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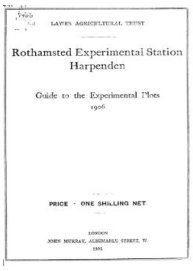
Rothamsted Experimental Station - Guide to the Experimental Plots 1906


LAWES AGRICULTURAL TRUST

Rothamsted Experimental Station
Harpenden

Guide to the Experimental Plots
1906

PRICE - ONE SHILLING NET

LONDON
JOHN MURRAY, ALBEMARLE STREET, W.
1906

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Rothamsted Research (1906) *Hoosfield - Barley ;* Rothamsted Experimental Station - Guide To The Experimental Plots 1906, pp 31 - 35 **- DOI: https://doi.org/10.23637/ERADOC-1-140**

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short of that on Plot 7, where minerals are used every year with the same amount of ammonium-salts, thus showing that the previous mineral manuring is carried forward and has an effect in seasons beyond the year of its application.

HOOS FIELD—BARLEY

The experiments on the continuous growth of barley were begun in the Hoos field in 1852. The arrangement of the plots and the manures applied to each plot have practically been unchanged since, so that the plots to-day show the effects of more than fifty years' continuous growth of barley under the same treatment year after year. There are four longitudinal strips receiving different combinations of the mineral manures; these are all crossed by four breadths receiving different nitrogenous manures. The mineral manuring on the strips is as follows:—(1) None; (2) Phosphoric acid only, no potash or alkali salts; (3) Potash, magnesia, and soda, no phosphoric acid; and (4) Complete mineral manure, supplying both phosphoric acid and the alkaline salts. Each of these is combined with the four cross-dressings of nitrogenous manures—Series O, no nitrogen; Series A, ammonium-salts; Series N, nitrate of soda; and Series C, rape cake. There are other plots, one of which has received farmyard manure for the first twenty years, but has since been unmanured.

TABLE XV.—*Experiments on Barley, Hoos Field. Manuring of the Plots per acre per annum,* 1852 *and since.*

Plot.	Abbreviated Description of Manures.	Nitrogenous Manures.				Mineral Manures.			
		Farmyard Manure.	Rape Cake.	Ammonium-salts.	Nitrate of Soda.	Super-phosphate.	Sulphate of Potash.	Sulphate of Soda.	Sulphate of Magnesia.
		Tons.	Lb.	Lb.	Lb.	Cwt.	Lb.	Lb.	Lb.
1 O	No Minerals, and no Nitrogen . .	...	...	...	...	...	...	...	...
2 O	Superphosphate only, do. . .	...	...	...	...	3·5	...	...	...
3 O	Alkali Salts only, do. . .	...	...	...	...	...	200	100	100
4 O	Complete Minerals, do. . .	...	...	...	...	3·5	200	100	100
1 A	Ammonium-salts alone . . .	...	...	200	...	...	...	...	...
2 A	Superphosphate and Ammonium-salts	...	...	200	...	3·5	...	...	...
3 A	Alkali Salts and do. .	...	...	200	...	...	200	100	100
4 A	Complete Minerals and do. .	...	...	200	...	3·5	200	100	100
1 N	Nitrate of Soda alone	...	...	...	275	...	...	...	...
2 N	Superphosphate and Nitrate of Soda .	...	...	...	275	3·5	...	...	...
3 N	Alkali Salts and do. .	...	...	...	275	...	200	100	100
4 N	Complete Minerals and do. .	...	...	...	275	3·5	200	100	100
1 C	Rape Cake alone	...	1000	...	...	...	...	...	...
2 C	Superphosphate and Rape Cake .	...	1000	...	...	3·5	...	...	...
3 C	Alkali Salts and do. .	...	1000	...	...	...	200	100	100
4 C	Complete Minerals and do. .	...	1000	...	...	3·5	200	100	100
7-1	Unmanured (after dung 20 yrs., 1852-71)	...	...	...	...	...	...	...	...
7-2	Farmyard Manure	14	...	...	...	...	...	...	...

