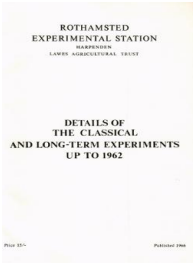
ROTHAMSTED RESEARCH

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



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Stackyard Woburn- Formerly Wheat and Barley

Rothamsted Research

Rothamsted Research (1966) *Stackyard Woburn- Formerly Wheat and Barley ;* Details Of The Classical And Long-Term Experiments Up To 1962, pp 32 - 35 **- DOI: https://doi.org/10.23637/ERADOC-1-191**

WOBURN, STACKYARD FIELD
CONTINUOUS WHEAT AND BARLEY, 1877 ONWARDS

The experiments on wheat and barley tested the same set of manurial treatments under the same plot numbers. There were four periods (1) 1877-1906 during which the fertiliser dressings were on much the same scale as for continuous cereals at Rothamsted (2) 1907-1926 when additional treatments were tested and most of the nitrogen dressings were reduced by half (3) 1927-1959 when the manurial treatments were discontinued and only nitrogen was applied while the residuals of the former treatments were being measured (4) 1960 onwards a more detailed study of residual effects involving direct additions of P and K on micro-plots.

Commencing in 1898 certain of the plots were subdivided to test lime applications. These lime dressings are tabulated separately in Table 19.

Plot size: The main plots of the original experiment were $\frac{1}{4}$ acre.

Varieties: Many changes were made, 11 varieties of wheat and 8 of barley were grown during the course of the experiment. Since 1927 the varieties have usually been Squareheads Master wheat and Plumage Archer barley. The table gives the treatments applied from 1877-1926.

Table 18

Manures, lb. per acre. 1877 - 1926 unless otherwise stated.

	Treatments						
Plot (1)	P P_2O_5 lb. (2)	K K_2O lb. (2)	N N lb.	N N lb.	R N lb.	D N lb.	Notes
1	-	-	-	-	-	-	
2	-	-	20.5	-	-	-	(7)
3a	-	-	-	41	-	-	
3b	-	-	-	20.5	-	-	(7)
4	56	27	-	-	-	-	
5	56	27	20.5	-	-	-	(7)
6	56	27	-	20.5	-	-	(7)
7	-	-	-	-	-	-	
8a, 8b	PK and 41 lb. N as sulphate of ammonia alternately						(3)
9a, 9b	PK and 41 lb. N as nitrate of soda alternately						(3)
10a	56	-	-	20.5	-	-	(4)
10b	-	-	-	-	20.5	-	(5)
11a	-	55	-	20.5	-	-	(6)
11b	-	-	-	-	-	82	(7)

https://doi.org/10.23637/ERADOC-1-191

Treatments: P. superphosphate. K: sulphate of potash. N: sulphate of ammonia (until 1906 equal parts of ammonium sulphate and ammonium chloride) N : nitrate of soda. R: rape cake. D: farmyard manure.

Notes

(1) Subdivisions of the plots for liming are ignored in this table. See below.
(2) Until 1906 the "minerals" provided 65 lb. P_2O_5, 98 lb. K_2O, 100 lb. sulphate of soda and 100 lb. sulphate of magnesia.
(3) Until 1881 the plots were undivided and the minerals and nitrogen were applied in the same year.
(4) Dung 53 lb. N until 1881; unmanured 1882-1906.
(5) Dung 53 lb. N until 1887; unmanured 1888; rape cake 82 lb. N 1889-1906.
(6) Dung 105 lb. N until 1881; unmanured 1882-1906.
(7) 105 lb. N until 1906.

Liming: After 16 years of ammonium salts providing 41 lb. N per acre the barley yields on plot 2 began to decline. This plot was first limed for the crop of 1898 as was also its counterpart in wheat which was by then also showing deterioration but to a lesser degree. Thereafter lime has been applied to several of the plots in different amounts and years. The material used was high grade burnt lime, slaked before application. The details are:

Table 19

Lime (CaO) cwt. per acre and years of application

	5	10	20	40
		Wheat		
2aa	'05, '09, '10, '11	-	-	-
2b	-	-	-	'98
2bb	-	-	-	'98, '05
5b	-	-	'05	-
8aa, 8bb	-	'05, '18	-	-
		Barley		
2aa	'05, '09, '10, '11	'23	-	-
2b, 5b, 8aa, 8bb	-	-	-	'98, '12
2bb	-	-	-	'98, '05
4b	-	-	'15	-
5aa	-	-	'05, '16	-
3aa, 3bb	-	-	-	'21

From 1927-1940 the plots were cropped with Red Standard wheat (Million in 1929 and 1930) and Plumage Archer barley usually without manure. The plots were bare fallowed in 1927, 1928, 1934, 1935. In 1931 and 1932 the varieties Plumage and Archer were grown side by side in alternate strips on all the barley plots. Most of the plots were unmanured but plots 8, 9, 10a, 11a received fertilisers as detailed below.

