDE[2]		
NONE	NONE	5.39	5.31
	BENOMYL	5.23	4.85
TRIADIM	NONE	5.26	5.41
	BENOMYL	5.26	5.34

	NEMACIDE	NONE	ALDICARB
WEEDKLLR	FUNGCIDE[1]		
NONE	NONE	5.34	5.19
	TRIADIM	5.56	5.24
GLYPHOS	NONE	5.13	5.13
	TRIADIM	5.29	5.18

	NEMACIDE	NONE	ALDICARB
WEEDKLLR	FUNGCIDE[2]		
NONE	NONE	5.55	5.29
	BENOMYL	5.34	5.14
GLYPHOS	NONE	5.36	5.17
	BENOMYL	5.06	5.14

	NEMACIDE	NONE	ALDICARB
FUNGCIDE[1]	FUNGCIDE[2]		
NONE	NONE	5.50	5.20
	BENOMYL	4.96	5.11
TRIADIM	NONE	5.41	5.26
	BENOMYL	5.43	5.17

	NEMACIDE	NONE	ALDICARB
WEEDKLLR	INSCTCDE		
NONE	NONE	5.42	5.20
	CHLORFEN	5.47	5.23
GLYPHOS	NONE	5.35	5.18
	CHLORFEN	5.07	5.13

	NEMACIDE	NONE	ALDICARB
FUNGCIDE[1]	INSCTCDE		
NONE	NONE	5.35	5.26
	CHLORFEN	5.11	5.05
TRIADIM	NONE	5.42	5.11
	CHLORFEN	5.43	5.32

https://doi.org/10.23637/ERADOC-1-37

87/R/CS/140

GRAIN TONNES/HECTARE

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

FUNGCIDE[2]	NEMACIDE INSCTCDE	NONE	ALDICARB
NONE	NONE	5.43	5.23
	CHLORFEN	5.49	5.23
BENOMYL	NONE	5.34	5.15
	CHLORFEN	5.06	5.13

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

Margins of two factor tables	0.151
Two factor tables	0.214
Three factor tables	0.303

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

Stratum	d.f.	s.e.	cv%
WP	6	0.428	8.1

GRAIN MEAN DM% 87.6

PLOT AREA HARVESTED 0.00075

https://doi.org/10.23637/ERADOC-1-37

87/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, second and third w. wheats after a break - Great Harpenden I.

Sponsors: D. Hornby, R.J. Gutteridge.

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

For previous years see 78-86/R/CS/212.

Design: 3 randomised blocks of 8 plots.

Whole plot dimensions: 5.33 x 10.7.

Treatments:

PREVCROP Previous crops before w. wheat 1987:

	1984	1985	1986
CONT W	W	W	W
FIRST W	W	BE	W
SECOND W	BE	W	W
THIRD W	W	W	W
BEANS 1	W	W	BE (duplicated)
BEANS 2	W	BE	BE

BE = s. beans, W = w. wheat

NOTE: One additional crop sequence was in s. beans 1987, yields not taken.

Standard applications:
W. wheat: Manures: Chalk at 5.0 t. 'Nitram' at 410 kg. Weedkillers: Isoproturon at 2.5 kg in 200 l. Fluroxypyr at 0.20 kg with clopyralid at 0.05 kg and bromoxynil at 0.24 kg in 500 l.

Seed: W. wheat: Avalon, sown at 180 kg.
S. beans: Minden, sown at 260 kg.

Cultivations, etc.:-
Both crops: Chalk applied: 24 Sept, 1986. Ploughed: 29 Sept. Rotary harrowed: 30 Sept.
W. wheat: Seed sown: 1 Oct, 1986. Isoproturon applied: 14 Apr, 1987. N applied: 17 Apr. Remaining weedkillers applied: 21 Apr. Combine harvested: 1 Sept.
S. beans: Rotary harrowed: 20 Mar, 1987. Seed sown: 31 Mar. Hand hoed: 27 May. Combine harvested: 21 Sept.

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

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87/R/CS/212

GRAIN TONNES/HECTARE

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

PREVCROP	CONT W	FIRST W	SECOND W	THIRD W	BEANS 1	BEANS 2	Mean
	4.63	4.90	4.68	5.07	5.24	6.00	5.11

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

Table	PREVCROP	
s.e.d.	0.351	min.rep
	0.304	max-min

	PREVCROP
max-min	BEANS 1 v any of the remainder
min.rep	any of the remainder

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	13	0.430	8.4

GRAIN MEAN DM% 85.4

PLOT AREA HARVESTED 0.00303

https://doi.org/10.23637/ERADOC-1-37 *pp 21*

87/W/CS/245

MINIMUM CULTIVATION AND DEEP PK

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

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

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

For previous years see 80-86/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 SB1	Series I, s. barley in rotation after w. oilseed rape, w. wheat
	SER2 WW10	Series II, w. wheat, tenth cereal after a break crop
	SER3 WB10	Series III, w. barley, tenth 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
	1980/3/6	In autumn 1979, autumn 1982 and autumn 1985
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)

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87/W/CS/245

Row plots:

5. N PATH — Nitrogen fertilizer as 'Nitram' in spring, and pathogen control:

W. wheat

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

S. & W. barley

75 ENHD	75 kg N enhanced pathogen control
150 ENHD	150 kg N enhanced pathogen control
150/225E	150 kg N enhanced pathogen control (225 kg N in previous years)
150 STND	150 kg N standard pathogen control

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

EXTRA

TPK 80 D	PK applied to topsoil and mouldboard ploughed in autumn 1979, direct drilled since
TPK 80 C	PK as above, mouldboard ploughed, conventionally drilled each year

NOTES: (1) Rates of extra P and K were 500 kg P2O5, as superphosphate, 250 kg K2O as muriate of potash.
(2) Subsoiling was done with the Wye double-digger which turns a furrow with a conventional plough share, to a depth of 23 cm, and at the same time rotary cultivates the bottom of the adjacent furrow to a further depth of 15 cm. When applying P and K this was distributed ahead of the rotary cultivator.
(3) The topsoil PK dressing was equally divided before and after ploughing.
(4) Standard pathogen control in 1987 was conventional seed dressing and, on Series II only, methiocarb pellets at sowing. Enhanced pathogen control had in addition, propiconazole at 0.25 kg in 200 l applied on 29 June, 1987, and, on Series II and III only, prochloraz at 0.40 kg in 200 l applied on 27 May.
(5) All plots with the combination YEAR 1980/3/6; DRILL DIRECT were mouldboard ploughed and conventionally drilled in error in 1987.

Standard applications:
Series I, s. barley: Manures: (5:14:30) at 340 kg. Weedkillers: Paraquat at 0.40 kg ion in 200 l on two occasions. Clopyralid at 0.05 kg, bromoxynil at 0.34 kg with mecoprop at 2.5 kg in 200 l.
Series II, w. wheat: Manures: (5:14:30) at 340 kg. Weedkillers: Paraquat at 0.40 kg ion in 200 l. Isoproturon at 1.5 kg, clopyralid at 0.05 kg, bromoxynil at 0.34 kg and mecoprop at 2.5 kg in 240 l. Growth regulator: Chlormequat chloride at 1.1 kg in 200 l.

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Series III, w. barley: Manures: (5:14:30) at 340 kg. Weedkillers: Paraquat at 0.40 kg ion in 200 l. Isoproturon at 1.5 kg, clopyralid at 0.05 kg, bromoxynil at 0.34 kg and mecoprop at 2.5 kg in 240 l. Growth regulators: Mepiquat chloride at 0.61 kg, 2-chloroethylphosphonic acid at 0.31 kg applied with a wetting agent ('Citowett' at 0.8 l) in 200 l.

Seed: Series I, s. barley: Klaxon, sown at 160 kg.
Series II, w. wheat: Avalon, with methiocarb pellets, sown at 200 kg.
Series III: W. barley: Igri, sown at 180 kg.

Cultivations, etc.:-
Series I, s. barley: Straw burnt: 8 Sept, 1986. Heavy spring-tine cultivated: 9 Sept. Ploughed treatment applied: 12 Sept. These plots disced twice: 18 Sept. These plots rolled: 19 Sept. Disced: 27 Sept. Spike harrowed with crumbler attached: 2 Oct. Rolled: 3 Oct. Paraquat applied: 3 Nov, 16 Mar, 1987. Spike harrowed with crumbler attached, seed sown, NPK applied: 16 Mar. N treatments applied: 1 May. Clopyralid, bromoxynil and mecoprop applied: 27 May. Combine harvested: 8 Sept.
Series II, w. wheat: Straw burnt: 8 Sept, 1986. Heavy spring-tine cultivated: 9 Sept. Ploughed treatment applied: 12-15 Sept. These plots disced four times: 18 Sept. These plots rolled: 19 Sept. Disced: 27 Sept. Rotary harrowed: 2 Oct. Rolled: 3 Oct. Paraquat applied: 3 Nov. Seed sown, NPK applied, harrowed: 7 Nov. Isoproturon, clopyralid, bromoxynil and mecoprop applied: 27 Apr. N treatments applied: 1 May. Growth regulator applied: 27 May. Combine harvested: 14 Sept.
Series III, w. barley: Straw burnt: 8 Sept, 1986. Heavy spring-tine cultivated: 9 Sept. Ploughed treatment applied: 15 Sept. These plots disced twice: 18 Sept. These plots rolled: 19 Sept. Disced: 27 Sept. Spike harrowed with crumbler attached: 2 Oct. Rolled: 3 Oct. Paraquat applied: 3 Nov. Seed sown, NPK applied, harrowed: 5 Dec. Isoproturon, clopyralid, bromoxynil and mecoprop applied: 27 Apr, 1987. N treatments applied: 1 May. Growth regulators applied: 27 May. Combine harvested: 10 Sept.

