ROTHAMSTED RESEARCH

Yields of the Field Experiments 1954

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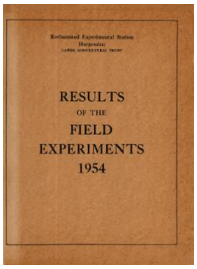

54/R/BC/1 Ley and Arable Rotations

Rothamsted Research

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LEY AND ARABLE ROTATIONS

Highfield and Fosters Field 1954 - the 6th year.

For details of treatments, rotations, etc., see "Results of the Field Experiments 1952", Section Bc/1.

Cultivations, etc.:

HIGHFIELD

1st year Treatment Crops

Cut grass, Grazed ley, Lucerne, Hay. Ploughed: Aug 31 and for leys again, Oct 3, 1953. Basal fertilizer applied: Hay plots - Dec 2, remainder - Apr 7, 1954.

Cut grass: Nitrochalk applied, seeds sown at 38 lb per acre: Apr 7, 1954. Cut: 4 times - June 21, July 21, Aug 11, Oct 11. Nitrochalk applied after each cut except the last.
Grazed ley: Nitrochalk applied, seeds sown at 55 lb per acre: Apr 7. Nitrochalk applied: June 28. Grazed: 9 circuits, June 13-Oct 20.
Lucerne: Seed drilled at 28 lb per acre: Apr 9. Cut twice: Aug 11 and Nov 18. Variety: Du Puits.
Hay: Undersown seeds failed. Resown at 38 lb per acre: Sept 18, 1953. Nitrochalk applied: Apr 2, 1954. Cut: June 22.

2nd year Treatment Crops

Cut grass, Grazed ley, Lucerne, Potatoes. Basal fertilizer to leys applied: Dec 2, 1953.

Cut grass: Nitrochalk applied: Apr 2, 1954 and after each cut except the last. Cut: 5 times, May 20, June 21, July 22, Aug 17, Oct 11.
Grazed ley: Nitrochalk applied: Apr 6 and July 7. Grazed: 10 circuits, Apr 13 - Oct 20.
Lucerne: Cut: 3 times, June 23, Aug 11, Nov 18.
Potatoes: For cultivations see Potato Test Crop.

3rd year Treatment Crops

Cut grass, Grazed ley, Lucerne, Barley. Basal fertilizer to leys applied: Dec 2, 1953.

Cut grass: Nitrochalk applied: Apr 2, 1954 and after each cut except the last. Cut: 5 times, May 20, June 21, July 23, Aug 17, Oct 8.
Grazed ley: Nitrochalk applied: Apr 2 and June 28. Grazed: 10 circuits, Apr 17 - Oct 20.
Lucerne: Cut: 3 times, June 22, Aug 11, Oct 8.
Barley: For cultivations see Barley Test Crop.

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1st Test Crop, Wheat

Ploughed after barley: Aug 31 and again Oct 3, 1953. Ploughed leys: Oct 16. Seed drilled at 3 bushels per acre with basal fertilizer: Oct 22. Nitrochalk applied: Apr 27, 1954. Combine harvested: Sept 2 and 7. Variety: Yeoman.

2nd Test Crop, Potatoes

Ploughed: Aug 24 and again Oct 26, 1953. Ridged, basal fertilizers applied: Apr 20, 1954. Dung and sulphate of ammonia applied, potatoes planted: Apr 22. Earthed up: July 9. Sprayed with copper fungicide, low volume, 5 lb in 10 gallons per acre: July 28 and again Aug 23. Sprayed with 20% sulphuric acid: Sept 30. Lifted: Oct 26. Variety: Majestic.

3rd Test Crop, Barley

Ploughed: Oct 3, 1953. Ground chalk applied to blocks 2 and 3: Dec 3. Seed drilled at 2 bushels per acre with basal fertilizer, nitrochalk applied: Mar 17, 1954. Combine harvested: Sept 3. Variety: Proctor. Note. Crop yields were not taken owing to the condition of the crop after being laid since early July.

