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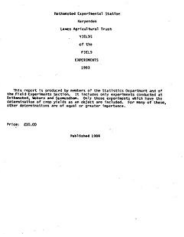
ROTHAMSTED RESEARCH

Yields of the Field Experiments 1983



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Rothamsted Research

Rothamsted Research (1984) *83/W/RN/3 Ley/ARABLE - Leys, S. Barley, S. Beans, W. Wheat ;* Yields Of The Field Experiments 1983, pp 61 - 66 **- DOI: https://doi.org/10.23637/ERADOC-1-44**

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83/W/RN/3

LEY/ARABLE

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

Sponsor: A.E. Johnston.

The 46th year, leys, s. barley, s. beans, w. wheat.

For previous years see 'Details' 1967 & 1973 and 74-82/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

LN = grass ley with N, LC = clover/grass ley no N, BE = s. beans (s. oats until 1980, failed in 1983 and replaced by potatoes), F = fallow

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

LN 8	LN, LN, LN, LN, LN, LN, LN, LN, W, B
LC 8	LC, LC, LC, LC, LC, LC, LC, LC, W, B

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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 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. FYMRES62 — Farmyard manure residues, last applied 1962:

   NONE — None
   FYM — 38 tonnes on each occasion

1/8 plots

3. N — Nitrogen fertilizer (kg 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

1/2 plots

2. FYMRES66 — Farmyard manure residues, last applied 1966:

   NONE — None
   FYM — 38 tonnes on each occasion

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83/W/RN/3

1/8 plots

3.	N	Nitrogen fertilizer (kg N):
	0	None
	60+60	60 kg to seedbed + 60 kg in June
	120+60	120 kg to seedbed + 60 kg in June
	180+60	180 kg to seedbed + 60 kg in June

NOTE: June nitrogen fertilizer was applied because of much leaching in the wet spring and consequent poor crop growth.

Corrective K dressings (kg K_2O) 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	276	276
LC	188	163
AF	289	251
AB	264	264
Ex-alternating rotations		
LN 8 ploughed for w. wheat	226	251
LN 8 not ploughed	301	163
LC 8 ploughed for w. wheat	0	0
LC 8 not ploughed	251	0

Standard applications:-

Grass ley and clover/grass, 1st year: Manures: (0:18:36) at 420 kg. N at 75 kg as 'Nitro-Chalk' to grass ley only. Weedkiller: Glyphosate at 1.5 kg in 280 l.

Grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Manures: Magnesian limestone at 5.0 t to 5th year only. (0:18:36) at 410 kg. (25:0:16) at 300 kg in spring and after the first cut.

Clover/grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Manures: Magnesian limestone at 5.0 t to 5th year only. (0:18:36) at 410 kg. K_2O at 48 kg as muriate of potash in spring and after the first cut.

S. barley, 1st and 2nd treatment crops: Manures: (20:10:10) at 400 kg, N at 60 kg as 'Nitro-Chalk'. Weedkillers: Dicamba with mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 250 l.

Fallow, 1st treatment crop: Weedkiller: Paraquat 0.84 kg ion in 280 l.

S. beans: 3rd treatment crop: Manures: (0:20:20) at 200 kg. Weedkiller: Trietazine at 0.76 kg with simazine at 0.11 kg in 280 l.

Potatoes, 3rd treatment crop: Manures: (10:10:15+4.5 Mg) at 1990 kg. Weedkillers: Linuron at 1.0 kg with paraquat at 0.40 kg ion in 250 l. Fungicides: Mancozeb at 1.4 kg in 250 l applied three times, with insecticide on the first and third occasions. Fentin hydroxide at 0.28 kg in 250 l applied five times, with insecticide on the first four occasions. Insecticide: Pirimicarb at 0.14 kg on six occasions.

W. wheat, 1st test crop: Manures: (0:20:20) at 310 kg. Weedkillers: Glyphosate at 1.5 kg in 280 l, mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) with fungicide in 250 l. Fungicide: Prochloraz at 0.40 l. Nematicide: Aldicarb at 10 kg.