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87/W/CS/245 SPRING BARLEY SERIES I

GRAIN TONNES/HECTARE

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

PK SUB N PATH	---	--S	PKS	Mean
75 ENHD	5.11	4.67	4.13	4.63
150 ENHD	4.71	4.07	4.48	4.42
150/225E	4.64	4.41	4.33	4.46
150 STND	4.27	4.23	3.56	4.02
Mean	4.68	4.35	4.12	4.38

YEAR N PATH	1980	1980/3/6	Mean
75 ENHD	5.13	4.14	4.63
150 ENHD	4.49	4.35	4.42
150/225E	4.70	4.22	4.46
150 STND	4.05	3.99	4.02
Mean	4.59	4.18	4.38

YEAR PK SUB	1980	1980/3/6	Mean
---	4.72	4.64	4.68
--S	4.81	3.89	4.35
PKS	4.24	4.01	4.12
Mean	4.59	4.18	4.38

DRILL N PATH	CNVNTIAL	DIRECT	Mean
75 ENHD	4.23	4.84	4.63
150 ENHD	4.23	4.52	4.42
150/225E	4.03	4.67	4.46
150 STND	3.86	4.10	4.02
Mean	4.09	4.53	4.38

DRILL PK SUB	CNVNTIAL	DIRECT	Mean
---	4.42	4.81	4.68
--S	3.86	4.59	4.35
PKS	3.99	4.19	4.12
Mean	4.09	4.53	4.38

DRILL YEAR	CNVNTIAL	DIRECT	Mean
1980	4.39	4.69	4.59
1980/3/6	3.78	4.37	4.18
Mean	4.09	4.53	4.38

https://doi.org/10.23637/ERADOC-1-37

87/W/CS/245 SPRING BARLEY SERIES I

GRAIN TONNES/HECTARE

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

PK SUB	---		--S		PKS	
YEAR	1980	1980/3/6	1980	1980/3/6	1980	1980/3/6
N PATH						
75 ENHD	5.05	5.16	5.52	3.83	4.81	3.44
150 ENHD	4.73	4.69	4.26	3.89	4.47	4.48
150/225E	4.70	4.57	5.16	3.66	4.24	4.43
150 STND	4.42	4.13	4.29	4.17	3.45	3.68

PK SUB	---		--S		PKS	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH						
75 ENHD	4.27	5.52	4.57	4.72	3.86	4.26
150 ENHD	4.61	4.76	3.62	4.30	4.46	4.49
150/225E	4.31	4.80	3.66	4.79	4.12	4.44
150 STND	4.49	4.17	3.58	4.56	3.51	3.59

YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	4.89	5.25	3.58	4.42
150 ENHD	4.26	4.60	4.20	4.43
150/225E	4.55	4.77	3.51	4.58
150 STND	3.87	4.14	3.85	4.07

YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
PK SUB				
---	4.58	4.80	4.26	4.83
--S	4.45	4.99	3.27	4.20
PKS	4.15	4.29	3.82	4.10

PK SUB	---			
YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	4.62	5.27	3.92	5.78
150 ENHD	4.74	4.73	4.49	4.79
150/225E	4.78	4.65	3.84	4.94
150 STND	4.19	4.53	4.79	3.80

PK SUB	--S			
YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	5.81	5.37	3.33	4.08
150 ENHD	3.52	4.63	3.73	3.97
150/225E	4.40	5.54	2.92	4.04
150 STND	4.07	4.41	3.09	4.71

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87/W/CS/245 SPRING BARLEY SERIES I

GRAIN TONNES/HECTARE

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

PK SUB YEAR DRILL N PATH	PKS 1980 CNVNTIAL	DIRECT	1980/3/6 CNVNTIAL	DIRECT
75 ENHD	4.24	5.10	3.47	3.42
150 ENHD	4.54	4.44	4.38	4.53
150/225E	4.47	4.12	3.77	4.76
150 STND	3.36	3.49	3.67	3.68

N PATH EXTRA	75 ENHD	150 ENHD	150/225E	150 STND	Mean
TPK 80 D	5.03	5.47	5.44	3.93	4.97
TPK 80 C	4.48	3.93	4.35	4.82	4.40
Mean	4.75	4.70	4.90	4.38	4.68

N PATH	PK SUB	YEAR DRILL	1980 CNVNTIAL	DIRECT	1980/3/6 CNVNTIAL	DIRECT
75 ENHD	---		4.62	5.27	3.92	5.78
	--S		5.81	5.37	3.33	4.08
	PKS		4.24	5.10	3.47	3.42
150 ENHD	---		4.74	4.73	4.49	4.79
	--S		3.52	4.63	3.73	3.97
	PKS		4.54	4.44	4.38	4.53
150/225E	---		4.78	4.65	3.84	4.94
	--S		4.40	5.54	2.92	4.04
	PKS		4.47	4.12	3.77	4.76
150 STND	---		4.19	4.53	4.79	3.80
	--S		4.07	4.41	3.09	4.71
	PKS		3.36	3.49	3.67	3.68

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

Table	EXTRA	PK SUB	YEAR	DRILL	
s.e.d.	0.568	0.232	0.189	0.201	
Table	N PATH* PK SUB	N PATH* YEAR	PK SUB YEAR	N PATH* DRILL	
s.e.d.	0.365	0.298	0.328	0.316	
Table	PK SUB DRILL	YEAR DRILL	N PATH* EXTRA	N PATH* PK SUB YEAR	
s.e.d.	0.402	0.328			min rep
	0.348	0.284	0.894	0.516	max-min
	0.284	0.232			max rep
Table	N PATH* PK SUB DRILL	N PATH* YEAR DRILL	PK SUB YEAR DRILL	N PATH* PK SUB YEAR DRILL	
s.e.d.	0.632	0.516	0.568	0.894	min rep
	0.547	0.447	0.492	0.774	max-min
	0.447	0.365	0.402	0.632	max rep

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87/W/CS/245 SPRING BARLEY SERIES I

GRAIN TONNES/HECTARE

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

* 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	d.f.	s.e.	cv%
WP1	6	0.402	9.1
WP1.WP2	18	0.563	12.8

GRAIN MEAN DM% 80.0

SUB PLOT AREA HARVESTED 0.00341

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87/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

PK SUB N PATH	---	--S	PKS	Mean
75 ENHD	4.13	3.78	3.94	3.95
150 ENHD	4.66	4.43	4.56	4.55
225 ENHD	5.27	4.94	5.07	5.09
150 STND	3.77	3.62	3.30	3.56
Mean	4.46	4.19	4.22	4.29

YEAR N PATH	1980	1980/3/6	Mean
75 ENHD	3.87	4.03	3.95
150 ENHD	4.37	4.73	4.55
225 ENHD	4.85	5.34	5.09
150 STND	3.10	4.02	3.56
Mean	4.05	4.53	4.29

YEAR PK SUB	1980	1980/3/6	Mean
---	4.39	4.52	4.46
--S	3.91	4.47	4.19
PKS	3.84	4.60	4.22
Mean	4.05	4.53	4.29

DRILL N PATH	CNVNTIAL	DIRECT	Mean
75 ENHD	3.93	3.96	3.95
150 ENHD	4.52	4.56	4.55
225 ENHD	5.18	5.05	5.09
150 STND	4.07	3.31	3.56
Mean	4.43	4.22	4.29

DRILL PK SUB	CNVNTIAL	DIRECT	Mean
---	4.38	4.49	4.46
--S	4.42	4.08	4.19
PKS	4.48	4.08	4.22
Mean	4.43	4.22	4.29

DRILL YEAR	CNVNTIAL	DIRECT	Mean
1980	4.54	3.80	4.05
1980/3/6	4.32	4.63	4.53
Mean	4.43	4.22	4.29

https://doi.org/10.23637/ERADOC-1-37

87/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

PK SUB	---		--S		PKS	
YEAR	1980	1980/3/6	1980	1980/3/6	1980	1980/3/6
N PATH						
75 ENHD	4.04	4.21	3.69	3.87	3.86	4.02
150 ENHD	4.71	4.61	4.31	4.55	4.09	5.02
225 ENHD	5.15	5.39	4.71	5.17	4.70	5.45
150 STND	3.67	3.86	2.94	4.30	2.69	3.90

PK SUB	---		--S		PKS	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH						
75 ENHD	3.94	4.22	3.83	3.76	4.04	3.89
150 ENHD	4.42	4.78	4.47	4.41	4.66	4.50
225 ENHD	5.20	5.30	5.22	4.80	5.13	5.05
150 STND	3.97	3.67	4.16	3.35	4.09	2.90

YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	4.05	3.77	3.82	4.14
150 ENHD	4.48	4.32	4.56	4.81
225 ENHD	5.53	4.51	4.84	5.59
150 STND	4.09	2.61	4.06	4.00

YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
PK SUB				
---	4.71	4.23	4.05	4.75
--S	4.47	3.63	4.37	4.53
PKS	4.42	3.54	4.54	4.63

PK SUB	---			
YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	4.07	4.03	3.80	4.42
150 ENHD	4.53	4.81	4.32	4.75
225 ENHD	6.00	4.72	4.40	5.89
150 STND	4.26	3.38	3.67	3.96

PK SUB	--S			
YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	3.89	3.60	3.77	3.92
150 ENHD	4.65	4.14	4.30	4.68
225 ENHD	5.30	4.41	5.14	5.19
150 STND	4.06	2.38	4.27	4.31

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87/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

PK SUB YEAR DRILL N PATH	PKS 1980 CNVNTIAL	DIRECT	1980/3/6 CNVNTIAL	DIRECT
75 ENHD	4.20	3.69	3.88	4.09
150 ENHD	4.25	4.02	5.07	4.99
225 ENHD	5.29	4.40	4.96	5.69
150 STND	3.93	2.07	4.25	3.73

N PATH EXTRA	75 ENHD	150 ENHD	225 ENHD	150 STND	Mean
TPK 80 D	4.37	4.80	4.93	3.53	4.41
TPK 80 C	4.02	4.16	5.10	4.36	4.41
Mean	4.19	4.48	5.01	3.95	4.41

N PATH	PK SUB	YEAR DRILL	1980 CNVNTIAL	DIRECT	1980/3/6 CNVNTIAL	DIRECT
75 ENHD	---		4.07	4.03	3.80	4.42
	--S		3.89	3.60	3.77	3.92
	PKS		4.20	3.69	3.88	4.09
150 ENHD	---		4.53	4.81	4.32	4.75
	--S		4.65	4.14	4.30	4.68
	PKS		4.25	4.02	5.07	4.99
225 ENHD	---		6.00	4.72	4.40	5.89
	--S		5.30	4.41	5.14	5.19
	PKS		5.29	4.40	4.96	5.69
150 STND	---		4.26	3.38	3.67	3.96
	--S		4.06	2.38	4.27	4.31
	PKS		3.93	2.07	4.25	3.73

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

Table	EXTRA	PK SUB	YEAR	DRILL	
s.e.d.	0.860	0.351	0.287	0.304	
Table	N PATH* PK SUB	N PATH* YEAR	PK SUB YEAR	N PATH* DRILL	
s.e.d.	0.408	0.333	0.496	0.354	
Table	PK SUB DRILL	YEAR DRILL	N PATH* EXTRA	N PATH* PK SUB YEAR	
s.e.d.	0.608	0.496			min rep
	0.527	0.430	1.000	0.578	max-min
	0.430	0.351			max rep
Table	N PATH* PK SUB DRILL	N PATH* YEAR DRILL	PK SUB YEAR DRILL	N PATH* PK SUB YEAR DRILL	
s.e.d.	0.707	0.576	0.860	1.000	min rep
	0.613	0.500	0.745	0.866	max-min
	0.500	0.408	0.608	0.707	max rep

https://doi.org/10.23637/ERADOC-1-37 *pp 31*

87/W/CS/245 WINTER WHEAT SERIES II

GRAIN TONNES/HECTARE

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

* 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	d.f.	s.e.	cv%
WP1	6	0.608	14.1
WP1.WP2	18	0.418	9.7

