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90/W/RN/3 Ley/ARABLE - Leys, S. Barley, W. Beans, W. Wheat

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90/R/RN/2 FOSTERS W.WHEAT (3RD TEST CROP)

GRAIN TONNES/HECTARE

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

FYMRES70 ROTATION	NONE	FYM	Mean
LUCERNE	3.80	3.53	3.67
CLOGRA	3.91	3.96	3.93
GRASS	3.57	3.86	3.72
ARABLE	3.66	3.66	3.66
Mean	3.74	3.75	3.75

N ROTATION	0	50	100	150	Mean
LUCERNE	2.21	3.59	3.85	5.02	3.67
CLOGRA	2.18	3.76	4.58	5.20	3.93
GRASS	2.08	3.48	4.52	4.79	3.72
ARABLE	1.83	3.81	4.27	4.73	3.66
Mean	2.08	3.66	4.31	4.94	3.75

N FYMRES70	0	50	100	150	Mean
NONE	2.19	3.45	4.40	4.92	3.74
FYM	1.97	3.87	4.22	4.96	3.75
Mean	2.08	3.66	4.31	4.94	3.75

ROTATION	N FYMRES70	0	50	100	150
LUCERNE	NONE	2.87	3.34	4.16	4.85
	FYM	1.55	3.84	3.54	5.19
CLOGRA	NONE	2.25	3.75	4.86	4.78
	FYM	2.12	3.78	4.31	5.63
GRASS	NONE	1.59	3.32	4.33	5.04
	FYM	2.58	3.63	4.72	4.53
ARABLE	NONE	2.04	3.39	4.23	4.99
	FYM	1.62	4.23	4.31	4.47

GRAIN MEAN DM% 90.4

PLOT AREA HARVESTED 0.00571

90/W/RN/3

LEY/ARABLE

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

Sponsor: P.R. Poulton.

The 53rd year, leys, w. beans, w. wheat, s. barley.

For previous years see 'Details' 1967 & 1973 and 74-89/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	Clover/grass 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 = w. rye, C = carrots, W = w. wheat, B = s. barley,
H = hay, L = clover/grass ley, SA = sainfoin ley, CL = red clover ley

Rotations themselves followed different cycles:

On four plots in each block the rotations were repeated

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

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

LN 3	(Previous LEY) LN, LN, LN, W, B
LC 3	(Previous CLO) LC, LC, LC, W, B
AF	(Previous A) F, F, BE, W, B
AB	(Previous A H) B, B, BE, W, B

LN1 to LN3 = three year grass ley with N, 1st year to 3rd year,
LC = clover/grass ley no N, BE = beans (s. oats until 1980), F = fallow

90/W/RN/3

Plots hitherto in alternating rotations were changed to test eight-year leys:

LLN	LN, LN, LN, LN, LN, LN, LN, W, B
LLC	LC, LC, LC, LC, LC, LC, LC, W, B

LLN1 to LLN8 = eight year grass ley with N, first year to eighth year, similarly for LLC

The new scheme started by sowing these new leys in spring 1976 on four phases and in spring 1977 on the fifth phase (2nd test crop in 1976).

Yields are taken only from the leys and the test crops.

Treatments to first test crop w. wheat, all combinations of:

Whole plots

1. **ROTATION** Rotations:

LN 8
LN 3
LC 8
LC 3
AF
AB

1/2 plots

2. **FYMRES64** Farmyard manure residues, last applied 1964:

NONE	None
FYM	38 tonnes on each occasion

1/8 plots

3. **N** Nitrogen fertilizer (kg N) as 'Nitro-Chalk' (27% N):

0
70
140
210

Treatments to second test crop s. barley, all combinations of:

Whole plots

1. **ROTATION** Rotations:

LN 8
LN 3
LC 8
LC 3
AF
AB

90/W/RN/3

1/2 plots

2. **FYMRES63** Farmyard manure residues, last applied 1963:

