ROTHAMSTED RESEARCH

Yields of the Field Experiments 1956

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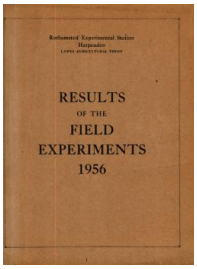

56/W/BE/1 Ley and Arable Rotations

Rothamsted Research

Rothamsted Research (1957) *56/W/BE/1 Ley and Arable Rotations ;* Yields Of The Field Experiments 1956, pp 55 - 62 **- DOI: https://doi.org/10.23637/ERADOC-1-176**

LEY AND ARABLE ROTATIONS

Woburn Stackyard 1956 - the 19th year.

For history, treatments etc., see "Details of the Classical and Long Term Experiments", 1956.

In 1956 carrots replaced sugar beet as the 3rd course of the arable rotation. Sugar beet replaced potatoes as the 1st test crop. The seeds hay split plot test of N after the first crop was discontinued.

Cultivations, etc.:

Treatment crops

Ley rotations

Ley 1st year. Ploughed twice: Sept 23, 1955 and Oct 28. Basal fertilizers applied, seed sown: Apr 16, 1956. 2nd dressing 'Nitro-Chalk' applied: Aug 29. Grazed 6 circuits: June 25 - 29, July 25 - Aug 2, Aug 19 - 29, Sept 14 - 22, Oct 9 - 17, Nov 2 - 10. Seeds mixture (sown at 40 lb per acre) 20 lb S24 Perennial Ryegrass, 11 lb S143 Cocksfoot, 6 lb Late Flowering Red Clover, 3 lb S100 White Clover.

Ley 2nd year. Basal potash applied: Apr 13, 1956. 'Nitro-Chalk' applied: May 20 and Sept 3. Grazed 8 circuits: May 4 - 12, May 20 - 28, June 17 - 25, July 7 - 15, Aug 8 - 17, Sept 6 - 14, Oct 1 - 9, Oct 25 - Nov 2.

Ley 3rd year. Basal potash applied: Apr 13, 1956. 'Nitro-Chalk' applied: May 16 and Sept 5. Grazed 9 circuits: Apr 26 - May 4, May 12 - 20, June 9 - 17, June 29 - July 7, July 17 - 25, Aug 2 - 11, Aug 29 - Sept 6, Sept 22 - Oct 1, Oct 17 - 25.

Lucerne 1st year. Ploughed twice: Sept 23, 1955 and Oct 28. Basal fertilizers applied, seed sown at 25 lb per acre: Apr 16, 1956. Dusted with 5% DDT: May 5. Sprayed with DDT emulsion, 3 pints per acre: May 7 and June 2. Cut twice: Aug 8 and Nov 16. Variety: Du Puits.

Lucerne 2nd year. Basal potash applied: Apr 13, 1956. Cut 3 times: June 21, Aug 8, Nov 16.

Lucerne 3rd year. Basal potash applied: Apr 13, 1956. Cut 3 times: June 21, Aug 8, Nov 16.

Arable rotations

Potatoes 1st course. Ploughed twice: Sept 23, 1955 and Oct 28. Basal fertilizers applied: Apr 11, 1956. Ridged, potatoes planted: Apr 13. Earthed up: June 22. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 23. Sprayed with arsenious compound, 1 gallon in 40 gallons per acre: Sept 4. Lifted: Oct 4 - 5. Variety: Majestic.

Rye 2nd course. Ploughed: Sept 3, 1955. Seed drilled at 3 bushels per acre: Oct 15. 'Nitro-Chalk' applied: Apr 16, 1956. Seeds hay mixture undersown on 4 plots: Apr 20. Harvested: Aug 22. Variety: King II.

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Seeds hay 3rd course. Seeds undersown in rye: May 9, 1955. Basal fertilizers applied: Apr 9, 1956. 1st cut: June 21. 'Nitro-Chalk' applied: June 22. 2nd cut: Nov 16. Seeds mixture per acre: 19 lb S24 Perennial Ryegrass, 9 lb Late Flowering Red Clover, 2 lb Alsike American.

Carrots 3rd course. Ploughed twice: Sept 6, 1955 and Dec 12. Basal fertilizer applied, seed drilled at 6 lb per acre: Apr 13, 1956. Singled: June 21 - 26. Lifted: Nov 8. Variety: James' Scarlet Intermediate.

Test crops

Sugar beet 1st test crop. Ploughed: Nov 9 - 11, 1955. Dung applied, ploughed: Mar 8, 1956. Basal and treatment fertilizers applied, rubbed seed drilled at 12 lb per acre: Apr 9. Sprayed with DDT emulsion, 3 pints in 40 gallons: May 7. Singled: June 1 - 5. Lifted: Oct 22 - 26. Variety: Klein E.