GRAIN MEAN DM% 80.0

SUB PLOT AREA HARVESTED 0.00341

https://doi.org/10.23637/ERADOC-1-37

87/W/CS/245 WINTER BARLEY SERIES III

GRAIN TONNES/HECTARE

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

PK SUB N PATH	---	--S	PKS	Mean
75 ENHD	4.13	4.47	4.78	4.46
150 ENHD	5.35	5.41	5.48	5.41
150/225E	5.34	5.31	5.40	5.35
150 STND	4.52	4.53	4.46	4.51
Mean	4.83	4.93	5.03	4.93

YEAR N PATH	1980	1980/3/6	Mean
75 ENHD	4.41	4.50	4.46
150 ENHD	5.50	5.32	5.41
150/225E	5.59	5.11	5.35
150 STND	4.57	4.44	4.51
Mean	5.02	4.84	4.93

YEAR PK SUB	1980	1980/3/6	Mean
---	5.02	4.65	4.83
--S	5.05	4.81	4.93
PKS	4.98	5.07	5.03
Mean	5.02	4.84	4.93

DRILL N PATH	CNVNTIAL	DIRECT	Mean
75 ENHD	4.46	4.46	4.46
150 ENHD	5.18	5.53	5.41
150/225E	4.96	5.55	5.35
150 STND	4.14	4.69	4.51
Mean	4.68	5.06	4.93

DRILL PK SUB	CNVNTIAL	DIRECT	Mean
---	4.52	4.99	4.83
--S	4.75	5.02	4.93
PKS	4.77	5.16	5.03
Mean	4.68	5.06	4.93

DRILL YEAR	CNVNTIAL	DIRECT	Mean
1980	4.62	5.22	5.02
1980/3/6	4.74	4.90	4.84
Mean	4.68	5.06	4.93

https://doi.org/10.23637/ERADOC-1-37

87/W/CS/245 WINTER BARLEY SERIES III

GRAIN TONNES/HECTARE

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

PK SUB	---		--S		PKS	
YEAR	1980	1980/3/6	1980	1980/3/6	1980	1980/3/6
N PATH						
75 ENHD	3.89	4.36	4.61	4.32	4.73	4.83
150 ENHD	5.42	5.28	5.57	5.25	5.52	5.43
150/225E	5.87	4.82	5.50	5.13	5.40	5.39
150 STND	4.92	4.12	4.51	4.56	4.28	4.64

PK SUB	---		--S		PKS	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH						
75 ENHD	4.29	4.04	4.49	4.45	4.59	4.88
150 ENHD	4.83	5.60	5.39	5.43	5.31	5.56
150/225E	4.92	5.56	4.87	5.53	5.09	5.55
150 STND	4.05	4.76	4.25	4.67	4.10	4.64

YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	4.42	4.41	4.49	4.51
150 ENHD	5.11	5.70	5.25	5.36
150/225E	4.95	5.91	4.97	5.18
150 STND	4.02	4.84	4.25	4.54

YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
PK SUB				
---	4.77	5.15	4.28	4.83
--S	4.52	5.31	4.99	4.73
PKS	4.59	5.18	4.95	5.13

PK SUB	---			
YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	4.43	3.63	4.15	4.46
150 ENHD	5.06	5.60	4.60	5.61
150/225E	5.24	6.18	4.60	4.93
150 STND	4.34	5.21	3.76	4.31

PK SUB	--S			
YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	4.46	4.69	4.53	4.22
150 ENHD	4.99	5.86	5.79	4.99
150/225E	4.75	5.87	4.99	5.19
150 STND	3.86	4.83	4.64	4.52

https://doi.org/10.23637/ERADOC-1-37 *pp 34*

87/W/CS/245 WINTER BARLEY SERIES III

GRAIN TONNES/HECTARE

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

PK SUB	PKS			
YEAR	1980		1980/3/6	
DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
N PATH				
75 ENHD	4.39	4.90	4.79	4.85
150 ENHD	5.28	5.64	5.34	5.48
150/225E	4.85	5.68	5.32	5.42
150 STND	3.84	4.49	4.36	4.79

N PATH	75 ENHD	150 ENHD	150/225E	150 STND	Mean
EXTRA					
TPK 80 D	4.87	5.89	6.34	5.01	5.53
TPK 80 C	4.16	4.72	4.77	4.37	4.50
Mean	4.51	5.30	5.56	4.69	5.02

		YEAR	1980		1980/3/6	
N PATH	PK SUB	DRILL	CNVNTIAL	DIRECT	CNVNTIAL	DIRECT
75 ENHD	---		4.43	3.63	4.15	4.46
	--S		4.46	4.69	4.53	4.22
	PKS		4.39	4.90	4.79	4.85
150 ENHD	---		5.06	5.60	4.60	5.61
	--S		4.99	5.86	5.79	4.99
	PKS		5.28	5.64	5.34	5.48
150/225E	---		5.24	6.18	4.60	4.93
	--S		4.75	5.87	4.99	5.19
	PKS		4.85	5.68	5.32	5.42
150 STND	---		4.34	5.21	3.76	4.31
	--S		3.86	4.83	4.64	4.52
	PKS		3.84	4.49	4.36	4.79

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

Table	EXTRA	PK SUB	YEAR	DRILL	
s.e.d.	0.438	0.179	0.146	0.155	
Table	N PATH* PK SUB	N PATH* YEAR	PK SUB YEAR	N PATH* DRILL	
s.e.d.	0.250	0.204	0.253	0.216	
Table	PK SUB DRILL	YEAR DRILL	N PATH* EXTRA	N PATH* PK SUB YEAR	
s.e.d.	0.310	0.253			min rep
	0.268	0.219	0.611	0.353	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	
s.e.d.	0.432	0.354	0.438	0.611	min rep
	0.374	0.306	0.379	0.529	max-min
	0.306	0.250	0.310	0.432	max rep

https://doi.org/10.23637/ERADOC-1-37

87/W/CS/245 WINTER BARLEY SERIES III

GRAIN TONNES/HECTARE

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

* 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	d.f.	s.e.	cv%
WP1	6	0.310	6.3
WP1.WP2	18	0.348	7.0

GRAIN MEAN DM% 83.1

SUB PLOT AREA HARVESTED 0.00341

https://doi.org/10.23637/ERADOC-1-37 *pp 36*

87/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, D.A. Govier, I.F. Henderson, G.A. Hide.

The sixth year, s. barley, potatoes.

For previous years see 82-86/W/CS/273.

Design: In the sixth year: 2 randomised blocks of 4 plots split into 8.

Whole plot dimensions: 9.00 x 24.7.

Treatments: All combinations of:-

Whole plots

1. VAR SEQ — Sequence of potato varieties in 1983, 1985 and 1987, all s. barley in 1982, 1984 and 1986:

	1983	1985	1987
D P D	Desiree	Maris Piper	Desiree
D D D	Desiree	Desiree	Desiree
D O D	Desiree	None (s. barley)	Desiree
O O D	None (s. barley)	None (s. barley)	Desiree

Sub plots, two replicates of:-

2. SD TREAT — Seed treatment:

NONE	None
TOL+PRO	Tolclofos methyl at 250 g and prochloraz at 35 g per tonne of tubers

3. NEMACIDE — Nematicide:

NONE	None
OXAMYL	Oxamyl at 5.0 kg worked in to seedbed

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):

6 July	12
10 July	12
Total	24

https://doi.org/10.23637/ERADOC-1-37

87/W/CS/273

Standard applications:
Potatoes: Manures: (0:18:36) at 420 kg, (10:10:15+4.5 Mg) at 2900 kg. Weedkiller: Linuron at 1.6 kg in 200 l. Fungicides: Mancozeb at 1.4 kg in 200 l on four occasions, with the pirimicarb on the second. Fentin hydroxide at 0.28 kg in 200 l on two occasions. Insecticide: Pirimicarb at 0.14 kg. Desiccant: Diquat at 0.80 kg ion in 200 l.
S. barley: Manure: 'Nitram' at 230 kg. Fungicides: Propiconazole at 0.12 kg with tridemorph at 0.19 kg in 200 l.

Seed: Potatoes: Desiree, phorate applied at planting.
S. barley: Triumph, dressed triadimenol and fuberidazole, sown at 160 kg.

Cultivations, etc.:-
Potatoes: PK applied: 29 Jan, 1987. Ploughed: 11 Mar. NPK Mg applied: 22 Apr. Subsoiled with 25 cm wide wings on tines 38 cm deep and 66 cm apart, oxamyl applied and rotary cultivated: 23 Apr. Potatoes planted: 24 Apr. Rotary ridged: 15 May. Linuron applied: 22 May. Mancozeb applied: 24 June, 26 July, 5 Aug. Mancozeb applied with pirimicarb: 8 July. Fentin hydroxide applied: 18 Aug, 4 Sept. Desiccant applied: 18 Sept. Haulm mechanically destroyed: 1 Oct. Lifted: 2 Oct.
S. barley: Deep-tine cultivated: 30 Jan, 1987. Ploughed: 11 Mar. Subsoiled with 25 cm wide wings on tines 38 cm deep and 66 cm apart: 23 Apr. Spike harrowed with crumbler attached, seed sown: 30 Apr. N applied: 6 May. Fungicides applied: 3 July. Combine harvested: 10 Sept.