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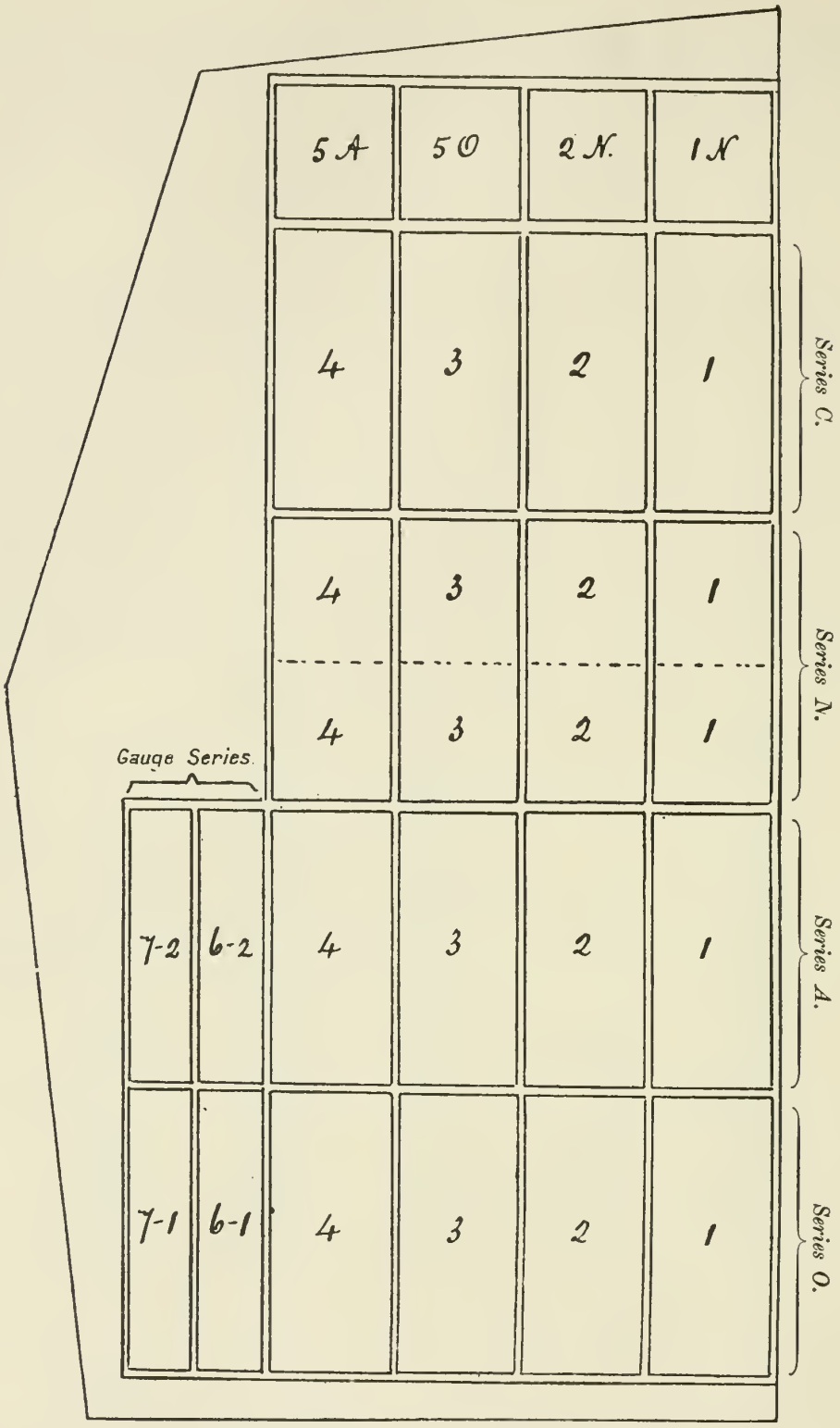
E.—*Plan of the Plots in Hoos Field, on which Barley has been Grown since* 1852.



Total area of ploughed land about $5\frac{1}{2}$ acres.

