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## Yields of the Field Experiments 1976

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

#### Rothamsted Research

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76/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 eighth year, potatoes, barley, sugar beet.

For previous years see 69/W/RN/15(t), 70/W/RN/15(t) and 71-75/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. N Nitrogen fertiliser (kg N), applied cumulatively:

POTATOES & S.BEET	BARLEY	To potatoes and sugar beet	To barley
75	38	75	38
150	75	150	75
225	113	225	113

#### Sub plots

2. CHEMICAL Chemicals:

0	None
A (P)	Aldicarb at 6 kg before potatoes
A (SB)	Aldicarb at 6 kg before sugar beet
A (B)	Aldicarb at 6 kg before barley
A (ALL)	Aldicarb at 6 kg before all crops
DAZ(ALL)	Dazomet at 224 kg before all crops since 1970 only
BEN(ALL)	Benomyl at 22 kg before all crops since 1974 only

NOTE: Aldicarb first used in 1976. From 1969-75 dichloropropane/dichloropropene ('D-D') was applied at 448 kg to these treatments (before appropriate crops as above).

#### Standard applications:

Potatoes: Matures: (0:14:28) at 1080 kg. Weedkiller: Linuron at 1.2 kg plus paraquat at 0.42 kg ion in 280 l. Insecticide: Pirimicarb at 0.14 kg in 450 l. Fungicide with insecticide: Mancozeb at 1.3 kg with demeton-s-methyl at 0.25 kg in 450 l. Fungicide: Mancozeb at 1.3 kg in 450 l.

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Barley: Manures: (0:20:20) at 310 kg combine drilled. Weedkiller:  
Ioxynil at 0.52 kg with mecoprop at 1.6 kg in 280 l.  
Sugar beet: Manures: Magnesian limestone at 2.5 tonnes. (0:14:28) at  
1080 kg. Boron at 7.4 kg B2O3 (as 'Solubor') applied with insecticide.  
Insecticide: Demeton-s-methyl at 0.25 kg in 390 l.

Seed: Potatoes: Pentland Crown.  
Barley: Julia, dressed with ethirimol, sown at 160 kg.  
Sugar beet: Klein E, sown at 6 kg.

Cultivations, etc.:-

All Series: Dazomet applied and these plots only rotary cultivated and all  
plots spring-tine cultivated: 11 Nov, 1975.

Potatoes: Ploughed: 4 Nov, 1975. Spring-tine cultivated with crumbler:  
5 Nov. Ploughed: 15 Jan, 1976. Spring-tine cultivated: 3 Mar.  
PK applied: 15 Mar. N applied: 23 Mar. Spring-tine cultivated:  
24 Mar. Aldicarb and benomyl applied, all plots rotary cultivated,  
potatoes planted: 1 Apr. Weedkiller applied: 5 May. Grubbed: 2 June.  
Rotary ridged: 3 June. Pirimicarb applied: 18 June. Fungicide with  
insecticide applied: 30 June. Fungicide applied: 30 July. Haulm  
mechanically destroyed: 15 Sept. Lifted: 28 Sept.

Barley: Ploughed, spring-tine cultivated with crumbler: 5 Nov, 1975.  
Ploughed: 15 Jan, 1976. Aldicarb and benomyl applied, all plots  
rotary cultivated: 2 Mar. N applied, spring-tine cultivated, seed  
sown: 3 Mar. Weedkiller applied: 29 Apr. Combine harvested: 28 July.

Sugar beet: Subsoiled: Tines 140 cm apart and 56 cm deep: 1 Sept, 1975.  
Magnesian limestone applied: 5 Sept. Spring-tine cultivated: 18 Sept.  
Ploughed twice: 16 Oct and 15 Jan, 1976. Spring-tine cultivated:  
3 Mar. PK applied: 15 Mar. N applied: 23 Mar. Spring-tine cultivated:  
24 Mar. Aldicarb and benomyl applied, all plots rotary cultivated:  
1 Apr. Spring-tine cultivated with crumbler, seed sown: 5 Apr.  
Tractor hoed: 13 May. Singled: 20 May. Boron and insecticide applied:  
28 May. Hoed by hand: 18 June, Lifted: 18 Nov.

NOTES: (1) Soil samples were taken after harvest for eelworm counts.  
(2) Sugar beet: Because of rabbit damage the yields on three plots  
with the following treatment combinations were not taken

N	CHEMICAL
75	A(B)
225	O
225	BEN(ALL)

Estimated values were used in the analysis.