NOTE: Soil samples were taken before nematicides were applied and after harvest for cyst and egg counts of Globodera pallida.

https://doi.org/10.23637/ERADOC-1-37

87/W/CS/273

TOTAL TUBERS TONNES/HECTARE

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

SD TREAT VAR SEQ	NONE	TOL+PRO	Mean
D P D	43.0	43.1	43.1
D D D	44.6	43.7	44.2
D O D	50.7	42.7	46.7
O O D	58.4	59.4	58.9
Mean	49.2	47.2	48.2

NEMACIDE VAR SEQ	NONE	OXAMYL	Mean
D P D	37.0	49.1	43.1
D D D	34.8	53.5	44.2
D O D	37.6	55.8	46.7
O O D	57.3	60.4	58.9
Mean	41.7	54.7	48.2

NEMACIDE SD TREAT	NONE	OXAMYL	Mean
NONE	42.4	55.9	49.2
TOL+PRO	41.0	53.5	47.2
Mean	41.7	54.7	48.2

SD TREAT	NONE		TOL+PRO	
NEMACIDE	NONE	OXAMYL	NONE	OXAMYL
VAR SEQ				
D P D	37.9	48.1	36.1	50.2
D D D	33.9	55.2	35.8	51.7
D O D	40.7	60.6	34.4	51.0
O O D	56.9	59.8	57.8	61.1

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

Table	SD TREAT	NEMACIDE	VAR SEQ* SD TREAT
s.e.d.	1.16	1.16	2.31

Table	VAR SEQ* NEMACIDE	SD TREAT NEMACIDE	VAR SEQ* SD TREAT NEMACIDE
s.e.d.	2.31	1.64	3.27

* Within the same level of VAR SEQ only

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP.SP	44	4.63	9.6

https://doi.org/10.23637/ERADOC-1-37

87/W/CS/273

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

SD TREAT	NONE	TOL+PRO	Mean
VAR SEQ			
D P D	62.3	67.4	64.9
D D D	66.0	64.1	65.1
D O D	73.3	64.0	68.6
O O D	79.7	77.7	78.7
Mean	70.3	68.3	69.3

NEMACIDE	NONE	OXAMYL	Mean
VAR SEQ			
D P D	59.3	70.4	64.9
D D D	56.0	74.2	65.1
D O D	60.8	76.4	68.6
O O D	78.2	79.2	78.7
Mean	63.6	75.0	69.3

NEMACIDE	NONE	OXAMYL	Mean
SD TREAT			
NONE	64.8	75.9	70.3
TOL+PRO	62.4	74.2	68.3
Mean	63.6	75.0	69.3

SD TREAT	NONE		TOL+PRO	
NEMACIDE	NONE	OXAMYL	NONE	OXAMYL
VAR SEQ				
D P D	59.1	65.6	59.6	75.2
D D D	55.3	76.8	56.6	71.6
D O D	66.5	80.0	55.2	72.8
O O D	78.2	81.1	78.1	77.3

PLOT AREA HARVESTED 0.00075

https://doi.org/10.23637/ERADOC-1-37

87/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 third years, w. wheat.

For previous years see 85-86/R/CS/302.

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 applied cumulatively to 1985 and 1986 treatments:

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, applied in first year only:

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 500 l on 12 Nov, 1986 repeated in 200 l on 14 Apr, 1987.
(2) The eyespot inoculum was colonised on oat seed and this was broadcast in October, 1984.

Basal applications: Manures: 'Nitram' at 590 kg. Weedkillers: Paraquat at 0.60 kg ion in 200 l. Isoproturon at 2.5 kg with clopyralid at 0.07 kg, bromoxynil at 0.34 kg and mecoprop at 2.5 kg in 200 l.

Seed: Avalon, sown at 180 kg.

Cultivations, etc.:- Heavy spring-tine cultivated twice: 27 Aug, 1986. Paraquat applied: 18 Sept. Disced, rotary harrowed, seed sown: 30 Sept. Remaining weedkillers applied: 16 Apr, 1987. N applied: 17 Apr. Combine harvested: 1 Sept.

NOTE: Yields were not taken. Eyespot and sharp eyespot were assessed in April and July. Eyespot was characterized according to type and MBC resistance.

https://doi.org/10.23637/ERADOC-1-37

87/R/CS/309 and 87/W/CS/309

LONG-TERM STRAW INCORPORATION

Object: To study the effects 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, M.J. Goss, R.J. Gutteridge, S.H.T. Harper, J.F. Jenkyn, A.E. Johnston, B.R. Kerry, R. Moffitt, W. Powell, A.D. Todd.

Associate sponsors: D.S. Powlson, A.J. Thomasson.

The third year, w. wheat.

For previous years see 85-86/R&W/CS/309.

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, applied cumulatively in successive years: 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
	TN10PL20	Tine cultivated to 10 cm depth, ploughed to 20 cm
	TN10TN20	Tine cultivated to 10 cm depth and again to 20 cm
	PLOUGH20	Ploughed to 20 cm depth

NOTES: (1) Straw was chopped by trailed straw chopper and spread on 20 Aug, 1986 (R), 4 Sept (W) and burnt 2-4 Sept (R), 5 Sept (W).

(2) A heavy spring-tine cultivator was used to cultivate to 10 cm depth, on 27 Aug, 28 Aug (R), 5 Sept, 18 Sept (W). A chisel plough was used to cultivate to 20 cm depth, on 28 Aug (R) and a deep-tine cultivator to 20 cm on 15 Sept (W).

(3) Ploughed plots were ploughed to 20 cm depth on: Chopped plots 28 Aug (R), burnt plots 4 Sept (R), 19 Sept (W).

(4) In error five plots of STRAW BURNT at Rothamsted were heavy spring-tine cultivated to 10 cm on 27 Aug before burning. Two were combinations with CULTIVTN TN10PL20 the others were combinations with CULTIVTN TINE 10, TN10TN20 and PLOUGH20. All were subsequently burnt with a flame gun on 4 Sept. Combinations with CULTIVTN TN10PL20 and with PLOUGH20 were ploughed, with TINE 10 heavy spring-tine cultivated and with TN10TN20 deep-tine cultivated on 8 Sept.

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87/R/CS/309 and 87/W/CS/309

Basal applications:
Great Knott III (R): Manures: 'Nitram' at 130 kg followed by 580 kg. Weedkillers: Paraquat at 0.60 kg ion in 200 l. Isoproturon at 2.5 kg in 200 l. Clopyralid at 0.05 kg, bromoxynil at 0.24 kg with mecoprop at 1.8 kg applied with the prochloraz and carbendazim in 200 l. Fungicides: Prochloraz at 0.40 kg with carbendazim at 0.15 kg. Propiconazole at 0.12 kg in 200 l. Propiconazole at 0.12 kg with carbendazim at 0.25 kg and maneb at 1.6 kg in 200 l.
Far Field I (W): Manures: 'Nitram' at 120 kg followed by 600 kg. Weedkillers: Tri-allate (as 'Avadex BW' at 4.2 l) in 250 l. Isoproturon at 2.0 kg, clopyralid at 0.07 kg, bromoxynil at 0.34 kg and mecoprop at 2.5 kg in 240 l. Fungicides: Prochloraz at 0.40 kg and carbendazim at 0.15 kg in 200 l. Propiconazole at 0.12 kg with tridemorph at 0.52 kg in 200 l. Propiconazole at 0.12 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 200 l.

Seed: Great Knott III (R) and Far Field I (W): Mission, sown at 190 kg.

Cultivations, etc.:-
Great Knott III (R): Paraquat applied: 27 Sept, 1986. Rolled: 29 Sept. Disced: 1 Oct. Rotary harrowed, seed sown, harrowed: 6 Oct. Rolled: 8 Oct. N applied: 19 Mar, 1987 and 18 Apr. Isoproturon applied: 31 Mar. Clopyralid, bromoxynil, mecoprop, prochloraz and carbendazim applied: 18 Apr. Propiconazole applied: 28 May. Propiconazole, carbendazim and maneb applied: 30 June. Combine harvested: 17 Aug.
Far Field I (W): Disced: 29 Sept, 1986. Rolled: 1 Oct. Rotary cultivated with crumbler attached, seed sown: 8 Oct. Rolled: 9 Oct. Tri-allate applied, harrowed: 10 Oct. N applied: 31 Mar, 1987 and 16 Apr. Isoproturon, clopyralid, bromoxynil and mecoprop applied: 17 Apr. Prochloraz and carbendazim applied: 7 May. Propiconazole and tridemorph applied: 5 June. Propiconazole, carbendazim and maneb applied: 30 June. Combine harvested: 18 Sept.

NOTES: (1) Establishment counts were made in the autumn and measurements were made of total dry matter in spring.
(2) Fungal diseases and pests were assessed at intervals during the season.
(3) Components of yield were measured and numbers of volunteer ears assessed.

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87/R/CS/309 GREAT KNOTT III (R)

GRAIN TONNES/HECTARE

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

CULTIVTN	TINE 10	TN10PL20	TN10TN20	PLOUGH20	Mean
STRAW					
BURNT	6.04	5.92	5.67	6.36	6.00
CHOPPED	6.24	5.80	5.48	5.86	5.84
Mean	6.17	5.84	5.54	6.03	5.89

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

Table	STRAW	CULTIVTN	STRAW CULTIVTN	
s.e.d.			0.401	min.rep
	0.174	0.232	0.347	max-min
			0.284	max.rep

	STRAW
min.rep	BURNT only
max-min	BURNT v CHOPPED
max.rep	CHOPPED only

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	37	0.567	9.6

GRAIN MEAN DM% 85.8

PLOT AREA HARVESTED 0.00648

https://doi.org/10.23637/ERADOC-1-37

87/W/CS/309 FAR FIELD I (W)

GRAIN TONNES/HECTARE

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

CULTIVTN	TINE 10	TN10PL20	TN10TN20	PLOUGH20	Mean
STRAW					
BURNT	4.34	3.78	4.17	3.90	4.05
CHOPPED	4.80	3.75	4.45	3.63	4.16
Mean	4.64	3.76	4.36	3.72	4.12

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

Table	STRAW	CULTIVTN	STRAW CULTIVTN	
s.e.d.			0.561	min.rep
	0.243	0.324	0.486	max-min
			0.397	max.rep

	STRAW
min.rep	BURNT only
max-min	BURNT v CHOPPED
max.rep	CHOPPED only

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	15	0.561	13.6

GRAIN MEAN DM% 82.8

PLOT AREA HARVESTED 0.00884

https://doi.org/10.23637/ERADOC-1-37 *pp 45*

87/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, R.J. Gutteridge, S.H.T. Harper, J.F. Jenkyn, A.E. Johnston, B.R. Kerry, R. Moffitt, W. Powell, A.D. Todd.

The third year, w. wheat.

For previous years see 85-86/R/CS/311.

Design: Single replicate of 3 x a half replicate of 2 x 2 x 2 x 2 x 2.

Whole plot dimensions: 9.0 x 57.0.