NONE	None
FYM	38 tonnes on each occasion

1/8 plots

3. **N** Nitrogen fertilizer (kg N) as 'Nitro-Chalk' (27% N):

0
60
120
180

Treatments to leys:

FYM RES Farmyard manure residues:

NONE	None
FYM	38 tonnes on each occasion, last applied 1962 to 1st and 6th year leys, 1966 to 2nd and 7th year leys, 1965 to 3rd and 8th year leys, 1964 to 4th year leys, 1963 to 5th year leys

Corrective K dressings (kg K₂O) as muriate of potash, applied to first test crop w. wheat and long-term leys in the wheat block:

Continuous rotations	No FYM half plots	FYM half plots
LN	125	145
LC	0	0
AF	200	220
AB	155	155

Ex-alternating rotations

LN 8 ploughed for w. wheat	0	0
LN 8 not ploughed	60	120
LC 8 ploughed for w. wheat	0	0
LC 8 not ploughed	20	0

Standard applications:-

Grass ley and clover/grass ley, 1st year: Manures: (0:18:36) at 420 kg. (25:0:16) at 300 kg to grass ley in spring and after the first cut. K₂O at 54 kg to clover/grass ley in spring and after the first cut.

Grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Manures: Chalk at 5.0 t to 5th year only. (25:0:16) at 300 kg in spring and after the first cut. (0:24:24) at 620 kg.

Clover/grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Manures: Chalk at 5.0 t to 5th year only. K₂O at 54 kg in spring and after the first cut. (0:24:24) at 620 kg.

90/W/RN/3

Standard applications:-

- S. barley, 1st and 2nd treatment crops: Manures: (20:10:10) at 400 kg. Weedkillers: Bromoxynil at 0.24 kg and clopyralid at 0.05 kg with mecoprop at 1.7 kg in 220 l. Fungicide: Fenpropimorph at 0.75 kg in 220 l.
- W. beans, 3rd treatment crop: Manures: (0:24:24) at 170 kg. Mn at 0.19 kg in 220 l and later at 0.096 kg in 220 l. Weedkillers: Propyzamide at 0.85 kg with simazine at 0.85 kg in 220 l. Fungicide: Fenpropimorph at 0.75 kg in 220 l. Insecticide: Deltamethrin at 7.5 g in 220 l applied on two occasions.
- Fallow, 1st and 2nd treatment years: No applications.
- W. wheat, 1st test crop: Manures: (0:24:24) at 260 kg. Weedkillers: Glyphosate at 1.4 kg in 220 l. Bromoxynil at 0.34 kg and clopyralid at 0.07 kg, with isoproturon at 2.1 kg and with fluroxypyr at 0.15 kg in 220 l. Fungicides: Propiconazole at 0.12 kg with chlorothalonil at 0.50 kg in 300 l. Insecticide: Carbofuran at 7.5 kg.
- S. barley, 2nd test crop: Manures: Chalk at 5.0 t. (0:24:24) at 260 kg. Weedkillers: Bromoxynil at 0.24 kg and clopyralid at 0.05 kg with mecoprop at 1.7 kg in 220 l. Fungicide: Fenpropimorph at 0.75 kg in 220 l. Insecticide: Carbofuran at 7.5 kg.

- Seed:** Grass ley: Climax timothy at 15 kg and meadow fescue at 15 kg, mixture sown at 30 kg.
- Clover/grass ley: Climax timothy at 15 kg, meadow fescue at 12 kg and Huia white clover at 3.4 kg, mixture sown at 30 kg.
- S. barley: Klaxon, dressed triadimenol and fuberidazole, sown at 160 kg.
- W. beans: Banner, sown at 18 seeds per square metre.
- W. wheat: Mercia, sown at 150 kg.

