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Yields of the Field Experiments 1975

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75/ W/RN/15 - Rotation and Fumigation - Potatoes, Barley, Sugar Beet

Rothamsted Research

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75/W/RN/15

ROTATION AND FUMIGATION

Object: To study different ways of using nematicides in a three-course rotation and to determine the effects on crop yield and incidence of pathogenic nematodes - Woburn Butt Close.

Sponsors: F.G.W. Jones, A.G. Whitehead, T.D. Williams.

The seventh year, potatoes, barley, sugar beet.

For previous years see 69/W/RN/15(t), 70/W/RN/15(t) and 71-74/W/RN/15.

Design: 3 series each of 2 blocks of 3 plots split into 7.

Whole plot dimensions: 5.33 x 31.1.

Treatments:

All phases of the rotation potatoes, barley, sugar beet are present.

Each crop tests all combinations of:-

Whole plots: 1. Nitrogen fertiliser (kg N):

N

To potatoes and
sugar beet

To barley

Potatoes &
s.beet

Barley

75

38

75

38

150

75

150

75

225

113

225

113

Sub plots: 2. Chemicals:

CHEMICAL

None

O

Dichloropropane/dichloropropene ('D-D') at 448 kg
before potatoes

DD(P)

Dichloropropane/dichloropropene ('D-D') at 448 kg
before sugar beet

DD(SE)

Dichloropropane/dichloropropene ('D-D') at 448 kg
before barley

DD(B)

Dichloropropane/dichloropropene ('D-D') at 448 kg
before all crops

DD(ALL)

Dazomet at 224 kg before all crops since 1970 only

DAZ(ALL)

Benomyl at 22 kg before all crops since 1974 only

BEN(ALL)

Standard applications:

Potatoes: Manures: (0:14:28) at 1050 kg. Weedkiller: Limuron at 1.2 kg
plus paraquat at 0.28 kg ion in 281 l. Insecticide: Demeton-s-
methyl at 0.25 kg in 280 l. Fungicide: Mancozeb at 1.3 kg in 391 l.

75/W/RG/15

2

Barley: Manures: (0:20:20) at 320 kg, combine drilled. Weedkiller: Ioxynil at 0.52 kg with mecoprop at 1.9 kg in 280 l.
Sugar beet: Manures: Magnesian limestone at 2.5 tonnes. (0:14:28) at 1050 kg. Boron at 7.4 kg B₂O₃ (as 'Solubor') applied with the second application of insecticide. Insecticide: Demeton-s-methyl at 0.25 kg in 280 l and on the second occasion in 390 l.

Seed: Potatoes: Penildar Crown.

Barley: Julia, dressed with ethirimol, sown at 160 kg.

Sugar beet: Klein E, sown at 6 kg.

Cultivations, etc.:-

All series: Ploughed: 29 Nov, 1974. 'D-D' injected: 5 Dec. Dezomet applied, and these plots only rotary cultivated, and all plots spring-time harrowed: 6 Dec. Benomyl applied, and these plots only rotary cultivated: 23 Apr, 1975. Spring-time cultivated, PK and N applied: 25 Apr.

Potatoes: Spring-time cultivated with crumbler: 28 Apr. Rotary cultivated, potatoes planted: 1 May. Weedkiller applied: 22 May. Grubbed: 23 June. Rotary ridged: 24 June. Insecticide applied: 26 June. Fungicide applied: 15 July. Haulm mechanically destroyed: 29 Sept. Sprayed with undiluted B.O.V. at 160 l: 2 Oct. Lifted: 16 Oct.

Barley: Spring-time cultivated, seed sown: 25 Apr, 1975. Weedkiller applied: 4 June. Combine harvested: 19-22 Aug.

Sugar beet: Subsoiled: Tines 140 cm apart and 56 cm deep: 18 Sept, 1974. Magnesian limestone applied: 7 Nov. Spring-time cultivated with crumbler: 28 Apr, 1975. Seed sown: 29 Apr. Tractor hoed: 30 May. Singled: 3-4 June. Insecticide applied: 9 June. Tractor hoed: 27 June. Boron and insecticide applied: 1 July. Side hoed by hand: 4-7 July. Lifted: 3-4 Nov.

NOTES: (1) Sugar beet plots were damaged by rabbits late in the season.
(2) Soil samples were taken after harvest for eelworm counts.

