ROTHAMSTED RESEARCH

Rothamsted Report for 1936

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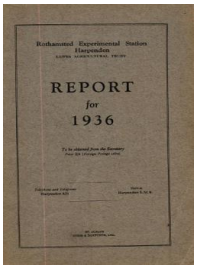

Continuous Rotation Experiments

Rothamsted Research

Rothamsted Research (1937) *Continuous Rotation Experiments ;* Rothamsted Report For 1936, pp 187 - 204 **- DOI: https://doi.org/10.23637/ERADOC-1-68**

FOUR COURSE ROTATION EXPERIMENT, ROTHAMSTED

RESIDUAL VALUES OF ORGANIC AND PHOSPHATIC FERTILISERS

For details, see 1932 Report, p. 127

MANURES APPLIED, SEASON 1935-6

Treatment	Organic Fertilisers (cwt. per acre)				Additional Artificial Fertilisers (cwt. per acre)		
	Organic Matter	N	P_2O_5	K_2O	N. as S. of A.	P_2O_5 as Super.	K_2O as Mur. of Pot
1	50 (as F.Y.M.)†	1.800	0.842	2.035	None†	0.358	0.965
2	50 (as Adco)	1.490	1.013	0.951	0.310	0.187	2.049
3	117.45 (as straw)	0.688	0.179	2.640	1.112	1.021	0.360
4			None		0.36	1.2	0.6
5			None		0.36	1.2*	0.6

* As mineral phosphate.

† The F.Y.M. used had too high a ratio of N. to organic matter, and had to be diluted with straw. The adjustment was made so that a quantity of the mixture containing 50 cwt. of organic matter, also contained 1.8 cwt. of N. No additional sulphate of ammonia was therefore required. The weights applied per acre were 288.3 cwt. F.Y.M. and 1.6 cwt. of straw.

CULTIVATIONS, ETC.

	Barley	Ryegrass	Potatoes	Wheat
Variety	Plumage Archer	Western Wolths	Ally	Yeoman
Date of Sowing ..	March 18	Sept.10	April 10	Oct. 26
Manures applied—				
Lime	Nov. 4			
Dung, Adco and accompanying artificials.. ..	Dec. 24 Straw Dec. 24	Sept. 5 Sept. 5	Dec. 24 Dec. 24	Sept. 6 Sept. 11
Artificials to straw	Dec. 24, March 13, 16	Sept. 5, Dec. 12, April 16	Dec. 24, March 13 April 9	Sept. 11, Dec. 12, March 25
Treatments 4 and 5	March 16	Sept. 10	April 9	Oct. 18
Harvested	Aug. 20	June 23	Sept. 25	Aug. 20
Previous crop ..	Potatoes	Barley	Wheat	Ryegrass
Cultivations—				
Ploughed ..	March 12-14	Sept. 5	Jan. 24-March 16	July 22, 23, Sept. 11
Harrowed ..	March 16-19	Sept. 7, 9, 10	April 7, 8	Oct. 24, 26, April 6
Rolled	March 18, April 28	Sept. 9	April 7	May 4
Hoed	May 27		Aug. 7	May 27
Ridged			April 9, June 29	
Grubbed			May 26, June 15, 26	

https://doi.org/10.23637/ERADOC-1-68

PLAN AND YIELDS

Potatoes—AP, plots 1-25
Yields in lb.

N.W.

5 328 IV	**2** 266 II	**1** 401 V	**3** 260 III	**4** 383 I
5 241 I	**1** 286 III	**3** 342 II	**4** 273 IV	**2** 191 V
3 372 I	**2** 195 IV	**5** 219 III	**4** 270 V	**1** 349 II
1 337 I	**3** 194 IV	**4** 228 II	**5** 153 V	**2** 230 III
4 211 III	**1** 129 IV	**5** 99 II	**3** 123 V	**2** 169 I

Barley—AB, plots 26-50
Yields in lb., grain above, straw below

N.W.

3 93.8 132.7 I	**2** 59.8 100.4 II	**5** 68.3 118.2 III	**4** 67.4 93.4 V	**1** 50.9 75.6 IV
4 77.5 100.0 II	**2** 45.6 74.2 V	**1** 74.8 94.4 I	**5** 67.8 110.7 IV	**3** 56.8 83 4 III
1 55.0 70.8 V	**4** 70.0 99.2 III	**3** 60.2 77.3 IV	**5** 70.2 114.0 II	**2** 75.1 103.6 I
4 78.6 102.9 IV	**5** 74.6 111.9 I	**3** 64.1 79.6 V	**2** 60.8 91.2 III	**1** 60.0 82.0 II
2 57.0 71.2 IV	**4** 73.2 105.8 I	**3** 61.2 75.3 II	**1** 52.9 76.8 III	**5** 67.9 98.8 V

Wheat—AW, plots 51-75
Yields in lb., grain above, straw below

N.W.

3 33.3 54.0 II	**4** 37.9 61.1 IV	**1** 28.1 44.9 III	**2** 24.1 37.4 V	**5** 31.2 65.8 I
3 38.9 58.1 III	**4** 37.9 64.1 I	**5** 38.2 60.8 II	**2** 21.1 34.2 IV	**1** 22.0 43.0 V
2 37.0 57.8 II	**4** 35.5 59.2 III	**3** 61.1 107.9 I	**1** 22.5 41.2 IV	**5** 34.4 67.8 V
5 39.1 64.6 III	**1** 32.8 54.2 II	**3** 26.5 41.5 IV	**4** 36.8 67.2 V	**2** 38.1 72.4 I
4 40.2 63.3 II	**2** 25.5 40.5 III	**1** 39.0 65.0 I	**5** 40.2 69.6 IV	**3** 29.1 50.9 V

Ryegrass—AR, plots 76—100
Yields in lb., hay

N.W.

4 82.4 I	**2** 48.8 II	**5** 74.5 V	**3** 38.1 III	**1** 32.3 IV
5 78.3 III	**2** 38.1 IV	**1** 63.8 I	**4** 75.1 V	**3** 47.0 II
2 34.7 V	**1** 55.3 II	**5** 81.2 IV	**4** 83.6 III	**3** 137.4 I
2 70.7 I	**4** 80.8 IV	**1** 43.9 III	**5** 75.1 II	**3** 38.1 V
5 84.6 I	**2** 46.2 III	**3** 47.9 IV	**1** 40.0 V	**4** 92.8 II