Treatments: Combinations of:-

Whole plots

1. STRAW	Treatments to straw of previous wheat:
BURNT	Burnt on 8 Sept, 1986
BALED	Baled and removed on 21 Aug
CHOPPED	Chopped on 21 Aug
2. CULTTIME	Time of cultivation, to 10 cm depth:
EARLY	Cultivated by rotary grubber on 9 Sept, 1986
LATER	Cultivated by rotary grubber on 26 Sept

Sub plots

3. AUT N	Autumn N as 'Nitram' applied just before cultivation:
0	None
50	50 kg N on 9 Sept, 1986 (CULTTIME EARLY), 25 Sept (CULTTIME LATER)
4. FUNGCIDE	Fungicides:
0	None
FULL	Full programme:- Triadimefon at 0.125 kg and carbendazim at 0.25 kg in 500 l on 14 Apr, 1987 Prochloraz at 0.40 kg and carbendazim at 0.15 kg in 200 l on 27 Apr Propiconazole at 0.125 kg in 200 l on 28 May Propiconazole at 0.125 kg with carbendazim at 0.25 kg and maneb at 1.5 kg in 200 l on 23 June
5. INSCTCDE	Insecticide:
0	None
PIR	Pirimicarb at 0.14 kg in 200 l on 23 June, 1987

https://doi.org/10.23637/ERADOC-1-37

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6. MOLLCIDE — Molluscicide:

0	None
METHCARB	Methiocarb at 0.22 kg, as pellets, broadcast on 29 Sept, 1986

Basal applications: Manures: 'Nitram' at 130 kg and later at 590 kg. Weedkillers: Paraquat at 0.60 kg ion in 200 l. Isoproturon at 2.5 kg in 200 l. Clopyralid at 0.05 kg and bromoxynil at 0.24 kg with mecoprop at 1.8 kg in 200 l.

Seed: Mission, sown at 190 kg.

Cultivations, etc.:- Paraquat applied: 3 Oct, 1986. Rotary harrowed: 6 Oct. Seed sown: 7 Oct. First N applied: 19 Mar, 1987. Isoproturon applied: 31 Mar. Second N, clopyralid, bromoxynil and mecoprop applied: 18 Apr. Combine harvested: 19 Aug.

NOTE: Growth was measured and incidence of pests and diseases assessed at intervals during the season. Ears of volunteers were counted prior to harvest and components of yield were measured.

https://doi.org/10.23637/ERADOC-1-37

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GRAIN TONNES/HECTARE

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

CULTTIME	EARLY	LATER	Mean
STRAW			
BURNT	6.19	6.10	6.14
BALED	6.78	6.83	6.81
CHOPPED	6.82	5.89	6.36
Mean	6.60	6.28	6.44

AUT N	0	50	Mean
STRAW			
BURNT	6.07	6.21	6.14
BALED	6.68	6.93	6.81
CHOPPED	6.41	6.31	6.36
Mean	6.39	6.48	6.44

AUT N	0	50	Mean
CULTTIME			
EARLY	6.54	6.65	6.60
LATER	6.23	6.32	6.28
Mean	6.39	6.48	6.44

MOLLCIDE	0	METHCARB	Mean
STRAW			
BURNT	6.00	6.29	6.14
BALED	6.69	6.92	6.81
CHOPPED	6.42	6.30	6.36
Mean	6.37	6.50	6.44

MOLLCIDE	0	METHCARB	Mean
CULTTIME			
EARLY	6.46	6.73	6.60
LATER	6.28	6.27	6.28
Mean	6.37	6.50	6.44

MOLLCIDE	0	METHCARB	Mean
AUT N			
0	6.39	6.39	6.39
50	6.35	6.62	6.48
Mean	6.37	6.50	6.44

FUNGCIDE	0	FULL	Mean
STRAW			
BURNT	5.86	6.43	6.14
BALED	6.43	7.18	6.81
CHOPPED	6.03	6.68	6.36
Mean	6.11	6.77	6.44

https://doi.org/10.23637/ERADOC-1-37

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GRAIN TONNES/HECTARE

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

FUNGCIDE	0	FULL	Mean
CULTTIME			
EARLY	6.32	6.88	6.60
LATER	5.90	6.65	6.28
Mean	6.11	6.77	6.44

FUNGCIDE	0	FULL	Mean
AUT N			
0	6.09	6.68	6.39
50	6.12	6.85	6.48
Mean	6.11	6.77	6.44

FUNGCIDE	0	FULL	Mean
MOLLCIDE			
0	5.99	6.75	6.37
METHCARB	6.23	6.78	6.50
Mean	6.11	6.77	6.44

INSCTCDE	0	PIR	Mean
STRAW			
BURNT	5.99	6.29	6.14
BALED	6.78	6.83	6.81
CHOPPED	6.27	6.45	6.36
Mean	6.35	6.52	6.44

INSCTCDE	0	PIR	Mean
CULTTIME			
EARLY	6.51	6.69	6.60
LATER	6.19	6.36	6.28
Mean	6.35	6.52	6.44

INSCTCDE	0	PIR	Mean
AUT N			
0	6.29	6.48	6.39
50	6.40	6.57	6.48
Mean	6.35	6.52	6.44

INSCTCDE	0	PIR	Mean
MOLLCIDE			
0	6.18	6.56	6.37
METHCARB	6.51	6.49	6.50
Mean	6.35	6.52	6.44

https://doi.org/10.23637/ERADOC-1-37

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GRAIN TONNES/HECTARE

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

INSCTCDE	0	PIR	Mean
FUNGCIDE			
0	6.05	6.17	6.11
FULL	6.65	6.88	6.77
Mean	6.35	6.52	6.44

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

Table	AUT N	FUNGCIDE	INSCTCDE	MOLLCIDE
s.e.d.	0.105	0.105	0.105	0.105

Table	STRAW* AUT N	CULTTIME* AUT N	STRAW* FUNGCIDE	CULTTIME* FUNGCIDE
s.e.d.	0.183	0.149	0.183	0.149

Table	AUT N FUNGCIDE	STRAW* INSCTCDE	CULTTIME* INSCTCDE	AUT N INSCTCDE
s.e.d.	0.149	0.183	0.149	0.149

Table	FUNGCIDE INSCTCDE	STRAW* MOLLCIDE	CULTTIME* MOLLCIDE	AUT N MOLLCIDE
s.e.d.	0.149	0.183	0.149	0.149

Table	FUNGCIDE MOLLCIDE	INSCTCDE MOLLCIDE
s.e.d.	0.149	0.149

* Within the same level of STRAW, CULTTIME or STRAW.CULTTIME only

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

Stratum	d.f.	s.e.	cv%
WP.SP	20	0.365	5.7

GRAIN MEAN DM% 84.2

SUB PLOT AREA HARVESTED 0.00288

https://doi.org/10.23637/ERADOC-1-37

87/R/CS/312

STRAW DECOMPOSITION

Object: To test the effects of two basidiomycetes on the decomposition of wheat straw from a preceding crop and on the establishment and yield of a following crop - West Barnfield I.

Sponsor: S.H.T. Harper.

The third year, w. wheat.

For previous years see 85-86/R/CS/312.

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, cumulative to applications in the first year:

1. TREATMNT[1] Treatment one:

NONE	None
BASID 1	Basidiomycete 1, cumulative to whey at 15 kg in 1985 and 1986

2. TREATMNT[2] Treatment two:

NONE	None
BASID 2	Basidiomycete 2, cumulative to a fungal accelerator in 1985 and 1986

NOTES: (1) Basidiomycetes 1 and 2 were naturally occurring fungi found in soil at Rothamsted and Woburn respectively.
(2) The basidiomycete fungus was colonised on wheat seed and this was spread on the surface at 1 seed per square cm on 25 Sept, 1986.
(3) Straw was chopped by a trailed straw chopper and incorporated to a depth of about 10 cm by a rotary grubber.

Basal applications: Manures: 'Nitram' at 130 kg and later at 590 kg. Weedkillers: Paraquat at 0.60 kg ion in 200 l. Isoproturon at 2.5 kg in 200 l. Clopyralid at 0.05 kg and bromoxynil at 0.24 kg with mecoprop at 1.8 kg in 200 l. Fungicides: Triadimefon at 0.12 kg and carbendazim at 0.25 kg in 200 l. Prochloraz at 0.40 kg and carbendazim at 0.15 kg in 200 l. Propiconazole at 0.12 kg in 200 l. Propiconazole at 0.12 kg with carbendazim at 0.25 kg and maneb at 1.5 kg in 200 l. Insecticide: Pirimicarb at 0.14 kg in 200 l. Molluscicide: Methiocarb at 0.22 kg.

Seed: Mission, sown at 190 kg.

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Cultivations, etc.:- Straw chopped: 21 Aug, 1986. Cultivated with rotary grubber: 26 Sept. Methiocarb applied: 29 Sept. Paraquat applied: 3 Oct. Rotary harrowed: 6 Oct. Seed sown: 7 Oct. First N applied: 19 Mar, 1987. Isoproturon applied: 31 Mar. Triadimefon and carbendazim applied: 14 Apr. Second N, clopyralid, bromoxynil and mecoprop applied: 18 Apr. Prochloraz and carbendazim applied: 27 Apr. Propiconazole applied: 28 May. Propiconazole with carbendazim and maneb applied, insecticide applied separately: 23 June. Combine harvested: 19 Aug.

NOTE: Samples of straw were taken throughout the season for observations on the rate of decomposition.

GRAIN TONNES/HECTARE

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

TREATMNT[2] / TREATMNT[1]	NONE	BASID 2	Mean
NONE	6.85	6.54	6.70
BASID 1	6.68	6.28	6.48
Mean	6.76	6.41	6.59

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

Table	TREATMNT[1]	TREATMNT[2]	TREATMNT[1] TREATMNT[2]
s.e.d.	0.258	0.258	0.364

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	9	0.515	7.8

GRAIN MEAN DM% 83.2

PLOT AREA HARVESTED 0.00288

https://doi.org/10.23637/ERADOC-1-37

87/W/CS/316

VARIETIES AND PCN TOLERANCE

Object: To study the effects of a range of populations of potato cyst nematode (PCN) on varieties differing in susceptibility - Woburn, Horsepool.

Sponsor: A.G. Whitehead.

The third year, potatoes.

For previous years see 85-86/W/CS/316.

Design: 3 randomised blocks of 32 plots.

Whole plot dimensions: 2.84 x 6.10.

Treatments: All combinations of:-

1. VARIETY[85] Potato varieties in 1985 (to establish different populations of PCN):

CARA	Cara
CROWN	Pentland Crown
CA CR	Cara plants alternating with Pentland Crown plants within the ridges
CA CA CR	Two Cara plants alternating with one Pentland Crown plant within the ridges

2. VARIETY[87] Potato varieties in 1987 (all fallow in 1986):

CROWN	Pentland Crown
DELL	Pentland Dell
DESIREE	Desiree
PIPER	Maris Piper

3. NEMACIDE[87] Nematicide applied to seedbed in 1987:

NONE	None
OXAMYL	Oxamyl at 5 kg

Basal applications: Manures: (10:10:15+4.5 Mg) at 2500 kg. Weedkiller: Linuron at 1.6 kg in 200 l. Fungicides: Mancozeb at 1.4 kg on four occasions in 200 l, with the insecticide on the second. Fentin hydroxide at 0.28 kg in 200 l on two occasions. Insecticide: Pirimicarb at 0.14 kg. Desiccant: Diquat at 0.80 kg ion in 200 l.