Permanent Grasses

4th year Reseeded. Permanent grass, Blocks 9-12.
Basal fertilizers applied: Dec 2, 1953. Nitrochalk applied: Apr 7, 1954 and July 7. Grazed: 8 circuits, Apr 21 - Oct 28.

5th year Reseeded. Permanent grass, Blocks 5-8.
Basal fertilizers applied: Dec 2, 1953. Nitrochalk applied: Apr 6 and June 28. Reseeded, grazed: 9 circuits, Apr 13 - Oct 28.
Permanent, grazed: 8 circuits, Apr 13 - Oct 20.

6th year Reseeded. Permanent grass, Blocks 1-4.
Basal fertilizers applied: Dec 2, 1953. Nitrochalk applied: Apr 2. Cut: June 22. Nitrochalk applied: June 25. Grazed: 4 circuits, July 16 - Oct 28.

FOSTERS

1st year Treatment Crops

Cut grass, Grazed ley, Lucerne, Hay. Ploughed (not hay plots): Aug 20, 1953 and again Sept 24. Basal fertilizer applied: Hay plots - Dec 1, remainder - Apr 7.

Cut grass: Nitrochalk applied, seeds sown at 38 lb per acre: Apr 7, 1954. Cut: 4 times, June 29, July 20, Aug 13, Oct 11. Nitrochalk applied after each cut except the last.
Grazed ley: Nitrochalk applied, seeds sown at 55 lb per acre: Apr 7. Nitrochalk applied: June 29. Grazed: 7 circuits, May 7 - Oct 21.
Lucerne: Seed drilled at 28 lb per acre: Apr 9. Cut twice: Aug 16, Nov 18. Variety: Du Puits.
Hay: Seeds undersown in barley at 38 lb per acre: May 4, 1953. Nitrochalk applied: Apr 1, 1954. Cut: June 23.

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2nd year Treatment Crops

Cut grass, Grazed ley, Lucerne, Potatoes. Basal fertilizers to leys applied: Dec 1, 1953.

Cut grass: Nitrochalk applied: Apr 1, 1954 and after each cut except the last. Cut: 5 times, May 21, June 21, July 20, Aug 16, Oct 11.
Grazed ley: Nitrochalk applied: Apr 5 and July 9. Grazed: 10 circuits, May 7 - Oct 21.
Lucerne: Cut: 3 times, June 23, Aug 16, Nov 18.
Potatoes: For cultivations see Potato Test Crop.

3rd year Treatment Crops

Cut grass, Grazed ley, Lucerne, Barley. Basal fertilizer to leys applied: Dec 1, 1953.

Cut grass: Nitrochalk applied: Apr 1, 1954 and after each cut except the last. Cut: 5 times, May 21, June 21, July 20, Aug16, Oct 8.
Grazed ley: Nitrochalk applied: Apr 5 and June 29. Grazed: 8 circuits, May 7 - Oct 21.
Lucerne: Cut: 3 times, June 24, Aug 16, Oct 8.
Barley: For cultivations see Barley Test Crop.

1st Test Crop, Wheat

Ploughed after barley: Aug 20, 1953 and again Sept 29. Ploughed leys: Oct 17. Seed drilled at 3 bushels per acre with basal fertilizer: Oct 22. Nitrochalk applied: Apr 28, 1954. Combine harvested: Sept 1. Variety: Yeoman.

2nd Test Crop, Potatoes

Ploughed: Aug 21, 1953 and again Oct 24. Ridged, basal fertilizers applied: Apr 20, 1954. Dung and sulphate of ammonia applied, potatoes planted: Apr 21. Earthed up: July 6. Sprayed with copper fungicide, low volume, 5 lb in 10 gallons: July 28 and again Aug 23. Sprayed with 15% sulphuric acid: Sept 29. Lifted: Oct 9 and Oct 16. Variety: Majestic.