Cultivations, etc.:-

Treatment crops:

- Grass ley and clover/grass ley, 1st year: Ploughed: 31 Aug, 1989. Rolled: 1 Sept. PK applied: 6 Sept. Rotary cultivated with crumbler attached, seed sown: 7 Sept. NK applied to grass ley and K applied to clover/grass ley: 2 March, 1990 and 15 June. Cut: 6 June.
- Grass ley and clover/grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Corrective K applied to 4th year only: 16 Feb, 1990. NK applied to grass ley and K applied to clover grass ley: 2 Mar and 15 June. PK applied: 6 Mar. Cut: 6 June.
- S. barley, 1st and 2nd treatment crops: Ploughed: 5 Mar, 1990. NPK applied, rotary harrowed with crumbler attached, seed sown and harrowed: 7 Mar. Weedkiller applied: 23 May. Fungicide applied: 24 May. Combine harvested: 2 Aug.
- W. beans, 3rd treatment crop: Subsoiled with vibrating tines 50 cm apart and 40 cm deep: 14 Sept, 1989. PK applied: 19 Sept. Discd twice: 11 Oct. Seed broadcast by drill then ploughed: 13 Oct. Rolled: 14 Oct. Weedkillers applied: 15 Oct. Mn applied: 5 Apr, 1990 and 30 Apr. Insecticide applied: 23 Apr and 18 May. Fungicide applied: 11 July. Combine harvested: 10 Aug.
- Fallow, 1st and 2nd treatment years: Ploughed: 5 Mar, 1990. Spring-tine cultivated: 9 May. Cultivated with thistle bar: 21 June.

90/W/RN/3

Cultivations, etc.:-

Test crops:

- W. wheat, 1st test crop: Glyphosate applied: 1 Sept, 1989. Subsoiled with vibrating tines 50 cm apart and 40 cm deep: 13 Sept. Discd twice: 15 Sept. PK applied, ploughed: 19 Sept. Carbofuran applied, rotary harrowed with crumbler attached: 25 Sept. Seed sown: 26 Sept. Corrective K applied: 16 Feb, 1990. N treatments applied: 23 Mar. Remaining weedkillers applied: 24 Apr. Fungicides applied: 22 May. Combine harvested: 7 Aug.
- S. barley, 2nd test crop: Chalk applied: 16 Jan, 1990. Ploughed: 5 Mar. PK applied: 6 Mar. Carbofuran applied, power harrowed with crumbler attached, seed sown and harrowed: 7 Mar. N treatments applied: 14 Mar. Weedkillers applied: 23 May. Fungicide applied: 24 May. Combine harvested: 2 Aug.

LEYS

1ST AND ONLY CUTTING OCCASION (6/6/90) DRY MATTER TONNES/HECTARE

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

FYM RES	NONE	FYM	Mean
LEY			
LC1	2.93	2.58	2.76
LC2	5.21	4.79	5.00
LC3	1.23	1.84	1.54
LN1	4.09	3.39	3.74
LN2	5.89	5.10	5.49
LN3	2.81	1.90	2.35
LLC1	2.97	2.58	2.78
LLC2	5.31	5.13	5.22
LLC3	2.63	2.05	2.34
LLC4	1.81	1.21	1.51
LLC5	1.39	1.09	1.24
LLC6	2.56	2.61	2.58
LLC7	4.50	3.51	4.01
LLC8	2.68	2.13	2.41
LLN1	3.39	3.56	3.47
LLN2	5.96	4.37	5.17
LLN3	4.13	3.18	3.65
LLN4	1.95	2.45	2.20
LLN5	3.18	3.43	3.31
LLN6	3.65	3.37	3.51
LLN7	5.09	4.77	4.93
LLN8	4.03	4.11	4.07
Mean	3.52	3.14	3.33