Area of Plots.
- 1, 2, 3, and 4, of Series O, Series A, and Series C, each $\frac{2}{11}$ acre.
- 1, 2, 3, and 4, of Series N, each $\frac{2}{11}$ acre.
- 1 N, 2 N, 5 O, and 5 A, each $\frac{1}{11}$ acre.
- 6-1 and 6-2, each about $\frac{1}{7}$ acre.
- 7-1 and 7-2, each about $\frac{1}{9}$ acre.

The double lines indicate division paths between plot and plot.

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TABLE XVI.—*Experiments on Barley, Hoos Field. Produce of Grain and Straw per acre. Averages over* 51 *years* (1852-1902), *and over* 10 (1893-1902). *Also Produce in* 1905.

Plot.	Abbreviated Description of Manures.	Dressed Grain.			Straw.		
		Average, 51 years (1852-1902).	Average, 10 years (1893-1902).	Season 1905.	Average, 51 years (1852-1902).	Average, 10 years (1893-1902).	Season 1905.
		Bush.	Bush.	Bush.	Cwt.	Cwt.	Cwt.
1 O	No Minerals, and no Nitrogen . .	15·3	10·1	6·5	8·8	6·4	5·3
2 O	Superphosphate only, do. . .	20·1	13·6	11·9	10·2	7·8	6·7
3 O	Alkali Salts only, do. . .	16·1	8·9	7·7	8·9	5·9	7·0
4 O	Complete Minerals do. . .	20·4	12·4	16·8	10·8	8·0	11·9
1 A	Ammonium-salts alone . . .	26·5	16·2	12·3	14·9	10·5	11·9
2 A	Superphosphate and Ammonium-salts .	39·9	26·8	22·1	22·5	16·5	19·0
3 A	Alkali Salts and do. .	29·4	20·8	14·9	17·0	12·9	14·0
4 A	Complete Minerals and do. .	42·1	35·1	35·5	24·9	20·5	22·2
1 N	Nitrate of Soda alone	30·4	20·5	17·3	18·1	14·4	14·3
2 N	Superphosphate and Nitrate of Soda .	44·0	35·9	32·9	26·2	23·0	25·8
3 N	Alkali Salts and do. .	31·5	23·4	17·3	19·7	15·3	14·8
4 N	Complete Minerals and do. .	43·5	34·9	32·2	27·4	22·6	24·7
1 C	Rape Cake alone	39·2	31·0	29·0	22·4	18·4	17·1
2 C	Superphosphate and Rape Cake . .	41·5	33·2	28·5	23·9	19·6	17·7
3 C	Alkali Salts and do. . .	37·7	29·6	29·3	22·4	18·1	20·8
4 C	Complete Minerals and do. . .	41·0	32·5	34·2	24·5	20·1	23·1
7-1	Unmanured (after dung 20 yrs., 1852-71)	27·0*	19·9	14·1	15·4*	12·8	8·6
7-2	Farmyard Manure	47·6	42·6	39·4	29·1	28·8	27·9

* Average 31 years (1872-1902).

Effect of Nitrogenous Manures

The effect of nitrogenous manures upon the barley crop is best seen by comparing the yields of the various Plots 4, all of which receive the same mineral manures ; the diagram, Fig. 11, shows this comparison in a graphic form.

Effect of Mineral Manures

The diagram, Fig 12, shows in a graphic form the effects of the various mineral manures, the nitrogen supply being the same in all cases.

The great importance of phosphoric acid to the barley crop is seen on comparing Plots 3 and 4, which only differ from one another in the omission of phosphoric acid on Plot 3. In the field the most striking effect is seen in the hastened maturity brought about by the phosphoric acid. By comparing Plot 2 with Plot 4 we can see the effect of omitting potash from the manure. Where nitrate of soda is used as the source of nitrogen the soda liberates sufficient potash from the soil to supply the needs of the crop, but with ammonium-salts the omission of potash has latterly begun to tell upon the yield, though it did not do so in the earlier years of the experiment.