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POTATOES

TOTAL TUBERS TONNES/HECTARE

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

	N	75	150	225	MEAN
CHEMICAL					
0		11.4	11.7	10.5	11.2
A(P)		28.6	27.2	20.4	25.4
A(SB)		23.9	23.8	20.8	22.8
A(B)		18.1	19.1	12.0	16.4
A(ALL)		31.3	30.5	27.5	29.8
DAZ(ALL)		28.4	26.3	26.3	27.0
BEN(ALL)		23.3	12.9	11.7	15.9
MEAN		23.6	21.6	18.4	21.2

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

TABLE	CHEMICAL	CHEMICAL N*
-----		
SED	2.81	4.87

\* WITHIN THE SAME LEVEL OF N ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	4.87	23.0

PERCENTAGE WARE 3.81CM (1.5 INCH) RIDDLE

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

	N	75	150	225	MEAN
CHEMICAL					
0		74.6	78.3	77.5	76.8
A(P)		91.7	87.1	84.0	87.6
A(SB)		91.0	89.1	89.1	89.7
A(B)		83.1	82.7	79.0	81.6
A(ALL)		90.8	87.6	88.6	89.0
DAZ(ALL)		90.5	89.1	89.7	89.8
BEN(ALL)		85.1	83.0	74.8	81.0
MEAN		86.7	85.3	83.2	85.1

PLOT AREA HARVESTED 0.00052

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BARLEY

GRAIN TONNES/HECTARE

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

	N	38	75	113	MEAN
CHEMICAL					
0		2.02	1.91	2.35	2.09
A(P)		1.90	2.58	2.24	2.24
A(SE)		2.12	2.70	3.03	2.62
A(B)		2.24	2.69	3.25	2.72
A(ALL)		1.68	2.24	3.36	2.43
DAZ(ALL)		2.24	1.68	1.56	1.83
BEN(ALL)		2.13	2.13	2.57	2.28
MEAN		2.05	2.27	2.62	2.31

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

TABLE	CHEMICAL	CHEMICAL N*
-----		
SED	0.348	0.603

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	18	0.603	26.1
GRAIN MEAN DM%	87.3		

STRAW TONNES/HECTARE

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

	N	38	75	113	MEAN
CHEMICAL					
0		1.67	1.40	2.06	1.71
A(P)		1.59	2.16	1.57	1.77
A(SB)		1.87	2.05	2.25	2.06
A(B)		1.78	2.06	2.43	2.09
A(ALL)		1.58	1.89	2.27	1.91
DAZ(ALL)		1.95	2.19	1.50	1.88
BEN(ALL)		1.97	1.97	1.96	1.97
MEAN		1.77	1.96	2.01	1.91

STRAW MEAN DM% 91.3

PLOT AREA HARVESTED 0.00052

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SUGAR BEET

ROOTS (WASHED) TONNES/HECTARE

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

N	75	150	225	MEAN
CHEMICAL				
0	29.8	32.4	29.7	30.6
A(P)	27.7	30.9	29.8	29.5
A(SB)	31.8	36.5	37.6	35.3
A(B)	29.3	29.8	32.4	30.5
A(ALL)	33.9	37.1	36.4	35.8
DAZ(ALL)	33.3	28.0	32.4	31.3
BEN(ALL)	26.6	25.6	32.7	28.3
MEAN	30.3	31.5	33.0	31.6

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

TABLE	CHEMICAL	CHEMICAL N*
SED	1.45	2.52

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	15	2.52	8.0

SUGAR PERCENTAGE

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

N	75	150	225	MEAN
CHEMICAL				
0	15.2	14.7	14.0	14.7
A(P)	14.6	14.8	14.3	14.6
A(SB)	15.0	14.9	14.8	14.9
A(B)	15.0	14.3	14.5	14.6
A(ALL)	14.8	14.8	14.8	14.8
DAZ(ALL)	15.0	14.3	14.5	14.6
BEN(ALL)	15.0	14.7	14.4	14.7
MEAN	14.9	14.7	14.5	14.7

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SUGAR BEET

TOTAL SUGAR TONNES/HECTARE

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

	N	75	150	225	MEAN
CHEMICAL					
0		4.54	4.78	4.15	4.49
A(P)		4.04	4.58	4.26	4.29
A(SB)		4.77	5.43	5.58	5.26
A(B)		4.45	4.28	4.69	4.47
A(ALL)		5.00	5.47	5.38	5.29
DAZ(ALL)		5.00	4.00	4.70	4.57
BEN(ALL)		3.98	3.78	4.82	4.19
MEAN		4.54	4.62	4.80	4.65

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

TABLE	CHEMICAL	CHEMICAL N*
-----		
SED	0.231	0.400

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	15	0.400	8.6
PLOT AREA HARVESTED	0.00130		