https://doi.org/10.23637/ERADOC-1-68

SUMMARY OF RESULTS, 1936

Manure	Year of Cycle	Wheat cwt. per acre Grain	Wheat cwt. per acre Straw	Potatoes tons per acre	Barley cwt. per acre Grain	Barley cwt. per acre Straw	Ryegrass cwt. per acre dry matter
Manure as F.Y.M.	I	14.3	23.8	6.18	27.4	34.6	15.9
	II	12.0	19.9	6.40	22.0	30.0	14.5
	III	10.3	16.4	5.24	19.4	28.1	9.3
	IV	8.2	15.1	2.36	18.6	27.7	8.8
	V	8.1	15.8	7.35	20.2	26.0	10.0
Manure as Adco	I	14.0	26.5	3.10	27.5	38.0	17.4
	II	13.6	21.2	4.87	21.9	36.8	12.5
	III	9.3	14.8	4.22	22.3	33.4	11.5
	IV	7.7	12.5	3.57	20.9	26.1	10.5
	V	8.8	13.7	3.50	16.7	27.2	9.5
Manure as Straw	I	22.4	39.5	6.82	34.4	48.6	33.5
	II	12.2	19.8	6.27	22.4	27.6	13.9
	III	14.2	21.3	4.76	20.8	30.6	10.4
	IV	9.7	15.2	3.56	22.1	28.3	13.0
	V	10.7	18.6	2.25	23.5	29.2	8 3
Super.	I	13.9	23.5	7.02	26.8	38.8	20.8
	II	14.7	23.2	4.18	28.4	36.6	23.2
	III	13.0	21.7	3.87	25.6	36.4	21.8
	IV	13.9	22.4	5.00	28.8	37.7	19.8
	V	13.5	24.6	4.95	24.7	34.2	19.5
Rock Phosphate	I	11.4	24.1	4.42	27.3	41.0	21.5
	II	14.0	22.3	1.81	25.7	41.8	19.2
	III	14.3	23.7	4.01	25.0	43.3	19.9
	IV	14.7	25.5	6.01	24.8	40.6	19.9
	V	12.6	24.8	2.80	24.9	36.2	18.8

A report on the results of this experiment to date is given on p. 51-53.

https://doi.org/10.23637/ERADOC-1-68

SIX COURSE ROTATION EXPERIMENTS

SEASONAL EFFECTS OF N, P_2O_5 AND K_2O

(FOR DETAILS, SEE *1932* REPORTS, p. *131*)

CULTIVATIONS, Etc.—ROTHAMSTED

	Sugar Beet	Barley	Clover Hay	Wheat	Potatoes	Rye
Variety	Kuhn	Plumage Archer	Broad Red	Yeoman	Ally	
Date of Sowing	April 24	March 18	April 18	Oct. 24	April 9	Nov. 27
Manures applied	April 24	March 16	Nov. 12, March 24	Oct. 18, March 23	April 9	Nov. 25, March 24
Lime applied		March 9				Nov. 4
Harvested	Dec. 4-6	Aug. 19	June 23	Aug. 19	Sept. 28	Aug. 14
Previous crop	Rye	Sugar Beet	Barley	Clover	Wheat	Potatoes
Cultivations—						
Ploughed	Aug. 26, Jan. 21	Dec. 19-Jan. 21		July 25	Sept. 18, March 28	Nov. 5
Harrowed	Aug. 28, April 20,24	March 17-19, May 2	April 18	Oct. 22, 24, March 24	Sept. 25, April 7	Nov. 27, April 6
Rolled	Aug. 28, April 24, 25	April 28, May 2	April 18	May 4	April 7	May 4
Singled	June 13-15					
Hoed	May 26, June 17, Aug. 15, 20	May 27		May 27	Aug. 11	May 27
Ridged					April 8, June 30	
Grubbed					May 26, June 27	

CULTIVATIONS, Etc.—WOBURN

	Sugar Beet	Barley	Clover Hay	Wheat	Potatoes	Rye
Variety	Kuhn	Plumage Archer	Broad Red	Yeoman	Ally	
Date of sowing	April 23	March 19	March 19	Oct. 25	April 7	Oct. 25
Manures applied	April 23	March 19	Oct. 25	Oct. 25	April 6	Oct. 25
			March 27	March 27		March 27
Lime applied		March 19				Oct. 17
Harvested	Nov. 4, 5	Aug. 18	Aug. 4	Aug. 19	Sept. 30	Aug. 19
Previous crop	Rye	Sugar Beet	Barley	Clover hay	Wheat	Potatoes
Cultivations—						
Ploughed	Sept. 4, 5, Feb. 21, 22	Feb. 24, 25		Sept. 10	Sept. 5, 6, Feb. 21	Oct. 15
Harrowed	Sept. 10, March 27, April 14, 23	March 17, 19, April 16	March 20	Oct. 23,25, March 27, April 24	Oct. 23, March 27, April 16, 23 May 4, 13	Oct. 23, 25, March 27 April 16, 24
Rolled	Sept. 10, March 25, April 17, 23, 29	March 16, 25, April 17	March 20	March 25	March 25	March 25
Singled	May 22, June 3,					
Hoed	May 27, June 11, 15, 30, Aug. 6, 26			April 15-17	May 28, June 11	April 10-14
Ridged					April 6, 20, 29, May 6, May 20, June 30	

https://doi.org/10.23637/ERADOC-1-68

ROTHAMSTED, 1936

Clover Hay—BC, plots 1-15
Yields in lb.

3N	**0N**	**0K**	**4P**	**2P**
67.1	50.3	61.6	70.8	66.2
4K	**2N**	**3K**	**0P**	**1P**
62.1	65.7	57.2	69.6	67.0
1N	**2K**	**1K**	**3P**	**4N**
51.9	66.4	65.2	63.4	76.1

N ↑

Rye—BR, plots 16-30
Yields in lb., grain above, straw below

3P	**4K**	**2K**	**3K**	**3N**
46.3	49.0	47.4	48.9	54.0
89.7	99.0	97.4	91.8	101.2
0P	**2P**	**1K**	**0N**	**4P**
46.1	48.0	40.8	37.8	50.8
93.2	97.5	101.7	70.4	92.0
1P	**0K**	**4N**	**2N**	**1N**
47.2	54.4	51.8	53.3	50.1
93.8	107.4	110.0	102.7	89.2

Sugar Beet—BS, plots 31-45
Yields in lb., roots (dirty) above, tops centre, sugar percentage below

2P	**0P**	**0N**	**2N**	**3K**
611	622	525	744	772
361	385	313	466	425
18.49	18.41	18.55	18.44	18.87
3P	**1P**	**4K**	**4P**	**0K**
568	641	699	705	684
324	373	430	488	424
18.61	18.81	18.41	18.32	18.18
4N	**3N**	**1N**	**2K**	**1K**
663	724	640	701	697
348	471	454	487	410
18.72	18.41	18.49	18.15	18.32

N ↑

Barley—BB, plots 46-60
Yields in lb., grain above, straw below

3K	**0K**	**1N**	**4P**	**2P**
80.4	87.1	78.4	72.0	67.4
124.1	126.1	138.6	134.8	130.1
1K	**4N**	**2N**	**3P**	**1P**
92.7	86.5	80.0	76.7	59.8
116.8	146.5	142.5	135.0	129.2
2K	**0N**	**3N**	**0P**	**4K**
90.6	85.2	91.4	78.1	61.2
125.9	115.8	153.3	142.4	141.8

Wheat—BW, plots 61-75
Yields in lb., grain above, straw below

4N	**0P**	**1N**	**0N**	**1K**
57.8	56.0	52.7	42.8	47.2
119.2	102.5	94.3	80.0	108.8
3P	**1P**	**2N**	**0K**	**4P**
53.9	57.3	58 4	52.7	51.6
104.8	107.2	111.4	104.6	107.2
2P	**3N**	**4K**	**2K**	**3K**
52.9	57.3	53.5	50.8	44.6
98.8	113.2	118.8	97.7	101.4

N ↑

Potatoes—BP, plots 76-90
Yields in lb.