3rd Test Crop, Barley

Ploughed: Oct 2, 1953. Nitrochalk applied: Mar 16, 1954. Seed sown at 2 bushels per acre with basal fertilizer: Mar 17. Combine harvested: Sept 2. Variety: Proctor.

Permanent grasses

4th year reseeded grass

Basal fertilizer applied: Dec 1, 1953. Nitrochalk applied: Apr 7, 1954 and July 9. Grazed: 7 circuits, May 7 - Oct 21.

5th year reseeded grass

Basal fertilizer applied: Dec 1, 1953. Nitrochalk applied: Apr 5, 1954 and June 29. Grazed: 7 circuits, May 7 - Oct 21.

6th year reseeded grass

Basal fertilizer applied: Dec 2, 1953. Nitrochalk applied: Apr 1, 1954. Cut: June 23. Nitrochalk applied: June 25. Grazed: 4 circuits, July 25 - Oct 21.

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Standard errors per ¼ plot. Test crops.

Wheat, grain (at 85% dry matter).	Highfield:	2.48 cwt per acre or 8.9% (13 d.f.)
	Fosters:	1.82 cwt per acre or 5.2% (13 d.f.)
Potatoes, total tubers.	Highfield:	1.073 tons per acre or 10.1% (15 d.f.)
	Fosters:	0.876 tons per acre or 8.6% (15 d.f.)
Barley, grain (at 85% dry matter).	Highfield:	Crop failed
	Fosters:	1.87 cwt per acre or 4.2% (15 d.f.)

Summary of Results

Wheat 1st test crop
Previous rotation 1951, 1952, 1953

cwt N per acre	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Grain (at 85% Dry Matter): cwt per acre					
Highfield					
Mean	28.6	32.7	22.7	27.9	28.0
To test crop					
0.3	29.5	34.8	24.8	28.6	29.4
0.6	27.8	30.6	20.6	27.1	26.5
Difference (±1.75)	-1.7	-4.2	-4.2	-1.5	-2.9 (±0.88)
To treatment crops					
Single rate		35.5	25.7	24.8	28.7
Double rate		29.9	19.7	30.9	26.8
Difference (±1.75)		-5.6	-6.0	+6.1	-1.9 (±1.01)
Fosters					
Mean	37.4	39.5	38.2	24.7	35.0
To test crop					
0.3	36.0	37.6	38.4	23.9	34.0
0.6	38.7	41.5	38.0	25.6	36.0
Difference (±1.28)	+2.7	+3.9	-0.4	+1.7	+2.0 (±0.64)
To treatment crops					
Single rate		39.4	39.1	22.3	33.6
Double rate		39.7	37.4	27.1	34.7
Difference (±1.28)		+0.3	-1.7	+4.8	+1.1 (±0.74)

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Wheat 1st test crop

cwt N per acre	Excluding Lucerne: N to previous treatment crop: Single rate	Excluding Lucerne: N to previous treatment crop: Double rate	Excluding Lucerne: Mean	Arable with hay only: Dung: tons per acre to potatoes 1952: None	Arable with hay only: Dung: tons per acre to potatoes 1952: 12	Arable with hay only: Mean
Grain (at 85% Dry Matter): cwt per acre						
Highfield						
To test crop	(±1.01)		(±0.71)	(±1.75)		(±1.24)
0.3	30.6	28.2	29.4	29.2	28.0	28.6
0.6	26.8	25.4	26.1	22.6	31.7	27.1
Mean	28.7	26.8	27.8	25.9	29.9	27.9
	(±0.71)			(±1.24)		
To previous treatment crops				(±1.75)		(±1.24)
Single rate				25.8	23.9	24.8
Double rate				26.0	35.8	30.9
Mean				25.9	29.9	27.9
				(±1.24)		
Fosters						
To test crop	(±0.74)		(±0.52)	(±1.28)		(±0.91)
0.3	32.7	33.9	33.3	24.0	23.8	23.9
0.6	34.5	35.5	35.0	28.1	23.1	25.6
Mean	33.6	34.7	34.2	26.1	23.4	24.7
	(±0.52)			(±0.91)		
To previous treatment crops				(±1.28)		(±0.91)
Single rate				25.0	19.7	22.3
Double rate				27.1	27.1	27.1
Mean				26.1	23.4	24.7
				(±0.91)		

