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Yields of the Field Experiments 1976

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76/W/RN/3 Ley/ARABLE - Leys, Barley, Oats, Wheat

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76/W/RN/3

LEY/ARABLE

Object: To compare the effects on soil fertility of rotations with or without leys - Woburn Stackyard D.

Sponsors: D.A. Boyd, K. Evans, A.E. Johnston, F.G.W. Jones, G.A. Salt.

The 39th year, leys, barley, oats, wheat.

For previous years see 'Details' 1967, 68/B/2(t), 69/W/RN/3(t), 70/W/RN/3(t), 71/W/RN/3(t), 72/W/RN/3(t) and 73-75/W/RN/3.

Design: 5 series of 8 plots, split for treatments other than rotations.

Whole plot dimensions: 8.53 x 40.7.

Treatments: All phases of four five-course rotations were originally present:

ROTATION

LEY	Grass/clover ley:	L, L, L, P, W
CLO	All legume ley:	SA, SA, SA, P, W until 1971 then CL, CL, CL, P, W
A	Arable with roots:	P, R, C, P, W until 1971 then P, B, B, P, W
A H	Arable with hay:	P, R, H, P, W until 1971 then P, B, H, P, W

P = potatoes, R = rye, C = carrots, W = wheat, B = barley, H = hay,
L = grass/clover ley, SA = sainfoin ley, CL = red clover ley

Rotations themselves followed different cycles:

On four plots in each block the rotations were repeated (PER)

On four plots in each block arable rotations alternated each five years with ley rotations (ALT)

From 1976 all the rotations have been changed on all phases except for first and second test crops wheat in 1976:

(Previous LEY) LN, LN, LN, W, B
(Previous CLO) LC, LC, LC, W, B
(Previous A H) B, B, O, W, B
(Previous A) F, F, O, W, B

LN = Grass ley with N, LC = Clover/grass ley no N, O = Oats, F = Fallow

Previous alternating rotations have been changed to test eight-year leys:

LN, LN, LN, LN, LN, LN, LN, LN, W, B
LC, LC, LC, LC, LC, LC, LC, LC, W, B

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Treatments to first test crop wheat:

ROT CYCL Combinations of rotations and cycles defined above

LEY PER
CLO PER
A PER
A ALT
A H PER
A H ALT

Treatments to second test crop wheat:

ROTATION The four rotations defined above

Yields are taken from first and second test crops only.

Additional treatments to first test crop, wheat:-

1/2 plots

1. FYMRES66 Farmyard manure residues, last applied 1966:

NONE	None
FYM	38 tonnes on each occasion

1/8 plots

2. N Nitrogen fertiliser (kg N):

0	None
63	63
126	126
189	189

Additional treatments to second test crop, wheat:-

1/2 plots

1. FYMRES65 Farmyard manure residues, last applied 1965

NONE	None
FYM	38 tonnes on each occasion

1/4 plots

2. FUMRES75 Fumigant residues, applied 1975

NONE	None
DICHL+AL	Dichloropropene, 220 kg, plus aldicarb, 11 kg

1/8 plots

3. N Nitrogen fertiliser (kg N):

0	None
63	63
126	126
189	189

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Corrective K dressings (kg K₂O) as muriate of potash applied to first test crop wheat.

Continuous rotations	No FYM half plots	FYM half plots
Ley	238	176
Clover	0	126
Arable with hay	0	75
Arable	264	289

Alternating rotations (last two rotations in order)

Sainfoin/arable	201	151
Ley/arable with hay	188	163
Arable with hay/clover	213	238
Arable/ley	213	226

NOTE: For a fuller record of previous treatments see 'Details' 1967 etc.

Standard applications:-

All grass leys: Manures: (0:14:28) at 540 kg. N at 80 kg as 'Nitro-Chalk'. Weedkiller: Paraquat at 0.56 kg ion in 280 l.
 All clover/grass leys: Manures: (0:14:28) at 540 kg. Weedkiller: Paraquat at 0.56 kg ion in 280 l.
 Barley: Manures: (20:14:14) at 400 kg, combine drilled. Weedkiller: Ioxynil at 0.52 kg plus mecoprop at 1.6 kg in 280 l.
 Oats: Manures: (20:14:14) at 400 kg combine drilled. Weedkiller: Ioxynil at 0.52 kg plus mecoprop at 1.6 kg in 280 l.
 Winter wheat: Manures: Magnesian limestone to 2nd test crop only at 5 tonnes. (0:20:20) at 300 kg combine drilled. Weedkiller: Ioxynil at 0.63 kg plus mecoprop 1.9 kg in 280 l. Nematicide: Aldicarb to 1st test crop only at 10 kg.

