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## Yields of the Field Experiments 1971

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### **71/W/RN/3 Ley/ARABLE - Leys, Potatoes, Rye, Carrots, Barley**

#### **Rothamsted Research**

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71/W/RN/3

LEY/ARABLE

Object: To compare the effects on soil fertility of rotations with or without three-year leys. The effects of the cropping systems on soil-borne pathogens are also studied - Woburn Stackyard D.

The 34th year, leys, potatoes, rye, carrots, barley.

For previous years see 'Details' 1967, 68/B/2(t), 69/W/RN/3(t) and 70/W/RN/3(t).

The first test crop was changed from barley to potatoes.

Corrective K dressings (in kg K<sub>2</sub>O) as muriate of potash applied to first test crop, potatoes.

	No FYM half plots	FYM half plots
Continuous rotations		
Ley	126	126
Sainfoin	126	126
Arable with hay	188	188
Arable	0	0
Alternating rotations (last two rotations in order)		
Arable/ley	188	439
Arable with hay/sainfoin	126	126
Ley/arable with hay	63	63
Sainfoin/arable	188	314

Treatments to first test crop potatoes:-

1. Residues of fumigant applied to potatoes 1968 (Arable and Arable with hay only) on quarter plots: None (O), 448 kg (C) chloropicrin.
2. Fresh fumigants on eighth plots: None (O), 448 kg chloropicrin plus 11.2 kg aldicarb (F).
3. Varieties, on half plots after Ley and Sainfoin and quarter plots after Arable and Arable with hay: Maris Piper (R), Pentland Crown (S).

Treatments to rye:-

1. Residues of fumigant applied to potatoes in 1970 on quarter plots: None (O), 448 kg (F) chloropicrin.

Treatments to carrots:-

1. Residues of fumigant applied to potatoes in 1969 on quarter plots: None (O), 448 kg (C) chloropicrin.

NOTE: Red clover, S 123, replaced sainfoin after the first and second year sainfoin failed. Third year sainfoin also failed and the plots were fallowed.

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Basal manuring to both test and treatment potatoes changed to 252 kg N, 252 kg P<sub>2</sub>O<sub>5</sub>, 376 kg K<sub>2</sub>O as (13:13:20).

Cultivations, etc.:

Treatment crops.

Ley 1st year: Ploughed: 4 Sept, 1970. NPK applied: 31 Mar, 1971.

Power harrowed, seed sown at 45 kg: 22 Apr. NK applied:

11 Aug. Cut twice: 2 Aug, 8 Sept.

Ley 2nd year: NK applied: 10 Mar, 1971, 15 June, 10 Aug. Cut three times: 1 June, 2 Aug, 8 Sept.

Ley 3rd year: NK applied: 10 Mar, 1971, 15 June, 10 Aug.

Cut three times: 1 June, 2 Aug, 8 Sept.

Sainfoin 1st year: Ploughed: 4 Sept, 1970. NPK applied: 31 Mar,

1971. Power harrowed, seed drilled at 45 kg: 22 Apr. Seed

redrilled, because of bird damage, at 34 kg: 12 May. Deep-

tine cultivated because of second failure: 24 June. Red

clover sown at 45 kg: 23 July. Varieties: Sainfoin: Common,

Red clover: S 123.

Sainfoin 2nd year: Sprayed with paraquat at 0.6 kg ion in 281 l:

5 Feb, 1971. NK applied: 10 Mar. Cut once: 1 June. Deep-

tine cultivated because of crop failure: 22 July. Red clover

sown at 45 kg: 23 July. Variety: Red clover S 123.

Sainfoin 3rd year: Sprayed with paraquat at 0.6 kg ion in 281 l:

5 Feb, 1971. NK applied: 10 Mar. Sprayed with paraquat at

1.1 kg ion in 281 l: 4 June. Rotary cultivated after crop

failure: 30 June. Deep-tine cultivated: 9 Aug.

Potatoes: Ploughed: 4 Sept, 1970. NPK applied: 26 Mar, 1971.

Rotary cultivated: 29 Mar. Potatoes planted: 30 Mar.

Sprayed with linuron at 1.12 kg in 371 l: 5 May. Rotary ridged:

1 June. Sprayed with mancozeb at 1.34 kg plus demeton-s-methyl

at 245 g in 416 l: 28 June. Haulm destroyed mechanically:

23 Aug. Lifted: 24 Aug. Variety: Maris Piper.

Rye: Deep-tine cultivated twice: 29 Sept, 1970. Seed combine

drilled at 190 kg: 14 Oct. N applied 13 Apr, 1971. Seeds

hay undersown at 45 kg (AH plots): 22 Apr. Combine harvested:

31 Aug. Variety: King II.

Seeds hay: Seeds undersown in rye at 34 kg: 24 Apr, 1970. NPK

applied: 10 Mar, 1971. NK applied: 16 Aug. Cut three times:

1 June, 2 Aug, 8 Sept.

Carrots: Ploughed twice: 4 Sept, 1970, 26 Sept. NPK applied:

1 Apr, 1971. Power harrowed: 15 Apr. Seed drilled at

4.5 kg: 16 Apr. Sprayed with demeton-s-methyl at 245 g in 281 l:

19 July. Mechanically hoed: 4 - 5 June. Hand hoed twice:

7 June, 2 July. Lifted: 14 - 18 Oct. Variety: Autumn King.

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Test crops.