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Wheat 1st test crop

cwt N per acre	Previous rotation 1951, 1952, 1953 Lucerne	Ley	Cut Grass	Arable with hay	Mean
Straw (at 85% Dry Matter): cwt per acre					
Highfield					
Mean	48.1	45.9	32.8	43.8	42.7
To test crop					
0.3	47.3	44.0	34.1	46.4	42.9
0.6	49.0	47.8	31.5	41.2	42.4
Difference	+1.7	+3.8	-2.6	-5.2	-0.5
To treatment crops					
Single rate		53.7	35.6	45.5	45.0
Double rate		38.1	29.9	42.1	36.7
Difference		-15.6	-5.7	-3.4	-8.3
Fosters					
Mean	61.6	55.9	50.6	47.9	54.0
To test crop					
0.3	61.2	53.0	48.9	43.7	51.7
0.6	62.1	58.8	52.3	52.2	56.3
Difference	+0.9	+5.8	+3.4	+8.5	+4.6
To treatment crops					
Single rate		56.9	51.2	46.8	51.6
Double rate		54.9	50.1	49.1	51.4
Difference		-2.0	-1.1	+2.3	-0.2

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Wheat 1st test crop

cwt N per acre	Excluding Lucerne: N to previous treatment crop: Single rate	Excluding Lucerne: N to previous treatment crop: Double rate	Excluding Lucerne: Mean	Arable with hay only: Dung: tons per acre to potatoes 1952: None	Arable with hay only: Dung: tons per acre to potatoes 1952: 12	Arable with hay only: Mean
Straw (at 85% Dry Matter): cwt per acre						
Highfield						
To test crop						
0.3	46.0	37.0	41.5	46.2	46.7	46.4
0.6	43.9	36.5	40.2	41.5	40.9	41.2
Mean	45.0	36.7	40.8	43.8	43.8	43.8
To previous treatment crops						
Single rate				46.9	44.2	45.5
Double rate				40.8	43.4	42.1
Mean				43.8	43.8	43.8
Fosters						
To test crop						
0.3	49.1	48.0	48.5	40.5	46.9	43.7
0.6	54.1	54.7	54.4	51.6	52.7	52.2
Mean	51.6	51.4	51.5	46.0	49.8	47.9
To previous treatment crops						
Single rate				45.6	47.9	46.8
Double rate				46.5	51.7	49.1
Mean				46.0	49.8	47.9

Potatoes 2nd test crop. Total tubers: tons per acre

	Previous rotation 1950, 1951, 1952				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
N: cwt per acre					
0.5	9.88	10.90	10.42	10.41	10.40
1.0	11.04	11.15	10.41	10.94	10.89
Difference (±0.759)	+1.16	+0.25	-0.01	+0.53	+0.49 (±0.379)
Dung: tons per acre					
None	8.89	9.18	8.87	8.59	8.88
12	12.03	12.88	11.95	12.76	12.40
Difference (±0.759)	+3.14	+3.70	+3.08	+4.17	+3.52 (±0.379)
Mean	10.46	11.03	10.41	10.68	10.64
Fosters					
N: cwt per acre					
0.5	9.58	9.63	9.22	10.17	9.65
1.0	10.82	10.73	9.80	11.52	10.72
Difference (±0.619)	+1.24	+1.10	+0.58	+1.35	+1.07 (±0.310)
Dung: tons per acre					
None	7.59	9.23	7.74	9.75	8.58
12	12.81	11.12	11.28	11.95	11.79
Difference (±0.619)	+5.22	+1.89	+3.54	+2.20	+3.21 (±0.310)
Mean	10.20	10.18	9.51	10.85	10.18

