

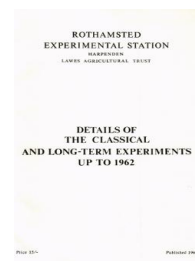
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## Details of the Classical and Long-term Experiments Up to 1962

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### Hoosfield- Formerly Wheat, Later Potatoes

#### Rothamsted Research

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EXHAUSTION LAND  
HOOSFIELD, 1850 ONWARDS

The experiments in progress on this land test the residual effects of manures applied in a classical potato experiment which occupied this site from 1876-1901(1). There were 10 plots of potatoes each of 0.167 acres, manured as follows:-

Table 13

MANURES APPLIED YEARLY PER ACRE 1876-1901

Plot	Treatment							Notes
	D tons	P P <sub>2</sub> O <sub>5</sub> lb. (6)	K K <sub>2</sub> O lb.	Na lb.	Mg lb.	N <sub>2</sub> N lb. (5)	N' N lb.	
1	-	-	-	-	-	-	-	
2	-	-	-	-	-	-	-	(2)
3	14	-	-	-	-	-	-	(3)
4	14	-	-	-	-	-	-	(4)
5	-	-	-	-	-	86	-	
6	-	-	-	-	-	-	86	
7	-	65	147	100	100	86	-	
8	-	65	147	100	100	-	86	
9	-	65	-	-	-	-	-	
10	-	65	147	100	100	-	-	

Treatments: D; farmyard manure. P; superphosphate. K; sulphate of potash. Mg; sulphate of magnesia. Na; sulphate of soda. N; ammonium salts. N'; nitrate of soda.

Notes:

- (1) Some of the treatments date back to a much earlier period:-  
1850-1855 Wheat, unmanured.  
1856-1874 Five strips of continuous wheat each 0.33 acres.  
Using the numbers of the potato plots given above the yearly manures to wheat were (with minor changes in the amounts of K, Na, Mg):-  
1, 2, 3, 4 No manure.  
5, 6 Ammonium salts 86 lb. N  
7, 8 Ammonium salts 86 lb. N with complete mineral manure (see below).  
9, 10 Mineral manure superphosphate 65 lb. P<sub>2</sub>O<sub>5</sub>, sulphate of potash 98 lb. K<sub>2</sub>O sulphate of soda 100 lb., sulphate of magnesia 100 lb.

In 1875 the wheat failed and the land was fallowed. The yields of wheat for the first 8 seasons are recorded in J. Roy. Agric. Soc. (1864) 25, p.493.

- (2) After 14 tons of dung until 1881.
- (3) Until 1882, this plot also received superphosphate at 65 lb. P<sub>2</sub>O<sub>5</sub> per acre.
- (4) Also 65 lb. P<sub>2</sub>O<sub>5</sub> until 1882 and also 86 lb. N as nitrate of soda until 1881.
- (5) The ammonium salts consisted of equal parts of ammonium sulphate and chloride.

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(6) 1897-1901 Basic slag was used in place of superphosphate made from 200 lb. bone ash and 150 lb. sulphuric acid.

For fuller details yields and crop analyses see Memoranda of the Field Experiments 1901, pp. 86-108.

Residual years: The cropping from 1902 onwards has been:-

1902-1922 Cereals without manure, yields taken. 16 crops of barley, 3 of oats, 1 of wheat and a bare fallow in 1920. (Plots 5-10 red clover from 1905 to 1911). For details see Rep. Rothamst. exp. Sta. for 1921-22, p. 88.

1923-1939 Cereals without manure, no yields recorded except for wheat in 1935.

1940-1948 Cereals with nitrogen only, average dressing 0.6 cwt. N per acre. No yields taken.

1949-1958 Barley (Plumage Archer) with 0.5 cwt. N per acre, yields taken.

1957 The land was cropped in halves, the West half containing Plots 2, 4, 6, 8, 10 and the East half 1, 3, 5, 7, 9.

W. Half Bare fallow, except a narrow strip in barley.

E. Half Strips of spring wheat, barley, sugar beet, potatoes, kale, swedes divided into microplots to test residuals against direct application of P and K.

1958 W. Half Barley.

E. Half As in 1957 but on fresh land (headlands of 1957 experiment).

Since 1959 Both halves in Barley with 0.5 cwt. N per acre.