Cultivations, etc.:- Deep-tine cultivated: 16 Feb, 1987. NPK Mg applied: 16 Apr. Oxamyl applied, rotary cultivated, potatoes planted: 23 Apr. Rotary ridged: 15 May. Weedkiller applied: 25 May. Mancozeb applied: 24 June, 26 July, 5 Aug. Mancozeb and pirimicarb applied: 8 July. Fentin hydroxide applied: 18 Aug, 4 Sept. Desiccant applied: 18 Sept. Haulm mechanically destroyed: 30 Sept. Lifted: 19 Oct.

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NOTES: (1) Soil samples were taken before nematicide was applied and after harvest for cyst and egg counts of Globodera pallida.
(2) The weight of one plot was not recorded, with treatment combination CA CR, DESIREE and NONE. An estimated value was used in the analysis.

TOTAL TUBERS TONNES/HECTARE

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

VARIETY[87] VARIETY[85]	CROWN	DELL	DESIREE	PIPER	Mean
CARA	61.8	48.6	53.8	63.9	57.0
CROWN	39.1	27.6	31.9	47.5	36.5
CA CR	54.7	38.2	44.6	54.4	48.0
CA CA CR	57.3	39.2	43.2	54.8	48.6
Mean	53.3	38.4	43.4	55.1	47.5

NEMACIDE[87] VARIETY[85]	NONE	OXAMYL	Mean
CARA	54.4	59.7	57.0
CROWN	20.8	52.2	36.5
CA CR	37.5	58.4	48.0
CA CA CR	39.2	58.1	48.6
Mean	38.0	57.1	47.5

NEMACIDE[87] VARIETY[87]	NONE	OXAMYL	Mean
CROWN	44.4	62.1	53.3
DELL	25.8	51.0	38.4
DESIREE	33.9	52.9	43.4
PIPER	47.9	62.4	55.1
Mean	38.0	57.1	47.5

VARIETY[85]	NEMACIDE[87] VARIETY[87]	NONE	OXAMYL
CARA	CROWN	57.5	66.1
	DELL	44.4	52.7
	DESIREE	52.6	55.1
	PIPER	63.0	64.7
CROWN	CROWN	22.7	55.5
	DELL	9.9	45.3
	DESIREE	17.3	46.6
	PIPER	33.5	61.4
CA CR	CROWN	47.3	62.2
	DELL	21.7	54.7
	DESIREE	32.3	56.9
	PIPER	48.9	59.8
CA CA CR	CROWN	50.0	64.7
	DELL	27.3	51.1
	DESIREE	33.5	52.9
	PIPER	46.0	63.7

https://doi.org/10.23637/ERADOC-1-37

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

Table	VARIETY[85]	VARIETY[87]	NEMACIDE[87]	VARIETY[85] VARIETY[87]
s.e.d.	1.58	1.58	1.12	3.15

Table	VARIETY[85] NEMACIDE[87]	VARIETY[87] NEMACIDE[87]	VARIETY[85] VARIETY[87] NEMACIDE[87]
s.e.d.	2.23	2.23	4.46

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	61	5.46	11.5

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

VARIETY[87] VARIETY[85]	CROWN	DELL	DESIREE	PIPER	Mean
CARA	92.8	87.0	91.1	87.1	89.5
CROWN	86.1	72.2	80.0	88.1	81.6
CA CR	92.4	71.7	90.2	89.4	85.9
CA CA CR	93.2	81.2	90.1	87.5	88.0
Mean	91.1	78.0	87.9	88.0	86.3

NEMACIDE[87] VARIETY[85]	NONE	OXAMYL	Mean
CARA	89.5	89.5	89.5
CROWN	71.3	92.0	81.6
CA CR	80.9	90.9	85.9
CA CA CR	85.1	91.0	88.0
Mean	81.7	90.8	86.3

NEMACIDE[87] VARIETY[87]	NONE	OXAMYL	Mean
CROWN	87.9	94.4	91.1
DELL	66.3	89.7	78.0
DESIREE	83.1	92.6	87.9
PIPER	89.4	86.7	88.0
Mean	81.7	90.8	86.3

https://doi.org/10.23637/ERADOC-1-37

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PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

VARIETY[85]	NEMACIDE[87] VARIETY[87]	NONE	OXAMYL
CARA	CROWN	92.5	93.0
	DELL	84.5	89.6
	DESIREE	91.7	90.4
	PIPER	89.2	85.0
CROWN	CROWN	77.2	95.0
	DELL	54.3	90.2
	DESIREE	66.5	93.6
	PIPER	87.2	89.1
CA CR	CROWN	90.0	94.9
	DELL	54.6	88.8
	DESIREE	87.7	92.8
	PIPER	91.6	87.2
CA CA CR	CROWN	92.0	94.5
	DELL	71.9	90.4
	DESIREE	86.6	93.7
	PIPER	89.7	85.4

PLOT AREA HARVESTED 0.00087

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87/R/CS/320

COMPARISON OF COMBINABLE CROPS

Object: To compare yields and other attributes of a range of combinable crops and to study their effects on a following crop of w. wheat - Long Hoos VI/VII 5.

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

The second year, w. wheat, s. wheat.

For previous year see 86/R/CS/320.

Design: 3 randomised blocks of 10 plots split into 2.

Whole plot dimensions: 2.5 x 8.0.

Treatments: All combinations of:-

Whole plots

1. PREVCROP	Crops in 1986:	
W BEANS	W. field beans, Vicia faba	
W OATS	W. oats	
W RAPE	W. oilseed rape	
W PEAS	W. peas, Pisum sativum	
W WHEAT	W. wheat	
S BEANS	S. field beans, Vicia faba	
S LUPINS	S. lupins, Lupinus albus	
S PEAS	S. peas, Pisum sativum	
SNFLOWER	Sunflower	
FALLOW	Fallow	

Sub plots

2. SPRING N	Nitrogen fertilizer applied on 10 Apr, 1987:
0	None
N	Applied, amount depending on quantity in crop and soil in spring

NOTES: (1) Amounts of N applied (kg N) as 'Nitro-Chalk' were:

After PREVCROP	W RAPE, S PEAS, FALLOW	190
	W BEANS	200
	S BEANS, SUNFLOWERS	210
	W OATS, W WHEAT	230
	W PEAS, S LUPINS	240

(2) W. wheat after PREVCROP S LUPINS failed and was resown to s. wheat.

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Standard applications:
After all treatments except after lupins: Weedkillers: Terbutryne at 2.8 kg with paraquat at 0.40 kg ion in 220 l. Isoproturon at 2.1 kg (2.5 kg after s. beans and sunflowers) with mecoprop at 2.8 l (2.0 l after s. beans and sunflowers) in 220 l. Cyanazine at 0.35 kg, clopyralid at 0.06 kg and mecoprop at 1.7 l in 220 l applied with the fungicides. Fungicides: Prochloraz at 0.40 kg, carbendazim at 0.15 kg.
After lupins: Weedkillers: Bentazone at 0.80 kg, dichlorprop at 1.1 kg and MCPA at 0.64 kg in 220 l applied with the fungicide. Fungicide: Tridemorph at 0.52 Kg.

Seed: W. wheat: Avalon, sown at 200 kg.
S. wheat: Wembley, sown at 180 kg.

Cultivations, etc.:-
After w. beans, w. oats, w. rape, w. peas, w. wheat and s. peas. Deep-tine cultivated, rotary cultivated: 13 Aug, 1986 (after w. oats, w. rape, w. peas and fallow only). Shallow-tine cultivated, rotary cultivated: 15 Aug (after w. wheat only). Shallow-tine cultivated: 1 Sept (after s. peas only). Spring-tine cultivated: 11 Sept (after w. beans only). Rotary cultivated: 1 Sept (11 Sept after w. beans). Power harrowed, seed sown, rolled: 23 Sept. Terbutryne and paraquat applied: 24 Sept. Isoproturon and mecoprop applied: 29 Oct and 2 Apr, 1987. Cyanazine, clopyralid, mecoprop and fungicides applied: 16 Apr. Combine harvested: 1 Sept.
After s. beans and sunflowers: Spring-tine cultivated, rotary cultivated: 2 Oct, 1986 (after s. beans only). Ploughed: 13 Oct. Spring-tine cultivated, seed sown, rolled, terbutryne and paraquat applied: 14 Oct. Isoproturon and mecoprop applied: 2 Apr, 1987. Cyanazine, clopyralid, mecoprop, prochloraz and carbendazim applied: 16 Apr. Combine harvested: 1 Sept.
After lupins: W. wheat sown, spring-tine cultivated: 4 Dec, 1986. Spring-tine cultivated, s. wheat sown, rolled: 31 Mar, 1987. Bentazone, dichlorprop, MCPA and tridemorph applied: 19 May. Combine harvested: 10 Sept.

NOTES: (1) Take-all was assessed in mid July.
(2) Amounts of ammonium and nitrate nitrogen in the soil were measured in autumn and late winter.
(3) N contents of grain were measured.
(4) The wrong rate of SPRING N was applied to two plots, those with treatment combinations S PEAS 0 and SNFLOWER N. Estimated values were used in the analysis.

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87/R/CS/320

W. WHEAT (S. WHEAT AFTER S. LUPINS)

GRAIN TONNES/HECTARE

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

SPRING N / PREVCROP	0	N	Mean
W BEANS	3.53	8.10	5.82
W OATS	2.18	8.13	5.16
W RAPE	4.10	8.63	6.37
W PEAS	3.28	7.83	5.56
W WHEAT	2.50	6.73	4.62
S BEANS	3.98	7.89	5.93
S LUPINS	3.26	4.93	4.09
S PEAS	3.43	7.88	5.65
SNFLOWER	2.71	7.78	5.24
FALLOW	5.28	7.94	6.61
Mean	3.42	7.59	5.50

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

Table	PREVCROP	SPRING N	PREVCROP SPRING N
s.e.d.	0.349	0.188	0.546
Except when comparing means with the same level(s) of PREVCROP			0.593

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	18	0.428	7.8
BLOCK.WP.SP	18	0.726	13.2

GRAIN MEAN DM% 83.2

PLOT AREA HARVESTED 0.00055

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87/W/CS/322

EFFECTS OF GLOBODERA PALLIDA

Object: To study the residual effects of a range of potato varieties differing in susceptibility to Globodera pallida and of nematicides on the numbers of Globodera pallida and on the yield of a susceptible variety grown in the second year - Far Field II.

Sponsor: A.G. Whitehead.

The second year, potatoes.

For first year see 86/W/P/3.

Design: 3 randomised blocks of 32 plots.

Whole plot dimensions: 3.0 x 4.57.