	Highfield N: cwt per acre		Fosters N: cwt per acre	
	0.5	1.0	0.5	1.0
	(±0.379)		(±0.310)	
Dung: tons per acre				
None	8.63	9.14	7.99	9.17
12	12.18	12.63	11.31	12.27

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Potatoes 2nd test crop. Percentage ware

	Previous rotation 1950, 1951, 1952				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
N: cwt per acre					
0.5	82.6	81.2	81.0	82.1	81.7
1.0	84.4	81.2	77.8	82.8	81.6
Difference	+1.8	0.0	-3.2	+0.7	-0.1
Dung; tons per acre					
None	79.3	79.6	80.0	78.9	79.5
12	87.6	82.8	78.7	86.0	83.8
Difference	+8.3	+3.2	-1.3	+7.1	+4.3
Mean	83.5	81.2	79.4	82.5	81.6
Fosters					
N: cwt per acre					
0.5	83.6	83.2	84.3	84.5	83.9
1.0	84.4	78.5	83.0	86.4	83.1
Difference	+0.8	-4.7	-1.3	+1.9	-0.8
Dung: tons per acre					
None	82.7	80.1	82.8	84.8	82.6
12	85.4	81.6	84.5	86.1	84.4
Difference	+2.7	+1.5	+1.7	+1.3	+1.8
Mean	84.0	80.9	83.6	85.5	83.5

	Highfield N: cwt per acre		Fosters N: cwt per acre	
	0.5	1.0	0.5	1.0
Dung: tons per acre				
None	79.3	79.6	83.1	82.1
12	84.1	83.5	84.7	84.1

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Barley 3rd test crop. Grain (at 85% Dry Matter): cwt per acre

	Previous rotation 1949, 1950, 1951				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
			Fosters		
N: cwt per acre					
0.2	46.6	43.5	44.4	44.3	44.7
0.4	44.8	44.5	44.7	45.2	44.8
Difference (±1.32)	-1.8	+1.0	+0.3	+0.9	+0.1 (±0.66)
Dung to potatoes 1953: tons per acre					
None	45.8	43.9	44.7	44.6	44.8
12	45.7	44.1	44.4	44.9	44.7
Difference (±1.32)	-0.1	+0.2	-0.3	+0.3	-0.1 (±0.66)
Mean	45.7	44.0	44.6	44.7	44.8

	Fosters	
	N: cwt per acre	
	0.2	0.4
	(±0.66)	
Dung to Potatoes 1953: tons per acre		
None	44.7	44.8
12	44.7	44.8

Note: Highfield: No yields of grain and straw recorded.
Fosters: No straw yields recorded.

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Treatment crops Arable and Hay rotation

(values based on Mean of 2 sub plots only)

	Highfield N: cwt per acre applied in 1954			Fosters N: cwt per acre applied in 1954		
	Single rate	Double rate	Mean	Single rate	Double rate	Mean
Hay (dry matter): cwt per acre						
No dung	59.1	68.8	63.9	55.1	65.8	60.5
Dung in 1952	62.4	62.3	62.4	58.0	64.5	61.3
Mean	60.7	65.6	63.1	56.6	65.2	60.9
Potatoes, total tubers: tons per acre						
No dung	8.03	8.61	8.32	9.25	10.85	10.05
Dung in 1954	12.11	12.42	12.27	10.59	11.77	11.18
Mean	10.07	10.51	10.29	9.92	11.31	10.61
Potatoes, percentage ware						
No dung	77.8	81.0	79.4	82.6	84.4	83.5
Dung in 1954	79.6	83.1	81.4	88.1	85.6	86.8
Mean	78.7	82.1	80.4	85.4	85.0	85.2
Barley, grain (at 85% dry matter): cwt per acre						
No dung	No yields of grain recorded			41.6	44.2	42.9
Dung in 1953				43.6	43.3	43.4
Mean				42.6	43.8	43.2
	No yields of straw recorded			No yields of straw recorded		