1ST CUT MEAN DM% 27.3

PLOT AREA HARVESTED 0.00200

90/W/RN/3

W.WHEAT 1ST TEST CROP

GRAIN TONNES/HECTARE

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

FYMRES64 ROTATION	NONE	FYM	Mean
LN 8	4.36	5.01	4.69
LN 3	4.43	4.71	4.57
LC 8	6.11	5.62	5.87
LC 3	6.12	5.52	5.82
AF	4.80	4.49	4.65
AB	5.01	4.27	4.64
Mean	5.14	4.94	5.04

N ROTATION	0	70	140	210	Mean
LN 8	2.62	5.79	5.08	5.25	4.69
LN 3	1.73	4.94	5.43	6.17	4.57
LC 8	3.31	6.51	6.65	6.99	5.87
LC 3	3.59	6.06	7.20	6.42	5.82
AF	1.38	5.72	6.30	5.18	4.65
AB	1.47	4.94	5.83	6.33	4.64
Mean	2.35	5.66	6.08	6.06	5.04

N FYMRES64	0	70	140	210	Mean
NONE	2.27	5.94	6.07	6.27	5.14
FYM	2.43	5.39	6.09	5.84	4.94
Mean	2.35	5.66	6.08	6.06	5.04

N ROTATION	FYMRES64	0	70	140	210
LN 8	NONE	2.07	5.47	5.56	4.35
	FYM	3.17	6.12	4.59	6.15
LN 3	NONE	1.67	4.71	4.82	6.51
	FYM	1.79	5.18	6.03	5.83
LC 8	NONE	3.42	7.04	6.92	7.08
	FYM	3.21	5.99	6.38	6.91
LC 3	NONE	3.44	6.44	7.56	7.02
	FYM	3.74	5.69	6.85	5.82
AF	NONE	1.21	5.89	5.77	6.34
	FYM	1.55	5.56	6.83	4.01
AB	NONE	1.84	6.09	5.79	6.32
	FYM	1.09	3.78	5.86	6.34

GRAIN MEAN DM% 90.1

PLOT AREA HARVESTED 0.00183

90/W/RN/3

S.BARLEY 2ND TEST CROP

GRAIN TONNES/HECTARE

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

FYMRES63 ROTATION	NONE	FYM	Mean
LN 8	3.01	3.09	3.05
LN 3	3.50	3.83	3.66
LC 8	3.60	3.85	3.72
LC 3	2.50	2.96	2.73
AF	2.73	2.75	2.74
AB	1.40	1.66	1.53
Mean	2.79	3.02	2.91

N ROTATION	0	60	120	180	Mean
LN 8	2.14	3.29	3.43	3.34	3.05
LN 3	2.64	4.08	3.65	4.29	3.66
LC 8	2.52	4.01	4.39	3.99	3.72
LC 3	1.47	2.91	3.20	3.33	2.73
AF	0.92	2.78	3.61	3.64	2.74
AB	0.55	1.79	2.29	1.50	1.53
Mean	1.71	3.14	3.43	3.35	2.91

N FYMRES63	0	60	120	180	Mean
NONE	1.60	3.06	3.28	3.22	2.79
FYM	1.81	3.23	3.57	3.47	3.02
Mean	1.71	3.14	3.43	3.35	2.91

ROTATION	N FYMRES63	0	60	120	180
LN 8	NONE	1.79	3.56	3.31	3.37
	FYM	2.49	3.02	3.55	3.30
LN 3	NONE	2.56	3.61	3.67	4.15
	FYM	2.72	4.55	3.62	4.43
LC 8	NONE	2.31	3.95	4.29	3.83
	FYM	2.72	4.06	4.48	4.15
LC 3	NONE	1.61	2.75	2.49	3.15
	FYM	1.33	3.08	3.90	3.50
AF	NONE	0.80	2.96	3.72	3.42
	FYM	1.04	2.61	3.50	3.85
AB	NONE	0.52	1.51	2.20	1.38
	FYM	0.57	2.08	2.37	1.62

GRAIN MEAN DM% 90.2

PLOT AREA HARVESTED 0.00183