4N	**0K**	**3N**	**0N**	**0P**
460	411	505	440	426
2K	**3K**	**4P**	**2P**	**3P**
384	390	506	475	483
1K	**2N**	**1N**	**4K**	**1P**
476	404	403	487	410

https://doi.org/10.23637/ERADOC-1-68

WOBURN, 1936

Wheat—CW, plots 1-15
Yields in lb., grain above, straw below

2K	4P	3P	2P	3N
66.2	66.2	75.0	73.5	82.5
118.7	114.0	130.5	132.0	152.5
3K	0K	0P	0N	2N
65.7	65.7	72.0	53.2	65.7
110.0	112.7	126.5	80.2	125.5
1K	4N	1P	1N	4K
58.7	75.2	68.5	62.5	65.7
100.5	133.2	117.7	99.5	112.0

N.W. ↑

Potatoes—CP, plots 16-30
Yields in lb.

2N	0N	4K	3P	2K
345	221	437	477	389
1N	4P	1P	0K	4N
281	356	456	422	434
3N	2P	0P	3K	1K
446	410	448	485	332

Clover Hay—CC, plots 31-45
Yields in lb., green weights

3K	4P	3P	1P	1N
330	340	364	389	338
0K	2K	0P	0N	2N
373	410	436	500	468
1K	2P	4N	4K	3N
327	410	398	389	374

N.W. ↑

Sugar Beet—CS, plots 46-60
Yields in lb., roots (dirty) above, tops centre, sugar percentage below

1P	0P	3K	0K	0N
446	479	594	592	506
263	285	329	408	343
17.34	17.34	17.08	16.68	17.19
2P	3P	1K	3N	4P
475	504	654	801	745
277	308	369	526	499
17.54	17.74	17.57	17.28	17.60
4K	2K	4N	1N	2N
432	589	874	771	661
271	342	536	426	415
17.57	17.51	17.16	17.51	17.31

Rye—CR, plots 61-75
Yields in lb., grain above, straw below

1P	0P	2N	4K	3K
54.7	53.0	57.2	55.5	56.2
107.7	116.2	125.5	123.2	118.2
4N	2P	0N	1K	0K
66.2	59.0	39.2	56.7	59.5
135.7	117.7	67.5	120.2	122.7
3P	3N	1N	4P	2K
57.2	66.2	36.0	56.0	52.5
116.0	136.0	91.5	110.2	105.2

N.W. ↑

Barley—CB, plots 76-90
Yields in lb., grain above, straw below

0N	1N	4K	0P	1K
54.5	75.2	66.7	83.2	77.5
128.5	153.7	115.5	135.0	128.7
2N	4P	3P	0K	4N
80.2	75.5	77.7	64.7	78.7
140.2	129.7	127.5	95.7	117.2
3N	1P	2P	2K	3K
78.0	74.0	74.7	72.2	70.0
115.7	117.7	115.5	113.7	119.0

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ROTHAMSTED, 1936

1.—Mean yields per acre and increments in yield per cwt. of N, P_2O_5 and K_2O.

		Average, 1930-35	1936	Standard error, 1936
Sugar Beet Roots (washed) tons	Yield	7.03	10.40	
	N	0.63	4.37	
	P	−0.36	0.51	
	K	0.18	0.65	
Tops tons	Yield	8.76	7.33	
	N	3.63	1.03	±2.43
	P	−1.68	1.87	±2.43
	K	−0.66	0.20	±1.46
Sugar percentage	Mean	16.92	18.48	
	N	−0.47	0.17	
	P	−0.65	−0.25	
	K	0.52	0.40	
Total sugar cwt.	Yield	24.4	38.4	
	N	1.4	**16.5**	±6.4
	P	−2.3	1.3	±6.4
	K	1.5	3.4	±3.8
Barley Grain cwt.	Yield	28.4	28.3	
	N	5.4	3.7	±5.8
	P	4.2	1.1	±5.8
	K	0.7	**−9.2**	±3.5
Straw cwt.	Yield	33.6	47.7	
	N	12.5	**18.1**	±5.7
	P	8.2	−2.2	±5.7
	K	2.9	5.5	±3.4
Clover Hay Dry matter cwt.	Yield	19.5*	15.4	
	N	15.8*	**8.8**	±2.8
	P	−0.4*	0.1	±2.8
	K	1.2*	−0.5	±1.7
Wheat Grain cwt.	Yield	24.7	18.8	
	N	3.8**	**8.2**	±2.7
	P	0.9	−3.0	±2.7
	K	1.6	−0.1	±1.6
Straw cwt.	Yield	46.9	37.4	
	N	19.9**	**23.1**	±4.7
	P	2.4	1.7	±4.7
	K	2.4	3.0	±2.8
Potatoes tons	Yield	6.52	7.93	
	N	1.87	1.68	±1.56
	P	0.83	2.77	±1.56
	K	2.89	0.47	±0.93
Rye Grain cwt.	Yield	25.2§	17.3	
	N	−1.4§	**7.6**	±3.3
	P	1.0§	1.9	±3.3
	K	−0.6§	−0.4	±2.0
Straw cwt.	Yield	51.5§	34.2	
	N	5.4§	**21.8**	±3.7
	P	8.0§	−1.7	±3.7
	K	−3.8§	−3.8	±2.2

§1934-35. **1931-1935. *4 years only, 1933 and 1935 crop failed. Significant results in heavy type. Negative sign means depression.

2.—Average percentage increments in yield for each application of N, P_2O_5 and K_2O.

	N		P		K		Standard error, 1936
	Average, 1930-35	1936	Average, 1930-35	1936	Average, 1930-35	1936	
Sugar Beet—							
Roots (washed)	1.04	6.30	−0.31	0.73	1.23	1.56	
Tops	6.46	2.10	−2.87	3.82	−1.18	0.67	±4.97
Sugar Percentage	−0.02	0.14	−0.41	−0.20	0.76	0.55	
Total sugar	0.59	**6.42**	−0.90	0.52	2.03	2.18	±2.50
Barley—Grain	3.04	1.98	2.31	0.56	0.70	**−8.13**	±3.10
Straw	5.62	**5.68**	3.73	−0.69	2.35	2.89	±1.79
Clover Hay—dry matter	9.92*	**8.55**	−3.90*	0.06	0.80*	−0.84	±2.70
Wheat—Grain	3.34**	**6.55**	0.64	−2.40	1.36	−0.16	±2.15
Straw	7.27**	**9.28**	0.59	0.67	1.04	1.98	±1.90
Potatoes	4.34	3.18	2.12	5.25	10.95	1.49	±2.95
Rye—Grain	−1.48§	**6.60**	0.72§	1.68	−1.04§	−0.52	±2.88
Straw	1.54§	**9.56**	2.31§	−0.73	−1.84§	−2.78	±1.63

§1934-35. **1931-1935. *4 years only, 1933 and 1935 crop failed. Significant results in heavy type. Negative sign means depression.

N

https://doi.org/10.23637/ERADOC-1-68

WOBURN, 1936

1.—Mean yields per acre and increments in yield per cwt. of N, P_2O_5 and K_2O.