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S. barley, 2nd test crop: Manures: Magnesian limestone at 5.0 t. (0:20:20) at 300 kg. Weedkillers: Dicamba with mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 250 l. Nematicide: Aldicarb at 10 kg.
Varieties: Grass ley: Climax timothy at 17 kg, meadow fescue at 17 kg, mixture sown at 34 kg.
Clover/grass ley: Climax timothy at 18 kg, meadow fescue at 15 kg, Huia white clover at 4 kg, mixture sown at 37 kg.
S. barley: Triumph, dressed with triadimenol and fuberidazole, sown at 160 kg.
S. beans: Minden, sown at 270 kg.
W. wheat: Avalon, sown at 190 kg.
Potatoes: Cara

NOTE: 3rd treatment crop of spring beans failed and was replaced by potatoes.

Cultivations, etc.:- Treatment crops:
Grass ley and clover/grass ley, 1st year: Ploughed: 8 Oct, 1982. Spring-tine cultivated: 8 Mar, 1983. PK applied, N applied to grass ley only: 13 Apr. Weedkiller applied: 16 May. Rotary cultivated: 7 June. Seeds sown: 9 June. Topped: 2 Aug, 15 Aug.
Grass ley and clover/grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Corrective K applied to 4th year only: 1 Oct, 1982. Magnesian limestone applied to 5th year only: 5 Oct. PK applied: 12 Jan, 1983. NK applied to grass ley, K applied to clover/grass ley: 17 Mar, 7 July. Cut: 17 June, 23 Aug.
S. barley, 1st and 2nd treatment crops: Ploughed, 2nd treatment crop: 21 Sept, 1982, 1st treatment crop: 8 Oct. Heavy spring-tine cultivated 2nd treatment crop, spring-tine cultivated 1st treatment crop: 8 Mar, 1983. NPK applied: 9 Mar. Spring-tine cultivated with crumbler attached, seed sown: 10 Mar. Weedkillers applied: 26 May. N applied: 6 June. Combine harvested: 10 Aug.
S. beans/Potatoes, 3rd treatment crop: Ploughed: 21 Sept, 1982. Heavy spring-tine cultivated: 8 Mar, 1983. PK applied: 9 Mar. Rotary cultivated, seed sown: 17 Mar. Trietazine with simazine applied: 29 Mar. NPK with Mg applied, rotary cultivated, potatoes planted: 27 May. Rotary ridged, linuron with paraquat applied: 7 June. Mancozeb applied: 22 June, 1 July, 8 July. Fentin hydroxide applied: 18 July, 29 July, 11 Aug, 26 Aug, 9 Sept. Insecticide applied: 22 June, 8 July, 18 July, 29 July, 11 Aug, 26 Aug. Haulm mechanically destroyed: 15 Sept. Lifted: 16 Sept.

Test crops:
W. wheat, 1st test crop: Glyphosate applied: 10 Sept, 1982. Ploughed: 24 Sept. PK applied: 30 Sept. Corrective K and aldicarb applied, rotary cultivated, seed sown: 1 Oct. N applied: 6 Apr, 1983. 'Brittox' with prochloraz applied: 15 Apr. Combine harvested: 12 Aug.
S. barley, 2nd test crop: Magnesian limestone applied: 5 Oct, 1982. Ploughed: 8 Oct. Spring-tine cultivated: 8 Mar, 1983. PK applied: 9 Mar. Aldicarb applied, rotary cultivated, seed sown: 10 Mar. N applied: 14 Mar. 'Herrisol' applied: 26 May. Extra N applied: 6 June. Combine harvested: 6 Aug.