Varieties: Grass ley: Timothy S51 15 kg, Meadow fescue S215 19 kg, sown at 34 kg.
 Clover/grass ley: Timothy S51 20 kg, Meadow fescue S215 16 kg, White clover S100 4 kg, sown at 40 kg.
 Barley: Julia, dressed with ethirimol, sown at 160 kg.
 Oats: Manod, sown at 190 kg.
 Winter wheat: Cappelle, sown at 210 kg.

Cultivations, etc.: - Treatment crops:

Grass ley and Clover/grass ley, 1st year: Subsoiled, tines 140 cm apart, 50 cm deep: 3 Sept, 1975. Deep-tine cultivated: 9 Sept. Ploughed: 7 Oct. Spring-tine cultivated: 9 Mar, 1976. Spring-tine cultivated with crumbler attached: 11 Mar. Power harrowed: 20 Apr.

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- Grass ley and Clover/grass ley, 2nd year: Deep-tine cultivated: 29 Dec, 1975. Rotary cultivated: 9 Mar, 1976. Ploughed: 10 Mar. Spring-tine cultivated with crumbler attached: 11 Mar. Power harrowed: 20 Apr.
- Grass ley and Clover/grass ley, 3rd year: Ploughed: 3 Nov, 1975. Rotary cultivated: 9 Mar, 1976. Ploughed: 10 Mar. Spring-tine cultivated with crumbler attached: 11 Mar. Power harrowed: 20 Apr.
- Grass ley and Clover/grass ley, 4th year: Rotary cultivated: 14 Oct, 1975. First half corrective K applied: 4 Nov. Rotary cultivated: 21 Nov. Second half corrective K applied: 1 Mar, 1976. Ploughed: 10 Mar. Spring-tine cultivated with crumbler attached, grass ley only: 11 Mar. Power harrowed grass ley only: 20 Apr.
- All grass leys and Clover/grass leys: PK applied, N applied to grass ley only, spring-tine cultivated with crumbler attached: 21 Apr. Seeds sown: 22 Apr. Topped: 11 June. Weedkiller applied: 20 July. Cultivated twice, with duck feet fitted: 23 July, 29 July. Power harrowed: 13 Aug.
- Barley, 1st treatment crop: Subsoiled, tines 140 cm apart, 50 cm deep: 3 Sept, 1975. Deep-tine cultivated: 9 Sept. Ploughed: 7 Oct. Spring-tine cultivated: 9 Mar, 1976. Spring-tine cultivated with crumbler attached, twice: 11 Mar, 22 Mar. Seed sown: 22 Mar. Rolled: 23 Mar. Weedkiller applied: 3 May. Combine harvested: 26 July.
- Barley, 2nd treatment crop: Deep-tine cultivated: 29 Dec, 1975. Rotary cultivated: 9 Mar, 1976. Ploughed: 10 Mar. Spring-tine cultivated with crumbler attached, twice: 11 Mar, 22 Mar. Seed sown: 22 Mar. Weedkiller applied: 3 May. Combine harvested: 26 July.
- Oats, 3rd treatment crop: Ploughed: 3 Nov, 1975. Rotary cultivated: 9 Mar, 1976. Ploughed: 10 Mar. Spring-tine cultivated with crumbler attached, twice: 11 Mar, 22 Mar. Seed sown: 22 Mar. Rolled: 23 Mar. Weedkiller applied: 3 May. Combine harvested: 4 Aug.
- Fallow, 1st treatment year: Subsoiled, tines 140 cm apart, 50 cm deep: 3 Sept, 1975. Deep-tine cultivated: 9 Sept. Ploughed: 7 Oct. Spring-tine cultivated: 9 Mar, 1976. Spring-tine cultivated with crumbler attached: 11 Mar. Spring-tine cultivated: 18 June. Cultivated twice, with duck feet fitted: 23 July, 29 July. Power harrowed: 13 Aug.
- Fallow, 2nd treatment year: Deep-tine cultivated: 29 Dec, 1975. Rotary cultivated: 9 Mar, 1976. Ploughed: 10 Mar. Spring-tine cultivated with crumbler attached: 11 Mar. Spring-tine cultivated: 18 June. Cultivated twice, with duck feet fitted: 23 July, 29 July. Power harrowed: 13 Aug.

Test crops:

- Winter wheat, 1st test crop: Rotary cultivated: 14 Oct, 1975. First half corrective K applied, ploughed: 4 Nov. Spring-tine cultivated with crumbler attached: 5 Nov. Aldicarb applied, rotary cultivated: 7 Nov. Seed sown: 10 Nov. Second half corrective K applied: 1 Mar, 1976. Rolled: 10 Mar. N applied: 15 Apr. Weedkiller applied: 20 Apr. Combine harvested: 2 Aug.
- Winter wheat, 2nd test crop: Magnesian limestone applied, deep-tine cultivated: 13 Oct, 1975. Spring-tine cultivated: 14 Oct. Seed sown: 15 Oct. Rolled: 10 Mar, 1976. N applied: 14 Apr. Weedkiller applied: 20 Apr. Combine harvested: 2 Aug.