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Cut grass. Dry Matter: cwt per acre

1st year	Highfield N: to previous 3 test crops Single rate	Highfield N: to previous 3 test crops Double rate	Highfield Dung to potatoes 1952 tons per acre None	Highfield Dung to potatoes 1952 tons per acre 12	Highfield Mean	Fosters N: to previous 3 test crops Single rate	Fosters N: to previous 3 test crops Double rate	Fosters Dung to potatoes 1952 tons per acre None	Fosters Dung to potatoes 1952 tons per acre 12	Fosters Mean
N(1) to cut grass										
Single rate	77.4	80.7	77.8	80.3	79.1	60.6	60.0	63.5	57.1	60.3
Double rate	81.6	89.4	89.0	82.1	85.5	73.9	76.4	73.6	76.7	75.1
N to test crops										
Single rate			80.1	78.9	79.5			67.2	67.3	67.3
Double rate			86.6	83.5	85.0			69.8	66.6	68.2
Mean			83.4	81.2	82.3			68.5	66.9	67.7

	Highfield N to cut grass (1) Single rate	Highfield N to cut grass (1) Double rate	Highfield Mean	Fosters N to cut grass (1) Single rate	Fosters N to cut grass (1) Double rate	Fosters Mean
2nd year (5 cuts)	59.1	75.3	67.2	71.1	76.6	73.8
3rd year (5 cuts)	57.5	72.7	65.1	65.5	74.4	70.0

(1) 0.15 v. 0.3 cwt N as Nitrochalk for every cut.

Lucerne. Dry Matter: cwt per acre

1st year (2 cuts)	Highfield N to 3 previous test crops Single rate	Highfield N to 3 previous test crops Double rate	Highfield Mean	Fosters N to 3 previous test crops Single rate	Fosters N to 3 previous test crops Double rate	Fosters Mean
Dung to potatoes 1952						
None	62.0	58.4	60.2	56.3	56.9	56.6
12 tons	57.6	57.3	57.4	56.3	60.6	58.4
Mean	59.8	57.9	58.8	56.3	58.7	57.5

	Highfield	Fosters
2nd year (3 cuts)	Mean 103.8	Mean 97.5
3rd year (3 cuts)	Mean 100.0	Mean 94.4

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Grazed Ley. Dry Matter: cwt per acre (estimated from sampling cuts)

	Highfield N: cwt per acre (yearly)			Fosters N: cwt per acre (yearly)		
	Single rate 0.15	Double rate 0.30	Mean	Single rate 0.15	Double rate 0.30	Mean
1st year	40.8	45.9	43.3	31.2	30.4	30.8
2nd year	39.2	52.2	45.7	40.5	53.4	46.9
3rd year	43.6	48.9	46.2	33.5	36.7	35.1

Reseeded Grass. Dry Matter: cwt per acre

	Cut for hay N			Grazed Estimated from sampling cuts N		
	Single rate	Double rate	Mean	Single rate	Double rate	Mean
Highfield						
4th year, grazing				49.9	47.6	48.7
5th year, grazing				42.5	45.7	44.1
6th year, hay	55.4	55.5	55.5	17.2*	21.2*	19.2*
Fosters						
4th year, grazing				41.4	41.6	41.5
5th year, grazing				44.1	43.3	43.7
6th year, hay	46.8	51.8	49.3	20.0*	20.4*	20.2*

Permanent Grass. Dry Matter: cwt per acre

Highfield						
Grazing, Blocks 9-12				40.0	39.9	39.9
Grazing, Blocks 5-8				36.6	36.6	36.6
Hay, Blocks 1-4	44.8	47.1	45.9	19.7*	20.7*	20.2*

*Aftermath grazing.