		Average, 1930-35	1936	Standard error 1936
Sugar Beet Roots (washed) tons	Yield	7.00	9.23	
	N	3.24	7.53	
	P	−0.83	5.51	
	K	0.81	−1.97	
Tops tons	Yield	6.57	6.66	
	N	2.03	**5.79**	±1.74
	P	−0.15	**5.63**	±1.74
	K	1.71	−2.24	±1.04
Sugar percentage	Mean	16.84	17.36	
	N	−1.02	−0.19	
	P	−0.03	0.61	
	K	0.78	0.52	
Total Sugar cwt.	Yield	23.6	32.0	
	N	9.6	**25.5**	±10.0
	P	−3.0	20.4	±10.0
	K	3.9	−6.0	±6.0
Barley Grain cwt.	Yield	22.9	26.2	
	N	18.2	**12.1**	±4.6
	P	0.9	−2.7	±4.6
	K	2.7	−0.5	±2.7
Straw cwt.	Yield	38.3	44.1	
	N	25.3	−14.5	±9.5
	P	−0.1	−0.2	±9.5
	K	4.3	4.2	±5.7
Clover Hay Dry matter cwt.	Yield	21.6*	28.7	
	N	−11.2*	−8.2	±7.5
	P	−3.6*	−10.6	±7.5
	K	8.0*	1.0	±4.5
Wheat Grain cwt.	Yield	9.8†	24.2	
	N	14.0†	**15.2**	±3.5
	P	−0.9†	−1.3	±3.5
	K	−0.8†	1.0	±2.1
Straw cwt.	Yield	22.8†	42.0	
	N	30.6†	**38.0**	±8.4
	P	−1.5†	−2.9	±8.4
	K	−3.2†	1.2	±5.0
Potatoes tons	Yield	8.83	7.07	
	N	3.97	**7.03**	±1.72
	P	0.74	−1.93	±1.72
	K	0.74	1.30	±1.03
Rye Grain cwt.	Yield	20.6§	19.6	
	N	7.2§	**20.0**	±3.3
	P	−3.8§	2.1	±3.3
	K	−1.8§	−1.2	±2.0
Straw cwt.	Yield	34.8§	40.8	
	N	19.3§	**43.1**	±6.8
	P	−4.2§	−0.9	±6.8
	K	−4.0§	−0.1	±4.1

*4 years only, 1931-1935, 1934 crop failed. †1931-1935. §1934-1935 only. Significant results in heavy type. Negative sign means depression.

2.—Average percentage increments in yield for each application of N, P_2O_5 and K_2O.

	N		P		K		Standard error 1936
	Average 1930-35	1936	Average 1930-35	1936	Average 1930-35	1936	
Sugar Beet—Roots (washed)	6.12	12.24	−1.51	8.95	3.41	−5.33	
Tops	4.37	**13.03**	−0.32	**12.67**	5.95	−8.40	±3.91
Sugar percentage	−0.60	−0.17	−0.02	0.53	1.15	0.74	
Total sugar	5.30	**11.93**	−1.53	9.55	4.40	−4.71	±4.67
Barley—Grain	12.57	**6.93**	0.45	−1.52	3.40	−0.50	±2.61
Straw	10.36	−4.94	0.16	−0.07	2.64	2.38	±3.23
Clover Hay—Dry matter	−9.42*	−4.28	−0.44*	−5.54	10.33*	0.90	±3.94
Wheat—Grain	17.50†	**9.42**	−1.80†	−0.78	0.78†	1.03	±2.17
Straw	19.78†	**13.56**	−1.46†	−1.05	0.26†	0.71	±3.00
Potatoes	7.12	**14.91**	0.77	−4.10	1.80	4.60	±3.64
Rye—Grain	5.99§	**15.28**	−2.56§	1.58	−2.30§	−1.48	±2.50
Straw	8.49§	**15.86**	−1.78§	−0.32	−2.89§	−0.07	±2.49

*4 years only, 1931-35, 1934 crop failed. § 1934-35. †1931-35. Significant results in heavy type. Negative sign means depression.

https://doi.org/10.23637/ERADOC-1-68

THREE COURSE ROTATION EXPERIMENT, ROTHAMSTED, 1936

EFFECT OF PLOUGHING IN STRAW AND OF WINTER GREEN-MANURE CROPS

For details see *1933* Report, p. *118*

CULTIVATIONS, ETC

	Barley	Sugar Beet	Potatoes
Variety	Plumage Archer	Kuhn	Ally
Date of sowing	March 18	April 24	April 9
Manures applied—			
Artificials ..	Oct. 17, March 17	Sept. 4, April 24	Oct. 26, April 9
Adco and straw	October 17	September 4	October 26
Harvested ..	August 31	October 19	September 24-28
Previous crop ..	Potatoes	Barley	Sugar Beet
Cultivations—			
Ploughed ..	October 17, March 6, 7	September 4, March 30	October 28, March 26
Harrowed ..	October 29, March 16, 18, 19	September 24, October 26, March 30, April 21, 24	October 29, April 7
Rolled	October 29, March 18, April 28	April 18, 24, 25	April 7
Singled ..		June 12	
Hoed	May 27	May 26, June 17, Aug. 6, 14, 20, 25	August 11
Ridged			April 8, June 31
Grubbed ..			May 26, June 29

GREEN MANURE CROPS—GREEN WEIGHTS–TONS PER ACRE

Preceding		Manured 1934-35					Manured 1935-36				
		Art'ls.	Adco	St. 1	St. 2	*Mean*	Art'ls.	Adco	St. 1	St. 2	*Mean*
Barley	Vetches	0.53	0.38	0.56	0.42	*0.47*	0.34	0.16	0.64	0.58	*0.43.*
	Rye ..	2.00	1.71	2.09	2.09	*1.97*	1.24	1.36	1.83	1.73	*1.54*
Sugar Beet	Vetches	0.02	0.01	0.00	0.03	*0.02*	0.01	0.03	0.01	0.01	*0.02*
	Rye ..	1.63	1.86	1.65	1.25	*1.60*	1.54	1.46	1.16	1.24	*1.35*
Potatoes	Vetches	0.21	0.18	0.17	0.20	*0.19*	0.19	0.23	0.18	0.22	*0.20*
	Rye ..	1.41	1.41	1.58	1.52	*1.48*	1.44	1.11	1.17	1.54	*1.32*

PERCENTAGE DRY MATTER

Preceding		Sample 1	Sample 2
Barley	Vetches	4.42	6.48
	Rye	4.74	6.15
Sugar Beet ..	Vetches	14.16	12.73
	Rye	9.41	9.16
Potatoes ..	Vetches	9.68	10.00
	Rye	7.84	7.48

For each break of the rotation, two large samples each of rye and vetches were taken for dry matter determination. These were weighed fresh, dried at 100°C, cleaned from soil as far as possible and weighed again. The dry matter percentages thus include a dirt tare correction.

https://doi.org/10.23637/ERADOC-1-68

PLAN AND YIELDS

Sugar Beet—DS, Plots *49-72*. Yields in lb. roots (dirty) above, tops centre, sugar percentage below

N

St *1* R I	Ad R I	Ad V II	Ad V I	Ad R II	St *1* V I
561	534	510	519	445	485
369	335	331	322	278	316
18.64	19.13	19.18	19.01	18.92	18.92
St *1* O I	St *2* V II	St *1* V II	St *2* V I	St *2* R I	St *2* O I
551	620	600	532	486	486
366	474	471	382	326	340
18.81	19.04	18.49	19.50	19.30	18.90
Ar R I	Ar R II	Ar O I	Ad O I	St *1* O II	Ar V II
521	635	475	468	582	568
356	483	296	287	427	457
19.18	18.92	18.95	19.07	19.10	18.91
St *1* R II	Ad O II	St *2* R II	St *2* O II	Ar V I	Ar O II
632	536	581	567	472	567
564	396	416	425	400	508
18.52	18.84	18.92	19.13	18.18	18.46

Potatoes—DP. Plots *25-48*. Yields in lb.