Treatments: All combinations of:-

1. VARIETY[86] Varieties in 1986, all Pentland Crown in 1987:

12290 AF	12290 AF20
A 25/11	A 25/11
CARA	Cara
CROMWELL	Cromwell
DESIREE	Desiree
DIANA	Diana
HEATHER	Heather
KIRSTY	Kirsty
MARFONA	Marfona
MORAG	Morag
PIPER	Maris Piper
ROMANO	Romano
SANTE	Sante
ZB 35/29	ZB 35/29

2. OXAMYL[86] Oxamyl (kg) in 1986, none in 1987:

0.0
5.6

plus four extra treatments:

VAR NEM[86]	Varieties and nematicides in 1986, Pentland Crown, no nematicide in 1987:
CARA ALD	Cara with slow-release aldicarb at 5.6 kg
CARA CAR	Cara with carbofuran at 5.6 kg
PIPR ALD	Maris Piper with slow-release aldicarb at 5.6 kg
PIPR CAR	Maris Piper with carbofuran at 5.6 kg

Basal applications: Manures: (10:10:15+4.5 Mg) at 2290 kg. Weedkiller: Linuron at 1.6 kg in 200 l. Fungicides: Mancozeb at 1.4 kg in 200 l on four occasions with the pirimicarb on the second occasion. Fentin hydroxide at 0.28 kg in 200 l on two occasions. Insecticide: Pirimicarb at 0.14 kg. Desiccant: Diquat at 0.80 kg ion in 200 l.

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Cultivations, etc.:- Deep-tine cultivated: 30 Jan, 1987 and 16 Feb. NPK Mg applied: 22 Apr. Rotary cultivated and potatoes planted: 28 Apr. Rotary ridged: 15 May. Weedkiller applied: 18 May. Mancozeb applied: 24 June, 26 July, 5 Aug. Mancozeb and pirimicarb applied: 8 July. Fentin hydroxide applied: 18 Aug, 4 Sept. Desiccant applied: 18 Sept. Haulm mechanically destroyed: 1 Oct. Lifted: 7 Oct.

NOTE: Soil samples were taken before nematicides were applied for cyst and egg counts of Globodera pallida.

TOTAL TUBERS TONNES/HECTARE

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

OXAMYL[86]	0.0	5.6	Mean
VARIETY[86]			
12290 AF	45.7	58.7	52.2
A 25/11	55.1	59.5	57.3
CARA	36.9	55.2	46.0
CROMWELL	46.8	57.7	52.3
DESIREE	42.3	52.3	47.3
DIANA	37.5	56.7	47.1
HEATHER	52.0	62.7	57.3
KIRSTY	42.9	54.7	48.8
MARFONA	45.1	55.0	50.1
MORAG	53.1	58.5	55.8
PIPER	44.3	54.2	49.2
ROMANO	46.1	59.1	52.6
SANTE	46.6	55.1	50.8
ZB 35/29	54.5	55.1	54.8
Mean	46.3	56.8	51.5

VAR NEM[86]	CARA ALD	CARA CAR	PIPR ALD	PIPR CAR	Mean
	55.8	42.6	61.1	43.5	50.8

Grand mean 51.4

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

Table	VAR NEM[86]	VARIETY[86]	OXAMYL[86]	VARIETY[86] OXAMYL[86]
s.e.d.	3.80	2.69	1.02	3.80

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	62	4.66	9.1

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PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

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

OXAMYL[86]	0.0	5.6	Mean
VARIETY[86]			
12290 AF	95.4	95.0	95.2
A 25/11	94.9	95.3	95.1
CARA	93.2	95.7	94.4
CROMWELL	96.0	95.4	95.7
DESIREE	94.6	96.0	95.3
DIANA	92.6	95.9	94.2
HEATHER	96.0	95.8	95.9
KIRSTY	94.2	95.0	94.6
MARFONA	94.5	95.3	94.9
MORAG	96.0	96.2	96.1
PIPER	94.0	95.8	94.9
ROMANO	95.8	96.7	96.2
SANTE	95.2	95.5	95.3
ZB 35/29	96.0	96.5	96.2
Mean	94.9	95.7	95.3

VAR NEM[86]	CARA ALD	CARA CAR	PIPR ALD	PIPR CAR	Mean
	95.5	94.2	96.2	94.5	95.1

Grand mean 95.3

PLOT AREA HARVESTED 0.00070

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87/R/CS/324

COMPARISON OF COMBINABLE CROPS

Object: To compare yields and other attributes of a range of combinable crops and to study their effects on a following crop of w. wheat - Long Hoos VI/VII 2.

Sponsors: J. McEwen, D.P. Yeoman, R.J. Darby, M.V. Hewitt.

The first year, w. oats, w. oilseed rape, w. peas, w. wheat, s. beans, s. lupins, s. peas, sunflowers and fallow.

Design: 3 randomised blocks of 10 plots.

Whole plot dimensions: 2.5 x 8.0.

Treatments:

CROP	Crops:
W OATS	W. oats
W RAPE	W. oilseed rape
W PEAS	W. peas, Pisum sativum
W WHEAT	W. wheat
S BEANS	S. field beans, Vicia faba
S LUPINS	S. lupins, Lupinus albus
S PEAS	S. peas, Pisum sativum
SNFLOWER	Sunflower

NOTE: Two plots in each block were fallowed, one of them after w. beans which failed.

Standard applications:-

All crops and fallow: Manures: Muriate of potash at 520 kg.

W. oats: Manure: N at 120 kg as 'Nitro-Chalk'. Weedkillers: Terbutryne at 1.5 kg with paraquat at 0.40 kg ion in 220 l. Cyanazine at 0.35 kg, clopyralid at 0.06 kg, mecoprop at 1.7 kg in 220 l applied with the fungicides. Fungicides: Prochloraz at 0.40 kg, carbendazim at 0.15 kg.

W. rape: Manure: N at 200 kg as 'Nitro-Chalk'. Weedkillers: Fluazifop-butyl at 0.25 kg in 220 l. Propyzamide and clopyralid applied twice (as 'Matrikerb' at 1.6 kg) in 220 l. Insecticide: Deltamethrin at 0.075 kg in 220 l on two occasions. Fungicide: Prochloraz at 0.50 kg in 220 l. Desiccant: Diquat at 0.40 kg ion in 220 l.

W. peas: Weedkillers: Paraquat at 0.40 kg ion. Trietazine at 1.2 kg with simazine at 0.17 kg in 220 l. Insecticides: Cypermethrin at 0.025 kg in 220 l applied twice, pirimicarb at 0.14 kg in 220 l. Fungicide: Benomyl at 0.55 kg applied with the pirimicarb. Desiccant: Diquat at 0.40 kg ion in 220 l.

W. wheat: Manure: N at 230 kg as 'Nitro-Chalk'. Weedkillers: Terbutryne at 2.8 kg with paraquat at 0.40 kg ion in 220 l. Isoproturon at 2.5 kg with mecoprop at 2.0 kg in 220 l. Cyanazine at 0.35 kg, clopyralid at 0.06 kg with mecoprop at 1.7 kg in 220 l applied with the fungicides. Fungicides: Prochloraz at 0.40 kg, carbendazim at 0.15 kg.

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Standard applications cont'd:-
S. beans, s. peas and s. lupins: Weedkillers: Paraquat at 0.40 kg ion in 220 l. Insecticides: Cypermethrin at 0.025 kg in 220 l applied twice, pirimicarb at 0.14 kg in 220 l. Fungicide: Benomyl at 0.55 kg applied with the pirimicarb.
S. beans and s. peas: Weedkillers: Trietazine at 1.2 kg with simazine 0.17 kg in 220 l.
S. lupins: Weedkillers: Paraquat at 0.33 kg ion with monolinuron at 0.46 kg in 220 l. Metamitron at 2.8 kg in 220 l.
Sunflowers: Manures: N at 70 kg as 'Nitro-Chalk'. Weedkillers: Paraquat at 0.40 kg ion in 220 l. Trifluralin at 1.1 kg in 220 l. Linuron at 0.50 kg in 220 l.
W. beans: Weedkiller: Paraquat at 0.40 kg ion in 220 l. Trietazine at 1.2 kg with simazine at 0.17 kg in 220 l. Insecticide: Cypermethrin at 0.025 kg in 220 l applied twice.
Fallow plots only: Paraquat at 0.40 kg ion in 220 l.

Seed: W. oats: Bulwark, sown at 180 kg.
W. rape: Ariana, sown at 8 kg.
W. peas: Frijaune, sown at 220 kg.
W. wheat: Avalon, sown at 200 kg.
S. beans: Minden, sown at 280 kg.
S. lupins: Vladimir, sown at 220 kg.
S. peas: Progreta, sown at 220 kg.
Sunflowers: Asmer 9, sown at 10 kg.

Cultivations, etc.:-
All plots: Shallow rotary cultivated: 19 Aug, 1986. K applied: 20 Aug. Ploughed, furrow pressed: 22 Aug.
W. oats: Spring-tine cultivated, seed sown, rolled, terbutryne and paraquat applied: 6 Oct, 1986. N applied: 8 Apr, 1987. Cyanazine, clopyralid, mecoprop, prochloraz and carbendazim applied: 16 Apr. Combine harvested: 10 Sept.
W. rape: Seed sown: 27 Aug. Fluazifop-butyl applied: 3 Oct. Deltamethrin applied: 14 Oct and 20 Nov. Propyzamide and clopyralid applied: 29 Oct and 6 Jan, 1987. Prochloraz applied: 17 Nov, 1986. N applied: 20 Feb, 1987. Diquat applied: 10 Aug. Combine harvested: 17 Aug.
W. peas: Spring-tine cultivated: 6 Oct, 1986. Paraquat applied: 29 Oct. Seed sown: 12 Nov. Trietazine and simazine applied: 18 Nov. Cypermethrin applied: 8 May, 1987 and 11 June. Pirimicarb and benomyl applied: 13 July. Diquat applied: 10 Aug. Combine harvested: 18 Aug.
W. wheat: Power harrowed, seed sown, rolled: 23 Sept, 1986. Terbutryne and paraquat applied: 24 Sept. Isoproturon and mecoprop applied: 29 Oct. N applied: 8 Apr, 1987. Cyanazine, clopyralid, mecoprop, prochloraz and carbendazim applied: 16 Apr. Combine harvested: 1 Sept.
S. beans and s. peas: Spring-tine cultivated: 6 Oct, 1986. Paraquat applied: 29 Oct. Seed sown: 18 Mar, 1987. Trietazine and simazine applied: 19 Mar. Cypermethrin applied: 8 May and 11 June. Benomyl and pirimicarb applied: 13 July. Combine harvested: S. beans 11 Sept, s. peas 14 Sept.
S. lupins: Spring-tine cultivated: 6 Oct, 1986. Paraquat applied: 29 Oct. Rotary cultivated, seed sown, rolled, monolinuron and paraquat applied: 16 Apr, 1987. Cypermethrin applied: 8 May and 11 June. Metamitron applied: 18 June. Benomyl and pirimicarb applied: 13 July. Combine harvested: 17 Nov.