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83/W/RN/3

W.WHEAT 1ST TEST CROP

GRAIN TONNES/HECTARE

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

FYMRES62	NONE	FYM	MEAN
ROTATION			
LN 8	6.75	6.29	6.52
LN 3	6.46	7.17	6.81
LC 8	8.22	9.02	8.62
LC 3	8.14	8.74	8.44
AF	7.26	6.98	7.12
AB	6.65	6.98	6.81
MEAN	7.25	7.53	7.39

N	0	70	140	210	MEAN
ROTATION					
LN 8	4.45	7.23	7.48	6.93	6.52
LN 3	3.86	7.05	8.06	8.28	6.81
LC 8	7.39	9.64	8.80	8.66	8.62
LC 3	6.36	9.67	9.34	8.40	8.44
AF	3.76	6.79	8.50	9.43	7.12
AB	4.11	6.28	8.70	8.17	6.81
MEAN	4.99	7.78	8.48	8.31	7.39

N	0	70	140	210	MEAN
FYMRES62					
NONE	4.94	7.48	8.30	8.26	7.25
FYM	5.03	8.07	8.66	8.36	7.53
MEAN	4.99	7.78	8.48	8.31	7.39

	N	0	70	140	210
ROTATION	FYMRES62				
LN 8	NONE	4.99	7.23	7.31	7.48
	FYM	3.91	7.23	7.65	6.38
LN 3	NONE	3.61	6.74	7.40	8.07
	FYM	4.10	7.36	8.71	8.49
LC 8	NONE	7.21	8.79	8.95	7.95
	FYM	7.56	10.49	8.65	9.37
LC 3	NONE	5.85	9.15	9.32	8.25
	FYM	6.86	10.19	9.36	8.55
AF	NONE	4.01	7.16	8.29	9.58
	FYM	3.51	6.42	8.71	9.28
AB	NONE	3.98	5.82	8.53	8.25
	FYM	4.24	6.74	8.87	8.09

GRAIN MEAN DM% 85.9

PLOT AREA HARVESTED 0.00251

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83/W/RN/3

BARLEY 2ND TEST CROP

GRAIN TONNES/HECTARE

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

FYMRES66	NONE	FYM	MEAN
ROTATION			
LN 8	6.19	5.89	6.04
LN 3	5.70	5.63	5.66
LC 8	5.95	5.66	5.80
LC 3	5.66	5.59	5.62
AF	3.82	3.72	3.77
AB	4.73	6.04	5.39
MEAN	5.34	5.42	5.38

N	0	60+60	120+60	180+60	MEAN
ROTATION					
LN 8	5.20	6.91	5.95	6.09	6.04
LN 3	4.82	6.47	6.02	5.32	5.66
LC 8	5.30	6.42	5.72	5.78	5.80
LC 3	4.22	6.29	6.11	5.87	5.62
AF	1.32	3.99	5.20	4.58	3.77
AB	3.79	6.07	6.53	5.16	5.39
MEAN	4.11	6.02	5.92	5.47	5.38

N	0	60+60	120+60	180+60	MEAN
FYMRES66					
NONE	3.87	6.04	5.99	5.46	5.34
FYM	4.34	6.01	5.85	5.48	5.42
MEAN	4.11	6.02	5.92	5.47	5.38

N		0	60+60	120+60	180+60
ROTATION	FYMRES66				
LN 8	NONE	4.70	7.11	6.49	6.44
	FYM	5.69	6.70	5.41	5.74
LN 3	NONE	4.54	6.55	6.12	5.57
	FYM	5.11	6.39	5.93	5.08
LC 8	NONE	5.01	6.55	5.39	6.83
	FYM	5.58	6.30	6.04	4.73
LC 3	NONE	4.92	6.02	6.46	5.23
	FYM	3.53	6.57	5.75	6.52
AF	NONE	1.00	4.50	5.71	4.08
	FYM	1.65	3.48	4.69	5.07
AB	NONE	3.06	5.53	5.75	4.59
	FYM	4.51	6.61	7.31	5.73

GRAIN MEAN DM% 85.0

PLOT AREA HARVESTED 0.00251

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