N

St *1* O II	Ad O I	Ad R II	Ar V II	Ar R I	St *2* O I
501	410	339	492	318	341
St *2* O II	Ad V II	St *2* R I	St *2* V I	St *1* R II	Ar O I
514	434	374	426	439	362
Ar R II	Ad O II	St *2* R II	St *1* V I	St *1* R I	Ad V I
468	398	455	392	342	330
Ad R I	Ar V I	St *1* O I	Ar O II	St *2* V II	St *1* V II
428	435	502	497	333	353

Barley—DB, Plots *1-24*. Yields in lb. grain above, straw below

N

St *1* R II	St *2* R I	Ar R I	St *2* O II	Ar O II	Ad O I
80.3	60.5	51.1	71.5	78.6	67.0
97.7	75.5	72.9	85.5	105.9	86.2
St *1* O I	St *2* R II	St *1* O II	Ar V II	Ad O II	St *2* O I
72.8	72.9	76.0	75.6	60.8	65.7
87.7	89.8	93.5	102.4	73.2	78.8
Ar R II	St *2* V II	Ar V I	St *1* R I	Ad R I	St *1* V II
79.1	78.2	65.9	49.8	41.8	71.1
110.4	96.3	80.8	70.7	55.0	82.4
Ad V II	Ar O I	Ad V I	St *2* V I	St *1* V I	Ad R II
82.4	67.7	62.0	69.4	66.8	52.4
101.6	82.8	69.8	76.4	73.2	63.8

https://doi.org/10.23637/ERADOC-1-68

SUMMARY OF RESULTS

		Manured 1934-5					Manured 1935-6				
		Artificials	Adco	Straw St 1	Straw St 2	*Mean*	Artificials	Adco	Straw St 1	Straw St 2	*Mean*
Barley Grain cwt. p.a.	None	30.2	29.9	32.5	29.3	*30.5*	35.1	27.1	33.9	31.9	*32.0*
	Vetches	29.4	27.7	29.8	31.0	*29.5*	33.7	36.8	31.7	34.9	*34.3*
	Rye	22.8	18.7	22.2	27.0	*22.7*	35.3	23.4	35.8	32.5	*31.8*
	Mean	*27.5*	*25.4*	*28.2*	*29.1*	*27.6*	*34.7*	*29.1*	*33.8*	*33.1*	*32.7*
Straw cwt. p.a.	None	37.0	38.5	39.2	35.2	*37.5*	47.3	32.7	41.7	38.2	*40.0*
	Vetches	36.1	31.2	32.7	34.1	*33.5*	45.7	45.4	36.8	43.0	*42.7*
	Rye	32.5	24.6	31.6	33.7	*30.6*	49.3	28.5	43.6	40.1	*40.4*
	Mean	*35.2*	*31.4*	*34.5*	*34.3*	*33.9*	*47.4*	*35.5*	*40.7*	*40.4*	*41.0*
Sugar Beet Roots (washed) tons p.a.	None	9.53	9.55	11.45	10.02	*10.14*	10.94	10.49	12.01	11.70	*11.28*
	Vetches	9.37	10.67	10.02	10.71	*10.19*	11.43	10.42	12.08	12.61	***11.64***
	Rye	10.45	11.00	11.38	9.98	*10.70*	12.95	9.11	12.43	11.83	***11.58***
	Mean	*9.78*	*10.41*	*10.95*	*10.24*	*10.34*	*11.77*	*10.01*	*12.17*	*12 05*	*11.50*
Tops tons p.a.	None	6.61	6.41	8.17	7.59	*7.20*	11.34	8.84	9.53	9.49	*9.80*
	Vetches	8.93	7.19	7.05	8.53	*7.92*	10.20	7.39	10.51	10.58	*9.67*
	Rye	7.95	7.48	8.24	7.28	*7.74*	10.78	6.20	12.59	9.28	*9.71*
	Mean	*7.83*	*7.03*	*7.82*	*7.80*	*7.62*	*10.77*	*7.48*	*10.88*	*9.78*	*9.73*
Sugar percentage	None	18.95	19.07	18.81	18.90	*18.93*	18.46	18.84	19.10	19.13	*18.88*
	Vetches	18.18	19.01	18.92	19.50	*18.90*	18.91	19.18	18.49	19.04	*18.90*
	Rye	19.18	19.13	18.64	19.30	*19.06*	18.92	18.92	18.52	18.92	*18.82*
	Mean	*18.77*	*19.07*	*18.79*	*19.23*	*18.96*	*18.76*	*18.98*	*18.70*	*19.03*	*18.87*
Total sugar cwt. p.a.	None	36.1	36.4	43.1	37.9	*38.4*	40.4	39.5	45.9	44.7	*42.6*
	Vetches	34.1	40.6	37.9	41.8	*38.6*	43.2	40.0	44.6	48.0	*44.0*
	Rye	40.1	42.1	42.4	38.5	*40.8*	49.0	34.5	46.1	44.8	*43.6*
	Mean	*36.8*	*39.7*	*41.1*	*39.4*	*39.3*	*44.2*	*38.0*	*45.5*	*45.8*	*43.4*
Potatoes tons p.a.	None	8.08	9.15	11.20	7.61	*9.01*	11.09	8.88	11.18	11.47	*10.66*
	Vetches	9.71	7.37	8.75	9.51	*8.84*	10.98	9.69	7.88	7.43	*9.00*
	Rye	7.10	9.55	7.63	8.35	*8.16*	10.45	7.57	9.80	10.16	*9.50*
	Mean	*8.30*	*8.69*	*9.19*	*8.49*	*8.67*	*10.84*	*8.71*	*9.62*	*9.69*	*9.72*

A report on the results of this experiment to date is given on p. 54-55.

https://doi.org/10.23637/ERADOC-1-68

LONG PERIOD CULTIVATION EXPERIMENT, 1936

Long Hoos V
(For details see 1934 Report, p. 175)

CULTIVATIONS, Etc.