Liming: In the winter of 1954-55 calcium carbonate at rates varying from 2 to 5 tons per acre was applied as ground chalk to various parts of the experimental area according to their needs (For details see Rep. Rothamst. exp. Sta. for 1954, p. 148).

Part of plot 2 received ground chalk at 2 tons per acre in winter 1959-60.

For general account of Exhaustion Land see Rep. Rothamst. exp. Sta. for 1959, 230-239.

For preliminary results of diversified cropping in 1957 and 1958 see Rep. Rothamst. exp. Sta. for 1958, pp. 55-57.

For residual effects measured in barley see Warren, R. G. (1956) N. P. K. residues from fertilisers and farmyard manure, in long-term experiments at Rothamsted. Proc. Fertil. Soc. 37, 1-33.



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Table 14

EXHAUSTION LAND HOOSFIELD

Wheat Yields: cwt per acre  
5-year means

Plot No. Treatment	1		2		3		4		5		6		7		8		9		10	
	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw
1856-1860	11.1	16.8	9.0	14.0	15.8	26.6	20.0	36.9	9.9	15.5										
1861-1865	8.1	12.3	5.7	8.7	10.2	16.2	20.3	31.6	7.5	10.7										
1866-1870	6.3	9.2	6.0	9.0	7.3	11.3	11.5	18.5	7.4	11.2										
1873-1874*	9.6	16.0	8.6	16.1	13.1	23.0	13.7	24.7	9.4	17.2										

\* Means of 2 years, crop failed 1871, fallow 1872 and 1875.

Table 15

EXHAUSTION LAND HOOSFIELD

Potatoes Total Tubers: tons per acre  
5-year means

Plot No. Treatment	1	2	3	4	5	6	7	8	9	10
	-	-	D	D	N <sub>2</sub>	N <sub>2</sub> '	N <sub>2</sub> PKNaMg	N <sub>2</sub> 'PKNaMg	P	PK
1876*	3.86	4.26	5.33	6.72	2.89	3.88	8.10	8.79	6.05	6.18
1877-1881	1.96	5.42	5.63	7.19	2.43	3.07	7.40	7.58	3.58	3.74
1882-1886	1.76	3.20	4.27	3.80	2.15	2.04	6.26	5.58	3.61	3.58
1887-1891	0.98	2.02	4.38	4.75	1.44	2.00	4.44	4.86	2.18	2.48
1892-1896	1.09	1.86	6.48	6.71	1.53	2.19	5.35	5.79	2.43	2.90
1897-1901	0.55	0.94	2.92	2.81	0.69	0.98	2.43	2.68	1.17	1.20

\* Manures applied October 1874 and not again before 1876 potatoes

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Table 16

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Barley

Means over 4 years 1949 - 52

Means over 4 years 1953-56

Treatment Symbol	Plot	cwt per acre		Plot	cwt per acre	
		Grain	Straw		Grain	Straw
O	1	11.4	13.9	1	12.6	15.6
O	2	12.0	14.8	2	13.7	18.9
D	3	24.3	25.7	3	25.0	26.9
D	4	25.7	27.8	4	24.4	26.8
N <sub>2</sub>	5	13.2	15.2	5	14.8	16.8
N <sub>2</sub>	6	13.0	14.5	6	12.4	16.8
N <sub>2</sub> PKNaMg	7	22.6	24.2	7	24.0	26.0
N <sub>2</sub> 'PKNaMg	8	24.8	24.2	8	22.8	25.6
P	9	22.7	22.5	9	21.8	24.4
PK	10	25.4	25.9	10	24.0	27.3

Means over 3 years 1960 - 62

Means over 11 years 1949-56 and 1960-62

Treatment Symbol	Plot	cwt per acre		Plot	cwt per acre	
		Grain	Straw		Grain	Straw
O	1	17.5	11.4	1	13.5	13.8
O	2	15.6	9.9	2	13.6	15.0
D	3	24.3	16.0	3	24.6	23.5
D	4	24.9	16.1	4	25.0	24.2
N <sub>2</sub>	5	16.3	10.4	5	14.6	14.5
N <sub>2</sub>	6	14.8	9.8	6	13.3	14.1
N <sub>2</sub> PKNaMg	7	20.8	13.9	7	22.6	22.1
N <sub>2</sub> 'PKNaMg	8	20.8	13.2	8	23.0	21.7
P	9	20.7	13.4	9	21.8	20.7
PK	10	21.7	14.6	10	23.9	23.3