NOTE: All grass leys and clover/grass leys failed to establish because of the summer drought.

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WINTER WHEAT 1ST TEST CROP

GRAIN TONNES/HECTARE

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

ROT CYCL	LEY PER	CLO PFR	A PER	A ALT	A H PER	A H ALT	MEAN
FYMRES66							
NONE	3.14	2.77	1.69	2.91	3.26	2.64	2.74
FYM	2.41	2.76	1.78	2.95	3.54	2.80	2.71
N							
0	2.40	3.17	0.43	2.65	2.48	2.80	2.32
63	3.01	2.71	2.24	3.21	3.64	2.66	2.91
126	2.61	2.57	2.24	3.12	3.72	2.69	2.83
189	3.07	2.61	2.04	2.74	3.76	2.73	2.83
MEAN	2.77	2.76	1.74	2.93	3.40	2.72	2.72
FYMRES66							
ROT CYCL	LEY PER	CLO PER	A PER	A ALT	A H PER	A H ALT	
N							
NONE	0	3.02	2.81	0.36	2.78	1.83	2.67
	63	3.24	2.89	2.65	3.11	3.02	2.71
	126	2.93	2.71	2.15	3.08	4.74	2.63
	189	3.36	2.66	1.61	2.67	3.46	2.57
FYM	0	1.79	3.53	0.49	2.53	3.14	2.93
	63	2.79	2.52	1.83	3.30	4.26	2.61
	126	2.29	2.43	2.34	3.17	2.70	2.76
	189	2.79	2.57	2.47	2.80	4.06	2.90

GRAIN MEAN DM% 87.9

STRAW TONNES/HECTARE

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

ROT CYCL	LEY PER	CLO PFR	A PER	A ALT	A H PER	A H ALT	MEAN
FYMRES66							
NONE	2.65	3.16	1.49	2.12	2.97	2.43	2.47
FYM	2.68	3.17	1.93	2.26	4.19	2.78	2.83
N							
0	1.98	2.96	1.07	1.33	2.31	2.26	1.99
63	2.86	2.89	2.03	2.48	3.84	2.28	2.73
126	2.53	3.08	2.15	2.49	4.38	3.24	2.98
189	3.27	3.73	1.59	2.45	3.79	2.63	2.91
MEAN	2.66	3.17	1.71	2.19	3.58	2.60	2.65
FYMRES66							
ROT CYCL	LEY PER	CLO PER	A PER	A ALT	A H PER	A H ALT	
N							
NONE	0	2.21	2.68	0.76	0.86	1.72	2.35
	63	2.60	3.03	1.92	2.64	2.69	2.29
	126	2.70	3.51	1.94	2.38	4.11	2.81
	189	3.08	3.43	1.35	2.59	3.36	2.26
FYM	0	1.76	3.24	1.37	1.81	2.90	2.17
	63	3.13	2.75	2.14	2.32	4.99	2.27
	126	2.36	2.65	2.37	2.61	4.66	3.68
	189	3.45	4.03	1.84	2.32	4.22	3.00

STRAW MEAN DM% 93.9 SUB PLOT AREA HARVESTED 0.00260

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WINTER WHEAT 2ND TEST CROP

GRAIN TONNES/HECTARE

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

ROTATION	LEY	CLO	A	A H	MEAN
FYMRES65					
NONE	2.37	2.88	2.26	2.44	2.49
FYM	2.62	2.75	2.40	2.50	2.57
FUMRES75					
NONE	2.42	2.84	2.29	2.51	2.52
DICHL+AL	2.57	2.79	2.37	2.44	2.54
N					
0	2.92	3.53	2.11	2.52	2.77
63	2.62	2.88	2.75	2.52	2.69
126	2.40	2.65	2.10	2.45	2.40
189	2.04	2.20	2.36	2.41	2.25
MEAN	2.50	2.81	2.33	2.47	2.53

GRAIN MEAN DM% 87.3

STRAW TONNES/HECTARE

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

ROTATION	LEY	CLO	A	A H	MEAN
FYMRES65					
NONE	3.95	4.85	3.08	4.73	4.15
FYM	4.52	4.75	3.42	3.71	4.10
FUMRES75					
NONE	4.14	4.40	2.41	3.92	3.72
DICHL+AL	4.33	5.19	4.09	4.53	4.53
N					
0	4.02	4.69	3.03	3.76	3.88
63	4.42	4.82	3.32	4.19	4.19
126	4.26	4.93	3.41	4.40	4.25
189	4.24	4.75	3.22	4.54	4.19
MEAN	4.24	4.80	3.25	4.22	4.13

STRAW MEAN DM% 92.7

SUB PLOT AREA HARVESTED 0.00260