	Wheat	Mangolds	Barley
Variety	Little Joss*	Yellow Globe	Plumage Archer
Date of sowing	March 18	April 25	April 10
Manures applied—			
Cyanamide	May 7	April 21	April 8
Nitro-chalk	May 7	April 21, June 17	April 8
Super. & mur.pot.	—	April 21	
Harvested	Sept. 7	Oct. 21-23	Sept. 1
Previous crop	Barley	Wheat	Mangolds
Cultivations—			
Ploughed	Oct. 25, 26	Sept. 25**, April 7	April 6
Simared	Oct. 26	April 7	April 6
Cultivated	Oct. 26	April 7	April 6
Harrowed	Oct. 30, 31, March 17, 18	April 15, 24, 25	April 7, 8, 10
Hoed	—	May 26, June 17 July 6, Aug. 14, 20, 24, 27	May 27
Rolled	—	April 24, 25	April 8, 28
Singled	—	June 15, 16	

* Original sowing on Oct. 31 with Victor failed owing to insect attack (Helophorus nubilus).
** All plots ploughed shallow.

PLAN AND YIELDS IN LB.

Wheat—Grain left, straw right

1	C Sh N	33.4	68.1	P Sh Cy	31.7	75.8	73
	C D N	33.6	69.4	C Sh Cy	33.1	71.9	
	P Sh Cy	35.0	69.0	C D N	35.8	46.4	
	S D Cy	32.6	61.9	S Sh N	37.6	80.4	
	P D N	34.1	68.9	C D Cy	35.5	73.8	
	S Sh Cy	32.8	67.2	S Sh Cy	36.8	77.2	
B	P Sh N	35.9	73.6	S D Cy	36.9	73.8	A
	S D N	34.0	68.5	C Sh N	36.5	75.5	
	S Sh N	34.5	70.5	P Sh N	41.1	85.4	
	P D Cy	35.3	64.2	P D Cy	35.9	72.6	
N	C D Cy	33.0	62.0	P D N	38.4	79.6	
↑	C Sh Cy	33.1	63.9	S D N	38.2	78.8	
	C Sh N	35.9	51.1	C D Cy	35.6	70.6	
	S Sh Cy	34.9	65.8	P Sh Cy	38.8	81.7	
	P D Cy	37.1	84.2	S D Cy	37.5	81.5	
	C D Cy	37.3	76.2	P D Cy	41.5	93.8	
	C Sh Cy	35.9	70.6	S Sh N	40.9	88.8	
	P Sh Cy	38.7	77.3	C Sh Cy	33.5	68.0	
C	S Sh N	36.7	70.6	S D N	40.9	82.1	C
	C D N	34.5	67.5	C D N	38.6	77.4	
	S D N	34.3	70.7	P Sh N	39.1	81.4	
	P Sh N	40.7	81.3	P D N	41.2	91.0	
	S D Cy	34.0	67.5	S Sh Cy	34.3	68.2	
	P D N	34.4	71.6	C Sh N	36.3	78.0	

https://doi.org/10.23637/ERADOC-1-68

Barley—Grain left, straw right

	S Sh N	43.4	70.4	S Sh N	37.4	61.6	
	C Sh N	37.9	60.8	S D Cy	41.9	63.6	
	C Sh Cy	39.0	64.2	P Sh Cy	41.0	64.0	
	P D N	49.9	75.5	P Sh N	48.0	69.5	
	C D N	39.0	61.2	P D Cy	55.3	76.2	
C	P Sh Cy	44.4	68.4	C D Cy	40.2	59.6	C
	C D Cy	42.4	67.4	S D N	43.9	64.6	
	S D Cy	46.9	73.6	P D N	48.8	67.7	
	P Sh N	47.8	66.2	S Sh Cy	44.5	61.5	
	S Sh Cy	45.9	72.1	C Sh N	26.8	46.4	
	S D N	50.0	75.0	C D N	39.3	58.0	
	P D Cy	48.4	71.8	C Sh Cy	31.0	51.5	
	C D N	50.7	71.3	P D Cy	45.9	64.1	
	S Sh Cy	44.9	64.6	P Sh Cy	46.4	63.1	
	S Sh N	48.4	78.8	C D N	48.8	69.7	
	S D N	50.6	78.2	S D Cy	49.5	65.5	
	P Sh N	50.8	67.7	C D Cy	40.7	57.8	
A	C Sh N	47.2	73.6	C Sh N	42.5	66.5	B
	P Sh Cy	48.6	73.6	P Sh N	52.4	66.1	
	P D N	57.4	77.1	S Sh Cy	47.0	62.0	
	S D Cy	50.6	65.9	S D N	51.7	65.6	
	P D Cy	48.7	72.8	S Sh N	45.7	60.3	
	C Sh Cy	46.8	74.7	P D N	50.4	68.6	
	C D Cy	49.0	79.0	C Sh Cy	43.0	68.5	

Mangolds—Roots left, tops right

	C Sh N	331	54	P D N	462	72	
	S Sh N	386	63	P Sh N	395	64	
	P Sh Cy	340	58	P D Cy	351	56	
	C D Cy	299	50	S Sh Cy	317	50	
	C Sh Cy	256	50	P Sh Cy	314	53	
	C D N	256	46	C D N	322	49	
C	S Sh Cy	240	50	C Sh Cy	310	52	A
	S D Cy	310	56	S D N	384	58	
	P D Cy	382	66	C Sh N	311	46	
	P Sh N	408	71	S Sh N	348	51	
	P D N	388	62	S D Cy	388	60	
	S D N	364	60	C D Cy	372	56	
	P D N	427	78	S D Cy	387	66	
	S Sh N	388	70	C D Cy	296	52	
	S D N	326	54	C Sh Cy	321	56	
	C D N	333	55	P Sh N	385	58	
	S D Cy	394	62	C D N	366	62	
	P D Cy	349	56	S Sh N	328	60	
B	S Sh Cy	274	46	S D N	398	70	C
	C Sh N	374	60	S Sh Cy	306	54	
	P Sh Cy	371	62	P D Cy	422	67	
	C Sh Cy	411	68	P D N	410	68	
	P Sh N	444	66	C Sh N	356	56	
72	C D Cy	425	65	P Sh Cy	358	60	144