Potatoes, 1st test crop: Half corrective K applied to all plots except 35 and 36 after carrots: 23 Sept, 1970. Half corrective K applied to plots 35 and 36: 27 Oct. Ploughed: 3 Nov. Chloropicrin applied: 18 Dec. Remaining corrective K applied to all plots: 5 Mar, 1971. NPK applied: 26 Mar. Aldicarb applied, rotary cultivated: 29 Mar. Potatoes planted: 30 Mar. Sprayed with linuron at 1.12 kg in 371 l: 5 May. Rotary ridged: 1 June. Sprayed with mancozeb at 1.34 kg plus demeton-s-methyl at 245 g in 416 l: 28 June. Sprayed with mancozeb at 1.34 kg in 371 l: 12 Aug. Haulm destroyed mechanically: 17 Sept. Sprayed with undiluted BOV at 225 l: 20 Sept. Lifted: 28 - 30 Sept. Varieties: Maris Piper and Pentland Crown.

Barley, 2nd test crop: Magnesian limestone applied at 5020 kg: 8 Oct, 1970. Ploughed: 26 Oct. Seed combine drilled at 168 kg: 10 Mar, 1971. Sprayed with ioxynil at 0.53 kg and mecoprop at 1.58 kg in 281 l: 30 Apr. Combine harvested: 18 Aug. Variety: Julia.

NOTE: Soil samples were taken from the potato plots monthly, throughout the growing season and in the barley stubble, for counts of nematodes.

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SUMMARY OF RESULTS

RYE

GRAIN: TONNES/HECTARE

	LE	SA	AH	AR	Mean
O	4.15	3.83	3.11	3.17	3.57
D*	3.86	3.68	3.16	3.04	3.44
O	3.71	4.11	3.23	2.99	3.51
F	4.30	3.39	3.04	3.22	3.49
Mean	4.01	3.75	3.14	3.11	3.50

Mean D.M. %: 71.0

\* Last applied to test crop sugar beet 1963

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POTATOES TREATMENT CROP

	LE	SA	AH	AR	Mean
TOTAL TUBERS: TONNES/HECTARE					
O	39.1	31.0	27.0	26.2	30.8
D*	43.2	34.4	30.7	30.5	34.7
Mean	41.2	32.7	28.8	28.4	32.7

% WARE: 3.81 CM (1.5 INCH) RIDDLE

O	97.8	94.7	92.8	94.4	94.9
D*	96.9	95.5	95.2	95.4	95.7
Mean	97.3	95.1	94.0	94.9	95.3

\* Last applied to test crop sugar beet 1964

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POTATOES 1ST TEST CROP

TOTAL TUBERS: TONNES/HECTARE

	LE	SA	Mean	AH	AR	Mean
R	68.0	74.4	71.2	68.9	62.8	65.8
S	62.6	59.6	61.1	56.2	59.8	58.0
O	64.1	65.3	64.7	60.1	56.9	58.5
D*	66.5	68.8	67.6	65.0	65.6	65.3
O	60.1	63.0	61.5	56.0	56.1	56.1
F	70.5	71.0	70.8	69.1	66.5	67.8
O				59.4	59.3	59.3
C				65.7	63.2	64.5
Mean	65.3	67.0	66.2	62.6	61.3	61.9

\* Last applied to test crop sugar beet 1966

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POTATOES 1ST TEST CROP

% WARE: 3.81 CM (1.5 INCH) RIDDLE

	LE	SA	Mean	AH	AR	Mean
R	98.0	97.6	97.8	97.6	97.4	97.5
S	97.6	97.2	97.4	96.7	97.5	97.1
O	97.8	97.6	97.7	97.0	97.2	97.1
D*	97.7	97.2	97.5	97.3	97.7	97.5
O	97.8	97.4	97.6	96.9	97.3	97.1
F	97.8	97.4	97.6	97.3	97.7	97.5
O				96.9	97.2	97.1
C				97.3	97.7	97.5
Mean	97.8	97.4	97.6	97.1	97.5	97.3

\* Last applied to test crop sugar beet 1966



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CARROTS

ROOTS: TONNES/HECTARE

	O	D*	O	C	Mean
SA	97.5	97.2	92.2	102.5	97.4
AR	89.3	96.4	89.4	96.3	92.9
Mean	93.4	96.8	90.8	99.4	95.1

\* Last applied to test crop sugar beet 1967