Barley 2nd test crop. Ploughed: Oct 29, 1955. Ground chalk applied: Dec 8. Potash applied to equalise treatment dressings to 1955 potatoes: Jan 16, 1956. 'Nitro-Chalk' applied: Mar 13. Seed drilled at 2½ bushels per acre: Mar 16. Additional 'Nitro-Chalk' applied: Apr 19. Harvested: Aug 21. Variety: Herta.

Note. The change of 1st test crop from potatoes to sugar beet, was decided on in spring, and the application of dung necessitated a second ploughing; this gave poor seed bed conditions after the leys and the yield of sugar beet after lucerne was possibly depressed as a result.

Standard errors per plot. Test Crops.

Sugar beet. Total sugar.	Whole plot:	3.36 cwt per acre or 6.2%	(3 d.f.)
	½ plot:	3.88 cwt per acre or 7.2%	(4 d.f.)
	⅛ plot:	3.41 cwt per acre or 6.3%	(24 d.f.)
Tops.	Whole plot:	0.758 tons per acre or 5.0%	(3 d.f.)
	½ plot:	0.856 tons per acre or 5.7%	(4 d.f.)
	⅛ plot:	1.786 tons per acre or 11.8%	(24 d.f.)
Barley. Grain	Whole plot:	2.24 cwt per acre or 6.3%	(4 d.f.)
	½ plot:	1.90 cwt per acre or 5.4%	(4 d.f.)

Errata to "Results of the Field Experiments" 1939-47, Vol.I.

Page Bf/1.4. Potatoes 1947. Date sown should read 'May 12" not "Apr 12".

Page Bf/1.16. Barley 1947. Order of crops previous to potatoes, for grain and straw tables should read "Lucerne, Arable with sugar beet, Arable with hay, Ley" and not as shown.

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Summary of Results

Treatment crops

Ley, sheep days of grazing per acre

1st year	2nd year	3rd year
1212	1746	2073

Lucerne, yield of hay (at 85% dry matter): cwt per acre

	1st crop	2nd crop	3rd crop	Total
1st year				
Dung in 1954: tons per acre				
None	10.5	4.8		15.3
15	11.5	6.9		18.4
Difference	+1.0	+2.1		+3.1
Previous rotation				
Lucerne	10.4	5.7		16.1
Arable with hay	11.6	6.0		17.6
Mean	11.0	5.8		16.8
2nd year				
Dung in 1953: tons per acre				
None	27.4	23.6	9.7	60.7
15	33.5	27.7	11.7	72.9
Difference	+6.1	+4.1	+2.0	+12.2
Previous rotation				
Lucerne	28.6	25.3	10.3	64.2
Arable with sugar beet	32.3	26.0	11.1	69.4
Mean	30.4	25.6	10.7	66.7
3rd year				
Dung in 1952: tons per acre				
None	30.4	24.5	9.7	64.6
15	37.3	28.0	11.9	77.2
Difference	+6.9	+3.5	+2.2	+12.6
Previous rotation				
Lucerne	31.5	24.3	10.2	66.0
Arable with hay	36.2	28.2	11.4	75.8
Mean	33.8	26.2	10.8	70.8

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Treatment crops

	Potatoes		Rye	
	Total tubers: tons per acre	Percentage ware	Grain: cwt per acre	Straw: cwt per acre
Dung: tons per acre				
None	13.58	90.5	41.2	46.3
15*	14.43	88.9	42.6	49.9
Difference	+0.85	-1.6	+1.4	+3.6
Previous rotation				
Ley	15.40	89.6	44.4	50.5
Lucerne	14.07	90.4	42.0	48.5
Arable with hay	13.32	89.8	39.5	44.0
Arable with sugar beet	13.22	89.2	41.7	49.5
Mean	14.00	89.7	41.9	48.1

Hay

Yield (at 85% dry matter): cwt per acre

	1st crop	2nd crop	Total
Dung in 1952: tons per acre			
None	48.2	20.7	68.9
15	50.3	24.0	74.3
Difference	2.1	3.3	5.4
Previous rotation			
Lucerne	48.9	23.7	72.6
Arable with hay	49.6	21.0	70.6
Mean	49.2	22.4	71.6

Carrots

	Roots (washed): tons per acre	Tops: tons per acre
Dung in 1952: tons per acre		
None	15.43	4.52
15	17.85	4.94
Difference	2.42	0.42
Previous rotation		
Ley	19.40	5.67
Arable with sugar beet	13.88	3.79
Mean	16.64	4.73

*Dung applied: Potatoes - for test crop potatoes in 1954.
Rye - for test crop potatoes in 1953.