75/W/RN/15

POTATOES

TOTAL TUBERS TONNES/HECTARE

*** TABLES OF MEANS ***

	N	75	150	225	MEAN
CHEMICAL					
0		9.8	11.1	19.4	13.4
DD(P)		22.9	31.3	25.4	26.5
DD(SB)		19.1	19.8	37.9	25.6
DD(B)		19.3	26.9	35.3	27.2
DD(ALL)		14.3	36.7	36.7	29.2
DAZ(ALL)		24.7	31.0	31.8	29.2
BEN(ALL)		12.9	20.5	24.1	19.1
MEAN		17.6	25.3	30.1	24.3

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

TABLE	CHEMICAL	N* CHEMICAL
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SED	2.44	4.22

* WITHIN THE SAME LEVEL OF N ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	4.22	17.3

PERCENTAGE WARE 3.81CM(1.5 INCH) RIDDLE

*** TABLES OF MEANS ***

	N	75	150	225	MEAN
CHEMICAL					
0		89.6	86.3	94.3	90.1
DD(P)		93.3	96.9	94.8	95.0
DD(SB)		93.9	93.9	96.8	94.9
DD(B)		95.0	95.6	96.7	95.7
DD(ALL)		95.5	96.7	95.9	96.1
DAZ(ALL)		97.4	96.1	95.3	96.3
BEN(ALL)		92.7	92.7	95.0	93.5
MEAN		93.9	94.0	95.5	94.5

PLOT AREA HARVESTED 0.00052

75/W/RN/15

BARLEY

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

	N	38	75	113	MEAN
CHEMICAL					
0		1.19	1.73	0.65	1.19
DD(P)		1.51	1.72	1.62	1.62
DD(SB)		1.30	1.72	1.94	1.66
DD(B)		1.19	1.29	1.61	1.37
DD(ALL)		1.41	1.40	2.05	1.62
DAZ(ALL)		1.30	2.16	1.61	1.69
BEN(ALL)		1.52	1.73	1.41	1.55
MEAN		1.35	1.68	1.56	1.53

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

TABLE	CHEMICAL	N* CHEMICAL
SED	0.168	0.291

* WITHIN THE SAME LEVEL OF N ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	0.291	19.0

GRAIN MEAN DM% 84.2

SUB PLOT AREA HARVESTED 0.00052

STRAW TONNES/HECTARE

*** TABLES OF MEANS ***

	N	38	75	113	MEAN
CHEMICAL					
0		0.84	1.13	1.02	1.00
DD(P)		0.84	1.39	1.49	1.24
DD(SB)		0.75	1.41	1.78	1.32
DD(B)		0.74	1.19	1.39	1.11
DD(ALL)		0.82	0.93	1.02	0.93
DAZ(ALL)		0.91	1.04	1.50	1.15
BEN(ALL)		1.02	1.22	1.31	1.18
MEAN		0.85	1.19	1.36	1.13

STRAW MEAN DM% 90.8

SUB PLOT AREA HARVESTED 0.00052

75/W/RN/15

SUGAR BEET

ROOTS (WASHED) TONNES/HECTARE

*** TABLES OF MEANS ***

N	75	150	225	MEAN
CHEMICAL				
0	6.8	11.8	10.1	9.6
DD(P)	6.9	11.0	12.4	10.1
DD(SB)	7.7	11.5	8.3	9.2
DD(B)	9.3	4.4	10.7	8.1
DD(ALL)	5.3	5.2	9.4	6.6
DAZ(ALL)	8.1	8.7	8.7	8.5
BEN(ALL)	9.4	12.3	4.5	8.7
MEAN	7.7	9.3	9.1	8.7

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

TABLE	CHEMICAL	N*
		CHEMICAL
SED	1.47	2.54

* WITHIN THE SAME LEVEL OF N ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	2.54	29.3

SUGAR PERCENTAGE

*** TABLES OF MEANS ***

N	75	150	225	MEAN
CHEMICAL				
0	14.5	13.8	13.9	14.1
DD(P)	14.8	14.0	13.6	14.2
DD(SB)	14.3	13.8	13.6	13.9
DD(B)	14.6	13.8	13.3	13.9
DD(ALL)	13.9	12.9	13.4	13.4
DAZ(ALL)	14.4	13.9	13.3	13.9
BEN(ALL)	14.6	14.0	13.9	14.2
MEAN	14.4	13.7	13.6	13.9

75/W/RN/15

SUGAR BEET

TOTAL SUGAR TONNES/HECTARE

*** TABLES OF MEANS ***

	N	75	150	225	MEAN
CHEMICAL					
0		0.99	1.63	1.40	1.34
DD(P)		1.02	1.54	1.69	1.42
DD(SB)		1.11	1.59	1.13	1.28
DD(B)		1.36	0.61	1.43	1.14
DD(ALL)		0.74	0.68	1.25	0.89
DAZ(ALL)		1.16	1.20	1.17	1.18
BEN(ALL)		1.37	1.73	0.62	1.24
MEAN		1.11	1.28	1.24	1.21

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

TABLE	CHEMICAL	N*
		CHEMICAL
SED	0.209	0.362

* WITHIN THE SAME LEVEL OF N ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	0.362	29.9

PLOT AREA HARVESTED 0.00130