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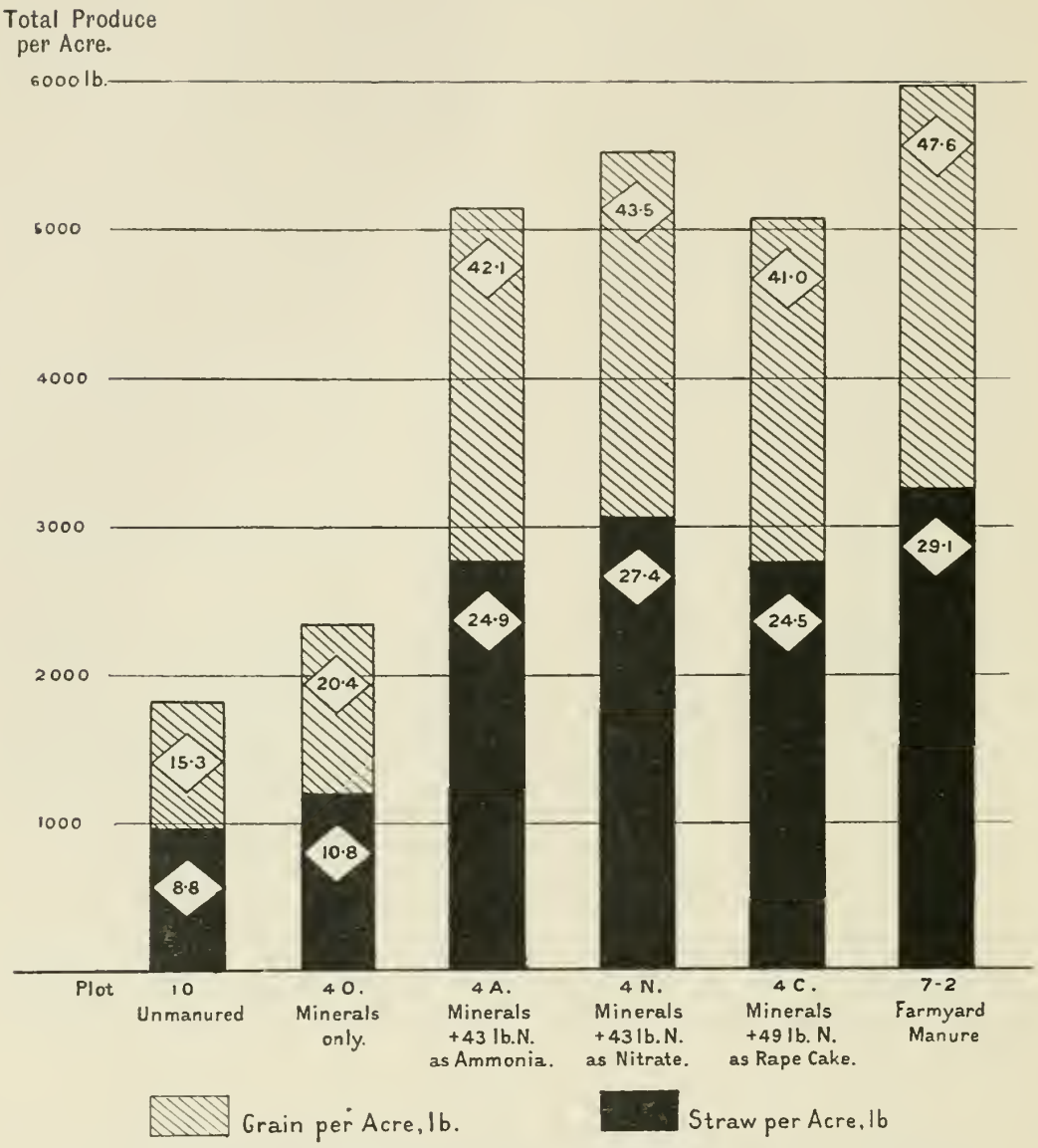

FIG. 11.—Yield in Barley (Grain and Straw) with different sources of Nitrogen. Averages for 51 years (1852-1902).

The figures in the labels indicate bushels of Grain and cwt. of Straw.