https://doi.org/10.23637/ERADOC-1-68

Summary of Results

Last Year / This year	Continuous P P	Continuous S S	Continuous C C	Mean	Cycle A C P	Cycle A P S	Cycle A S C	Cycle B S P	Cycle B C S	Cycle B P C	Mean
Wheat				GRAIN : cwt. per acre							
N D	21.9	21.8	21.2	*21.6*	22.3	22.2	20.8	19.8	19.7	19.5	*20.7*
N Sh	23.2	22.5	21.0	*22.2*	23.8	21.8	21.2	20.8	20.0	19.4	*21.2*
Cy D	22.8	20.7	21.2	*21.6*	20.8	21.4	20.6	20.5	18.9	19.2	*20.2*
Cy Sh	22.5	20.1	20.1	*20.9*	18.4	21.4	19.2	20.3	19.0	19.2	*19.6*
St. errors		±0.962		*±0.555*							
				STRAW : cwt. per acre							
N D	47.2	44.3	42.0	*44.5*	46.2	45.7	26.9	40.0	39.8	40.3	*42.4**
N Sh	47.2	46.2	37.5	*43.6*	49.6	46.7	43.8	42.7	40.9	39.5	*43.9*
Cy D	51.6	43.2	42.6	*45.8*	42.1	42.8	42.8	37.2	35.9	36.0	*39.5*
Cy Sh	46.1	38.9	40.2	*41.7*	44.0	44.8	41.7	40.0	39.0	37.1	*41.1*
St. errors		±2.81		*±1.62*							
Mangolds				ROOTS : tons per acre							
N D	23.16	22.11	18.05	*21.11*	26.81	22.28	18.69	24.78	18.92	19.32	*21.80*
N Sh	23.01	20.72	19.94	*21.22*	22.92	20.20	18.05	25.77	22.52	21.70	*21.86*
Cy D	23.33	20.22	17.26	*20.27*	20.37	22.52	21.59	20.25	22.87	24.66	*22.04*
Cy Sh	20.25	15.84	16.74	*17.61*	18.22	18.40	17.99	21.53	15.90	23.85	*19.32*
St. errors		±1.33		*±0.768*							
				TOPS : tons per acre							
N D	3.74	3.77	3.10	*3.54*	4.18	3.37	2.84	4.56	3.16	3.19	*3.55*
N Sh	3.76	3.55	3.21	*3.51*	3.74	2.96	2.70	3.83	4.06	3.51	*3.47*
Cy D	3.84	3.54	2.97	*3.45*	3.22	3.51	3.25	3.28	3.63	3.77	*3.44*
Cy Sh	3.44	3.05	3.06	*3.18*	3.08	2.93	3.02	3.57	2.64	3.95	*3.20*
Barley				GRAIN : cwt. per acre							
N D	28.4	27.2	22.7	*26.1*	33.3	29.4	29.4	29.2	30.0	28.3	*29.9*
N Sh	27.8	23.4	18.8	*23.3*	29.5	28.1	27.4	30.4	26.5	24.7	*27.8*
Cy D	30.1	25.8	24.0	*26.6*	28.3	29.4	28.4	26.6	28.7	23.6	*27.5*
Cy Sh	24.8	26.2	20.3	*23.8*	28.2	26.0	27.2	26.9	27.3	25.0	*26.8*
St. errors		±1.36		*±0.785*							
				STRAW : cwt. per acre							
N D	41.6	40.5	34.6	*38.9*	44.7	45.4	41.4	39.8	38.1	40.4	*41.6*
N Sh	39.4	38.3	31.1	*36.3*	39.3	45.7	42.7	38.4	35.0	38.6	*40.0*
Cy D	42.9	39.8	36.8	*39.8*	42.2	38.2	45.8	37.2	38.0	33.5	*39.2*
Cy Sh	38.4	38.8	33.6	*36.9*	42.7	37.5	43.4	36.6	36.0	39.8	*39.3*
St. errors		±1.71		*±0.987*							

* Excluding SC Cycle A.

https://doi.org/10.23637/ERADOC-1-68

Mean of Nitro-Chalk and Cyanamide

Last year / This year	Continuous			Mean	Cycle A			Cycle B			Mean
	P / P	S / S	C / C		C / P	P / S	S / C	S / P	C / S	P / C	
Wheat					GRAIN : cwt. per acre						
D ..	22.4[1]	21.3[1]	21.2[1]	*21.6*[3]	21.6	21.8	20.7	20.2	19.3	19.4	*20.5*
Sh ..	22.8[1]	21.3[1]	20.6[1]	*21.6*[3]	21.1	21.6	20.2	20.6	19.5	19.3	*20.4*
Mean	*22.6*[2]	*21.3*[2]	*20.9*[2]	*21.6*	*21.4*	*21.7*	*20.4*	*20.4*	*19.4*	*19.4*	*20.4*
St. errors (1) ±0.680, (2) ±0.481, (3) ±0.393.											
					STRAW : cwt. per acre						
D ..	49.4[1]	43.8[1]	42.3[1]	*45.2*[3]	44.1	44.2	42.8*	38.6	37.8	38.2	*40.9**
Sh ..	46.6[1]	42.6[1]	38.8[1]	*42.7*[3]	46.8	45.8	42.8	41.4	40.0	38.3	*42.5*
Mean	*48.0*[2]	*43.2*[2]	*40.6*[2]	*43.9*	*45.4*	*45.0*	*42.8**	*40.0*	*38.9*	*38.2*	*41.7**
St. errors (1) ±1.99, (2) ±1.41, (3) ±1.15.											
Mangolds					ROOTS : tons per acre						
D ..	23.24[1]	21.16[1]	17.66[1]	*20.69*[3]	23.59	22.40	20.14	22.52	20.90	21.99	*21.92*
Sh ..	21.63[1]	18.28[1]	18.34[1]	*19.42*[3]	20.57	19.30	18.02	23.65	19.21	22.78	*20.59*
Mean	*22.44*[2]	*19.72*[2]	*18.00*[2]	*20.05*	*22.08*	*20.85*	*19.08*	*23.08*	*20.06*	*22.38*	*21.26*
St. errors (1) ±0.940, (2) ±0.665, (3) ±0.543.											
					TOPS : tons per acre						
D ..	3.79	3.66	3.04	*3.50*	3.70	3.44	3.04	3.92	3.40	3.48	*3.50*
Sh ..	3.60	3.30	3.14	*3.35*	3.41	2.94	2.86	3.70	3.35	3.73	*3.33*
Mean	*3.70*	*3.48*	*3.09*	*3.42*	*3.56*	*3.19*	*2.95*	*3.81*	*3.38*	*3.60*	*3.42*
Barley					GRAIN : cwt. per acre						
D ..	29.2[1]	26.5[1]	23.4[1]	*26.4*[3]	30.8	29.4	28.9	27.9	29.4	26.0	*28.7*
Sh ..	26.3[1]	24.8[1]	19.6[1]	*23.6*[3]	28.8	27.1	27.3	28.6	26.9	24.8	*27.2*
Mean	*27.8*[2]	*25.6*[2]	*21.5*[2]	*25.0*	*29.8*	*28.2*	*28.1*	*28.2*	*28.2*	*25.4*	*28.0*
St. errors (1) ±0.965, (2) ±0.682, (3) ±0.557.											
					STRAW : cwt. per acre						
D ..	42.2[1]	40.2[1]	35.7[1]	*39.4*[3]	43.4	41.8	43.6	38.5	38.1	37.0	*40.4*
Sh ..	38.9[1]	38.6[1]	32.4[1]	*36.6*[3]	41.0	41.6	43.1	37.5	35.5	39.2	*39.6*
Mean	*40.6*[2]	*39.4*[2]	*34.0*[2]	*38.0*	*42.2*	*41.7*	*43.4*	*38.0*	*36.8*	*38.1*	*40.0*

St. errors (1) ±1.21, (2) ±0.856, (3) ±0.699.

* Excluding **SCDN** Cycle A.

https://doi.org/10.23637/ERADOC-1-68

Conclusions

For all three crops the plots ploughed every year gave consistently higher yields than those simared every year, and the latter gave higher yields than the cultivated plots. For wheat and barley the results were similar with the rotating cultivations, though the differences were somewhat smaller. For mangolds with the rotating cultivations, the results were similar in Cycle A but in Cycle B the cultivated plots gave higher yields than the simared plots. It should be noted, however, that the ploughing, simaring, and cultivating were all carried out at the same time. It is proposed to modify this practice in future, the ploughing being carried out at a time judged favourable to it, while simaring and cultivating are postponed until a favourable time nearer sowing date.