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1st Test Crop

	Previous rotation				
	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Sugar beet, roots (washed): tons per acre					
Mean	16.82	15.05	14.80	15.71	15.59
Dung: tons per acre					
None	15.55	13.41	12.15	13.29	13.60
15	18.10	16.70	17.44	18.13	17.59
Difference	+2.55	+3.29	+5.29	+4.84	+3.99
Response to additional 0.72 cwt N per acre					
No dung	+0.33	-0.85	-0.61	+0.81	-0.08
Dung 15 tons per acre	+0.53	+0.01	+0.51	+0.94	+0.49
Response to additional 0.9 cwt K_2O per acre					
No dung	+0.79	+1.79	+1.38	-0.71	+0.81
Dung 15 tons per acre	+0.45	+1.23	+0.39	-0.85	+0.31
Sugar beet, sugar percentage					
Mean	16.9	17.4	17.4	18.0	17.4
Dung: tons per acre					
None	17.1	17.4	17.6	18.0	17.6
15	16.6	17.3	17.2	18.0	17.3
Difference	-0.5	-0.1	-0.4	0.0	-0.3
Response to additional 0.72 cwt N per acre					
No dung	-0.4	-0.4	-1.0	-0.8	-0.6
Dung 15 tons per acre	-0.4	-0.4	-0.2	-0.5	-0.4
Response to additional 0.9 cwt K_2O per acre					
No dung	+0.4	0.0	+0.3	-0.2	+0.1
Dung 15 tons per acre	0.0	+0.2	+0.2	-0.4	0.0

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1st Test Crop

	Previous rotation				
	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Sugar beet, total sugar: cwt per acre					
Mean (±2.38)	56.7	52.3	51.4	56.5	54.2
Dung: tons per acre					
None (±3.07)*	53.2	46.7	42.9	47.9	47.7
15	60.2	57.9	59.9	65.2	60.8
Difference (±3.88)	+7.0	+11.2	+17.0	+17.3	+13.1 (± 1.94)
Response to additional 0.72 cwt N per acre		(±2.41)			(± 1.21)
No dung	-0.3	-3.9	-4.5	+0.8	-2.0
Dung 15 tons per acre	+0.7	-1.6	+0.8	+1.5	+0.3
Response to additional 0.9 cwt K_2O per acre		(±2.41)			(± 1.21)
No dung	+3.7	+6.3	+5.5	-3.2	+3.0
Dung 15 tons per acre	+1.3	+5.2	+2.0	-4.0	+1.1
Sugar beet, tops: tons per acre					
Mean (±0.536)	17.15	15.59	16.26	11.33	15.08
Dung: tons per acre					
None (±0.686)*	16.64	15.31	14.75	9.98	14.17
15	17.66	15.88	17.78	12.69	16.00
Difference (±0.856)	+1.02	+0.57	+3.03	+2.71	+1.83 (± 0.428)
Response to additional 0.72 cwt N per acre		(±1.263)			(± 0.631)
No dung	+3.57	+1.60	+2.85	+2.36	+2.59
Dung 15 tons per acre	+3.35	+1.08	+1.88	+1.79	+2.03
Response to additional 0.9 cwt K_2O per acre		(±1.263)			(± 0.631)
No dung	+2.14	+1.04	+0.95	+0.11	+1.06
Dung 15 tons per acre	+0.45	-0.74	-1.19	-1.67	-0.79

*For use in comparisons other than vertical.

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1st Test Crop

Plots receiving no additional N or K

Dung: tons per acre	Previous Rotation: Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Sugar beet, roots (washed): tons per acre					
Mean	16.26	14.81	14.58	15.81	15.36
None	14.83	13.42	12.22	13.76	13.56
15	17.68	16.20	16.92	17.87	17.17
Difference	+2.85	+2.78	+4.70	+4.11	+3.61
Sugar beet, sugar percentage					
Mean	16.9	17.5	17.5	18.5	17.6
None	17.1	17.5	17.9	18.4	17.7
15	16.7	17.5	17.1	18.7	17.5
Difference	-0.4	0.0	-0.8	+0.3	-0.2
Sugar beet, total sugar: cwt per acre					
Mean (±2.83)	54.8	51.7	50.9	58.7	54.0
None (±4.01)*	50.5	46.8	43.8	50.6	47.9
15	59.2	56.6	58.0	66.8	60.2
Difference (±5.53)	+8.7	+9.8	+14.2	+16.2	+12.3
Sugar beet, tops: tons per acre					
Mean (±0.913)	14.75	14.42	15.33	10.62	13.78
None (±1.291)*	13.58	13.62	13.19	8.91	12.32
15	15.92	15.22	17.47	12.33	15.24
Difference (±1.768)	+2.34	+1.60	+4.28	+3.42	+2.92

*For use in comparisons other than vertical.

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2nd Test Crop

Dung in 1955: tons per acre	Previous Rotation: Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Barley, grain: cwt per acre					
None (±1.85)*	36.3	35.1	33.7	31.3	34.1
15	35.6	41.7	36.1	32.5	36.5
Mean (±1.58)	35.9	38.4	34.9	31.9	35.3
Difference (±1.90)	-0.7	+6.6	+2.4	+1.2	+2.4 (± 0.95)
Barley, straw: cwt per acre					
None	30.1	29.2	28.3	26.0	28.4
15	32.3	33.0	29.1	27.5	30.5
Mean	31.2	31.1	28.7	26.8	29.4
Difference	+2.2	+3.8	+0.8	+1.5	+2.1

*For use in comparisons other than vertical.

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