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Cultivations cont'd, etc.:-
Sunflowers: Spring-tine cultivated: 6 Oct, 1986. Paraquat applied: 29 Oct. N applied, trifluralin applied, spring-tine cultivated twice and seed sown: 30 Apr, 1987. Rolled: 5 May. Linuron applied: 6 May. Harvested by hand and one plot stationary combine harvested: 28 Oct.
W. beans, later fallowed: Spring-tine cultivated: 6 Oct, 1986. Paraquat applied: 29 Oct. Seed sown: 4 Dec. Trietazine and simazine applied: 10 Dec. Cypermethrin applied: 8 May, 1987 and 11 June. Spring-tine cultivated, rotary cultivated: 29 June.
Fallow: Spring-tine cultivated: 6 Oct, 1986. Paraquat applied: 29 Oct. Spring-tine cultivated, rotary cultivated: 29 June, 1987. Previous crops: Potatoes 1985, s. barley 1986.

NOTE: Two sunflower plot yields were lost because of bird damage. Estimated values were used in the analysis.

VARIOUS CROPS

GRAIN TONNES/HECTARE

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

CROP	
W OATS	4.31
W RAPE	2.12
W PEAS	1.29
W WHEAT	7.35
S BEANS	5.22
S LUPINS	0.93
S PEAS	2.73
SNFLOWER	0.91
Mean	3.11

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

Table	CROP
s.e.d.	0.507

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	12	0.621	20.0

GRAIN MEAN DM% 77.1

SUB PLOT AREA HARVESTED
W. OATS, W. RAPE, W. WHEAT 0.00124
W. PEAS, S. BEANS, S. LUPINS, S.PEAS, SNFLOWER 0.00115

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87/R/CS/326 and 87/W/CS/326

AMOUNTS OF STRAW

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

Sponsors: D.G. Christian, J.F. Jenkyn, E.T.G. Bacon, R.D. Prew.

The first year, w. wheat.

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

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

Treatments:

STRAW — Amounts of straw incorporated into seedbed (t ha 85% DM):

		R	W
NONE	None	-	-
NORMAL	Normal	5.8	4.3
2 NORMAL	Twice normal	11.6	8.6
4 NORMAL	Four times normal	23.2	17.3

NOTES: (1) Straw was chopped by trailed straw chopper and spread on 20 Aug, 1986 (R), 4 Sept (W). Straw treatments were applied on 22 Aug (R), 8 Sept (W).
(2) At Rothamsted straw was incorporated by 'N.I.A.E. Mixaplough' on 29 Aug. At Woburn it was deep-tine cultivated in to 20 cm twice on 15 Sept, heavy spring-tine cultivated to 10 cm and disced three times on 18 Sept and disced twice on 29 Sept.

Basal applications:
Great Knott III (R): Manures: 'Nitram' at 130 kg followed by 590 kg. Weedkillers: Paraquat at 0.60 kg ion in 200 l. Isoproturon at 2.5 kg in 200 l. Clopyralid at 0.05 kg, bromoxynil at 0.24 kg with mecoprop at 1.8 kg in 200 l. Fungicides: Propiconazole at 0.12 kg in 200 l. Propiconazole at 0.12 kg with carbendazim at 0.25 kg and maneb at 1.6 kg in 200 l.
Far Field I (W): Manures: 'Nitram' at 120 kg followed by 600 kg. Weedkillers: Tri-allate (as 'Avadex BW' at 4.2 l) in 250 l. Isoproturon at 2.0 kg with clopyralid at 0.07 kg, bromoxynil at 0.34 kg and mecoprop at 2.5 kg in 240 l. Fungicides: Propiconazole at 0.12 kg with tridemorph at 0.52 kg in 200 l. Propiconazole at 0.12 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 200 l.

Seed: Great Knott III (R) and Far Field I (W): Mission, sown at 190 kg.

Cultivations, etc.:-
Great Knott III (R): Paraquat applied: 27 Sept, 1986. Rolled: 29 Sept. Disced: 1 Oct. Rotary harrowed, seed sown and harrowed: 6 Oct. N applied: 19 Mar, 1987, 18 Apr. Isoproturon applied: 31 Mar. Clopyralid, bromoxynil and mecoprop applied: 18 Apr. Propiconazole applied: 28 May. Propiconazole, carbendazim and maneb applied: 30 June. Combine harvested: 19 Aug. Previous crops: W. wheat 1985 and 1986.

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Cultivations, etc.:-
Far Field I (W): Rotary cultivated with crumbler attached, seed sown: 8 Oct, 1986. Rolled: 9 Oct. Tri-allate applied, harrowed: 10 Oct. N applied: 31 Mar, 1987, 16 Apr. Isoproturon, clopyralid, bromoxynil and mecoprop applied: 17 Apr. Propiconazole and tridemorph applied: 5 June. Propiconazole, carbendazim and maneb applied: 30 June. Combine harvested: 7 Sept. Previous crops: W. wheat 1985 and 1986.

NOTES: (1) Establishment counts were made in autumn and measurements were made of total dry matter in spring.
(2) Foliar diseases and foot and root rots were assessed in summer.

87/R/CS/326

GRAIN TONNES/HECTARE

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

STRAW	NONE	NORMAL	2 NORMAL	4 NORMAL	Mean
	4.95	4.77	4.62	5.05	4.85

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

Table	STRAW
s.e.d.	0.155

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	9	0.219	4.5

GRAIN MEAN DM% 82.8

PLOT AREA HARVESTED 0.00324

87/W/CS/326

GRAIN TONNES/HECTARE

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

STRAW	NONE	NORMAL	2 NORMAL	4 NORMAL	Mean
	2.93	2.88	3.01	2.43	2.81

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

Table	STRAW
s.e.d.	0.209

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	6	0.256	9.1

GRAIN MEAN DM% 75.2 PLOT AREA HARVESTED 0.00442

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87/W/CS/328

DEEP-WORKED SOIL AND PCN

Object: To study the effects of deep working of soil, on a site infested with potato cyst-nematode (PCN), on varieties resistant or susceptible to PCN, with and without a nematicide - Stackyard A II.

Sponsor: A.G. Whitehead.

The first year, potatoes.

Design: 3 randomised blocks of 8 plots.

Whole plot dimensions: 3.0 x 8.0.

Treatments: All combinations of:-

1. SOIL TRT	Soil treatment:	
	NONE	None
	SUBSOIL	Subsoiled, with 25 cm wide wings on tines 38 cm deep and 66 cm apart, on 23 Apr, 1987
2. NEMACIDE	Nematicides:	
	NONE	None
	OXAMYL	Oxamyl at 5.5 kg worked into seedbed on 27 Apr
3. VARIETY	Varieties:	
	CARA	Cara
	DESIREE	Desiree

NOTE: The experiment was sited on Series III of W/CS/35 (see 86/W/CS/35). Series II was planted to uniform Desiree potatoes for fresh tests of the above treatments in 1988.

Basal applications: Series II and III: Manures: (10:10:15+4.5Mg) at 2290 kg. Weedkillers: Sodium trichloroacetate at 38 kg in 240 l. EPTC at 4.5 kg in 240 l. Linuron at 1.6 kg in 200 l. Fungicides: Mancozeb at 1.4 kg on four occasions in 200 l, applied with the pirimicarb on the second. Fentin hydroxide at 0.28 kg on two occasions in 200 l. Desiccant: Diquat at 0.80 kg ion in 200 l.

Cultivations, etc.:- Series II and III: Sodium trichloroacetate applied, spring-tine cultivated twice: 13 Nov, 1986. Spring-tine cultivated: 18 Feb, 1987. NPK Mg applied: 21 Apr. EPTC applied, rotary cultivated, potatoes planted: 29 Apr. Rotary ridged: 15 May. Linuron applied: 22 May. Mancozeb applied: 22 June, 26 July and 5 Aug. Mancozeb and pirimicarb applied: 8 July. Fentin hydroxide applied: 18 Aug and 4 Sept. Desiccant applied: 18 Sept. Haulm mechnically destroyed: 1 Oct. Lifted: 14 Oct.

NOTE: Soil samples were taken before nematicides were applied and after harvest for cyst and egg counts of Globodera pallida.

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87/W/CS/328

TOTAL TUBERS TONNES/HECTARE

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

NEMACIDE SOIL TRT	NONE	OXAMYL	Mean
NONE	15.7	27.7	21.7
SUBSOIL	16.8	38.8	27.8
Mean	16.2	33.2	24.7

VARIETY SOIL TRT	CARA	DESIREE	Mean
NONE	28.1	15.3	21.7
SUBSOIL	35.7	19.8	27.8
Mean	31.9	17.6	24.7

VARIETY NEMACIDE	CARA	DESIREE	Mean
NONE	27.5	5.0	16.2
OXAMYL	36.3	30.2	33.2
Mean	31.9	17.6	24.7

SOIL TRT	VARIETY NEMACIDE	CARA	DESIREE
NONE	NONE	25.8	5.6
	OXAMYL	30.4	25.0
SUBSOIL	NONE	29.2	4.3
	OXAMYL	42.2	35.4

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

Table	SOIL TRT	NEMACIDE	VARIETY	SOIL TRT NEMACIDE
s.e.d.	1.63	1.63	1.63	2.30

Table	SOIL TRT VARIETY	NEMACIDE VARIETY	SOIL TRT NEMACIDE VARIETY
s.e.d.	2.30	2.30	3.25

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	14	3.98	16.1

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87/W/CS/328

PERCENTAGE WARE 4CM (1.57 INCH) RIDDLE

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

NEMACIDE	NONE	OXAMYL	Mean
SOIL TRT			
NONE	67.4	76.4	71.9
SUBSOIL	72.8	85.3	79.0
Mean	70.1	80.8	75.5

VARIETY	CARA	DESIREE	Mean
SOIL TRT			
NONE	83.3	60.5	71.9
SUBSOIL	88.9	69.2	79.0
Mean	86.1	64.8	75.5

VARIETY	CARA	DESIREE	Mean
NEMACIDE			
NONE	89.1	51.1	70.1
OXAMYL	83.1	78.6	80.8
Mean	86.1	64.8	75.5

	VARIETY	CARA	DESIREE
SOIL TRT	NEMACIDE		
NONE	NONE	88.0	46.8
	OXAMYL	78.7	74.1
SUBSOIL	NONE	90.3	55.4
	OXAMYL	87.5	83.0

PLOT AREA HARVESTED 0.00120

https://doi.org/10.23637/ERADOC-1-37