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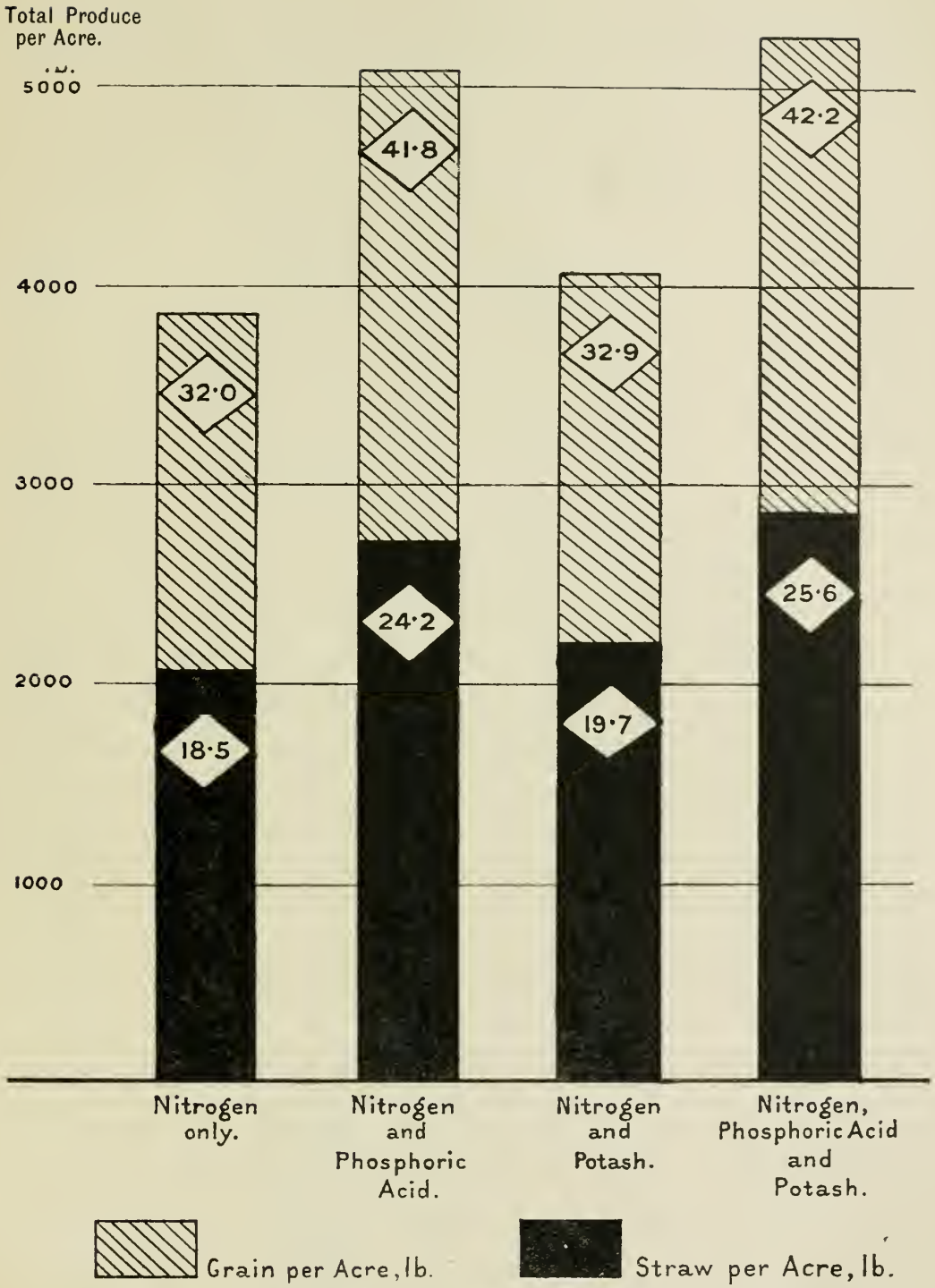

FIG. 12.—Effect of Mineral Manures on the yield of Barley (Grain and Straw). Mean of Series A. N. and C. 51 years (1852-1902).

The figures in the labels indicate bushels of Grain and cwt. of Straw.