For barley the deep cultivations gave higher yields than the shallow cultivations, the differences being smaller on the rotating part than on the continuous part of the experiment. For mangolds there was little difference between deep and shallow cultivations on the plots receiving nitrochalk, but on the cyanamide plots the shallow cultivations gave reduced yields. For wheat grain deep and shallow cultivations gave almost identical results.

There was again little difference for wheat and barley between the yields with nitrochalk and cyanamide.

https://doi.org/10.23637/ERADOC-1-68

NEW GREEN MANURING EXPERIMENT,

STACKYARD, WOBURN

Begun Autumn, 1936

OBJECTS : To compare the fertilising effects on kale of clover and ryegrass as leys (after taking a crop of hay) and of mustard and tares as green manures ploughed in in mid-season.

To assess the effects on kale of dung and sulphate of ammonia and of the application of straw with and without dung and sulphate of ammonia.

ROTATION : Barley, seeds, kale. (2nd season.)

TREATMENTS : 5×2^3 factorial design.

LEYS AND GREEN MANURES : Clover sod ploughed in, ryegrass sod ploughed in, tares ploughed in, mustard ploughed in, fallow.

The seeds are established under barley. After barley some of the plots not carrying leys are sown with green manures, the remainder being left fallow. In mid-season the leys are cut and weighed and the yields of the green manure crops are determined by sampling.

DUNG : None, 10 tons per acre.

SULPHATE OF AMMONIA : 2 cwt., 4 cwt. per acre.

STRAW : None, 1½ tons per acre.

These are applied to the land before sowing kale.

ARRANGEMENT : Two randomised blocks of 40 plots. As the rotation is a two-year one, each stage of it is grown every year in single replication.

SPECIAL NOTE : In 1936 only the green manure and the kale crop were grown, mustard being grown on the (C) plots and tares on the (R) plots.

SPECIAL NOTE: In 1936 only the green manure and the kale crop were grown, mustard being grown on the (C) plots and tares on the (R) plots.

KALE

WK—STACKYARD—1936

Plan and Yields in lb.

20	M(C)	—	—	N	885	T	D	S	2N	1224	40
	M	—	—	N	871	T(R)	—	—	N	822	
	F	—	S	2N	1156	F	—	—	2N	963	
	M	—	S	2N	1114	M	D	S	N	922	
	T	D	S	N	1131	F	D	—	2N	1215	
	T	—	—	N	1043	M(C)	D	—	2N	1182	
	M(C)	D	S	2N	1283	T	—	S	N	893	
	T(R)	D	—	2N	1486	F	D	S	N	908	
	M(C)	—	S	N	774	M(C)	—	S	2N	964	
	T(R)	—	S	2N	1170	F	—	—	N	728	
	F	D	—	N	1191	T(R)	D	S	N	1115	
	M	—	—	2N	1082	F	D	S	2N	1219	
	M(C)	D	—	N	1050	T	D	—	N	1206	
	F	—	S	N	856	T(R)	—	S	N	802	
	M(C)	—	—	2N	1170	M	—	S	N	664	
	T(R)	D	S	2N	1390	M	D	—	N	1008	
	T	—	S	2N	1225	M	D	S	2N	1230	
	M(C)	D	S	N	1118	T	—	—	2N	1114	
	T(R)	—	—	2N	1275	T(R)	D	—	N	1150	
1	M	D	—	2N	1277	T	D	—	2N	1228	21

SYSTEM OF REPLICATION : 1 randomised block of 40 plots.

AREA OF EACH PLOT : 0.0367 acre (201.5 lks. × 18.2 lks.)

BASAL MANURING : 3 parts superphosphate and 1 part muriate of potash at the rate of 4 cwt. per acre.

CULTIVATIONS, ETC. : Ploughed ; Feb.-March. Rolled ; March 16. Tares drilled ; March 16. Harrowed ; March 16. Mustard drilled ; April 14. Harrowed mustard and fallow plots ; April 14. Rolled ; April 17. Harrowed tare plots ; April 28. Rolled tare plots ; May 4. Harrowed fallow plots ; June 2. Dung applied ; June 8. Straw applied ; June 10. Ploughed June 10-15. Rolled ; June 17. Harrowed ; June 23. Kale drilled ; June 23. Sulphate of ammonia applied ; June 23. Harrowed and Rolled ; June 24. Thinned ; July 14-22. Plants 6 inches apart in the rows. Horse hoed ; Aug. 6 and 13. Hand hoed ; Aug. 25 and Sept. 9. Harvested ; Jan. 20. Variety ; Thousand head. Previous crop ; wheat.

STANDARD ERROR PER PLOT ; Kale ; 1.13 tons per acre or 8.65%.

https://doi.org/10.23637/ERADOC-1-68

Nitrogen and organic matter buried in green crops

	Tares	Mustard	*Mean*
Dry organic matter cwt. per acre	5.8	9.2	*7.5*
Nitrogen lb. per acre	24.0	17.8	*20.9*

Yields of Kale : tons per acre
Main effects and interactions of green manures with fertilisers

	Green manure None	Tares	Mustard	*Mean*	*Increase*
No dung	11.26[1]	12.69[2]	11.44[2]	*11.90*[4]	
Dung	13.79[1]	15.10[2]	13.79[2]	*14.32*[4]	*+2.42*[6]
No straw	12.46[1]	14.18[2]	12.96[2]	*13.35*[4]	
Straw	12.59[1]	13.61[2]	12.27[2]	*12.87*[4]	*−0.48*[6]
2 cwt. Sulphate of ammonia ..	11.20[1]	12.41[2]	11.09[2]	*11.64*[4]	
4 cwt. Sulphate of ammonia ..	13.85[1]	15.38[2]	14.14[2]	*14.58*[4]	*+2.94*[6]
Mean	*12.52*[2]	*13.90*[3]	*12.62*[3]	*13.11*	
Increase		*+1.38*[5]	*+0.10*[5]		
Standard errors	[1] ±0.565, [2] ±0.400, [3] ±0.283, [4] ±0.253, [5] ±0.490, [6] ±0.358.				

Interactions of fertilisers

Tons per acre (±0.505)

	2 cwt. Sulphate of ammonia No dung	Dung	4 cwt. Sulphate of ammonia No dung	Dung
No straw ..	10.58	13.64	13.64	15.54
Straw ..	9.70	12.64	13.70	15.44

Conclusions

There was a significant response in kale of 1.4 tons per acre to the tares ploughed in, while the response to mustard ploughed in was negligible. This difference cannot be accounted for by the difference in the amounts of nitrogen buried in the tares and mustard.

Sulphate of ammonia significantly increased the yield of kale by 2.9 tons per acre, and dung by 2.4 tons per acre. The response to each was somewhat greater in the absence of the other, than in its presence, but the difference was not significant. The effects of straw were not significant.

There was no indication of any effect of the green manures on the responses to dung and sulphate of ammonia.

https://doi.org/10.23637/ERADOC-1-68