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WOBURN CLASSICALS

Manures applied to certain plots 1931, 1932

lb. per acre

Plot	Super-phosphate P_2O_5 lb.	Sulphate of potash K_2O lb.	Sulphate of ammonia N lb.	Nitrate of soda N lb.
8	56	82	41	-
9	56	82	-	41
10a	56	-	-	42
11a	-	82	-	42

From 1941 to 1957 cropping was continued as before but nitrogenous fertilisers were given to all plots. In 1941 and 1942 sulphate of ammonia at 47 lb. N per acre was given as a basal dressing for both crops. In 1943 the plots, excluding 2, 5, and 8 which had received sulphate of ammonia, were divided into sets of three and dressings of 35 lb., 70 lb., 105 lb. N per acre as "Nitro-Chalk" were applied to the plots of each set in cyclical order. The sets were:

No PK	Plots 1, 3, 7
PK	Plots 4, 6, 9
Dung	Plot 11b (divided into 3 sections)
Various treatments	Plots 10a, 10b, 11a

The wheat plots were fallowed in 1947, 1948, 1955, 1956, 1957; the barley plots in 1947, 1948, 1949, 1956, 1957. No crop weights were taken on either experiment in 1950. In 1952 and 1953 the barley plots were divided to compare winter and spring sown barley.

Liming: In 1955 dressings of ground chalk ranging from 20-50 cwt. per acre, according to pH of the individual plots, were applied to both experiments in order to bring all plots to about pH 6.0.

In 1956 and again in 1957 further adjustments involving dressings ranging from 7.5-15 cwt. chalk per acre were made to both experiments.

1958 All main plots of both experiments divided into 4 sections carrying winter wheat, winter barley, spring wheat and spring barley respectively. The crops were uneven and were ploughed up in spring 1958.

1959-61. All main plots divided to test Squareheads Master wheat and Plumage Archer barley with a basal dressing of 102 lb N per acre.

1960 On the barley strip crossing plots 7, 8, 9, 11a, 11b on both experiments two sub-strips were put down one in Plumage Archer barley and the other in Majestic potatoes. These were divided into microplots to measure residuals against direct applications of P and K.

1961 As 1960 but microplots included also Klein E Sugar beet.

1962 Spring oats, variety Condor with a basal dressing of 56 lb. N per acre. A further small area was allocated for micro-plots on soil structure, occupying parts of plots 4, 5, 6, 11a and 11b of the Permanent Barley Site.

Summary of yields 1877-1926. Rep. Rothamst. exp. Sta. for 1927-28, pp. 104-107. Early results yearly in the J.R. agric. Soc., since 1921 yearly in the Rep. Rothamst. exp. Sta.

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Table 20

Continuous Wheat and Barley

Wheat Grain: cwt. per acre

Means over 7 years 1944, 45, 49, 51, 52, 53, 54.

Plot Numbers Treatment 1877-1926		1, 3, 7 No P or K	4, 6, 9 PK	10a, 10b, 11a, NP, R, NK	11b D	Mean
Treatment "Nitro-Chalk" 1944-54 cwt. per acre	2	8.3	9.5	8.6	11.1	9.4
	4	9.8	13.9	10.8	13.2	11.9
	6	12.1	14.5	13.3	16.3	14.1
Mean		10.1	12.6	10.9	13.5	11.8

(1943: failed. 1946: rejected (highest yield 6.7 cwt.). 1947, 48: fallow. 1950: failed. 1955: fallow).

Barley Grain: cwt. per acre

Means over 6 years 1943, 44, 45, 46, 52, 53.

Plot Numbers Treatment 1877-1926		1, 3, 7 No P or K	4, 6, 9 PK	10a 10b 11a NP, R, NK	11b D	Mean
Treatment "Nitro-Chalk" 1943-54 cwt. per acre	2	5.6	7.2	5.8	9.0	6.9
	4	7.4	11.2	7.2	9.9	8.9
	6	8.8	10.9	6.5	11.5	9.4
Mean		7.3	9.7	6.5	10.1	8.4

Note: no yield was recorded for plot 10a (N3) in 1952. A value (10.5 cwt.) was estimated and used in making the table.

(1947, 48, 49: fallow. 1950: failed. 1951: rejected - 3 plots not recorded, (highest yield 8.7 cwt.). 1952, 53: yields of spring-sown barley only used. 1954: rejected - 5 plots not recorded. 1955: not included - lime applied).

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