Guide to the Experimental Plots - 1913

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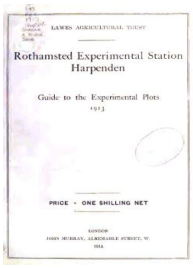

Hoos Field - Barley

Rothamsted Research

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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 sixty 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 nitro-

Table XVII.—*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.	Silicate of Soda.
		Tons.	Lb.	Lb.	Lb.	Cwt.	Lb.	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 Ammonium-salts	...	...	200	...	...	200	100	100	...
4 A	Complete Minerals and Ammonium-salts	...	...	200	...	3·5	200	100	100	...
1 AA	Nitrate of Soda alone . .	...	...	...	275	...	...	...	...	...
2 AA	Superphosphate and Nitrate of Soda	...	...	...	275	3·5	...	...	...	...
3 AA	Alkali Salts and Nitrate of Soda	...	...	...	275	...	200	100	100	...
4 AA	Complete Minerals and Nitrate of Soda	...	...	...	275	3·5	200	100	100	...
1 AAS	As 1AA and Silicate of Soda .	...	...	...	275	...	...	...	...	400
2 AAS	As 2AA and do.	...	...	...	275	3·5	...	...	...	400
3 AAS	As 3AA and do.	...	...	...	275	...	200	100	100	400
4 AAS	As 4AA and do.	...	...	...	275	3·5	200	100	100	400
1 C	Rape Cake alone . . .	...	1000	...	...	...	...	...	...	...
2 C	Superphosphate and Rape Cake	...	1000	...	...	3·5	...	...	...	...
3 C	Alkali Salts and Rape Cake .	...	1000	...	...	...	200	100	100	...
4 C	Complete Minerals and Rape Cake	...	1000	...	...	3·5	200	100	100	...
7-1	Unmanured (after dung 20 years, 1852-1871) . .	...	...	...	...	...	...	...	...	...
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 AA and AAS, each $\frac{1}{11}$ 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 $\frac{1}{8}$ acre.

The double lines indicate division paths between plot and plot.

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genous 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 AA, nitrate of soda; Series AAS as Series AA and silicate of soda in addition; and Series C, rape cake. There are other plots, one of which received farmyard manure for the first twenty years, but has since been unmanured.

TABLE XVIII.—*Experiments on Barley, Hoos Field. Produce of Grain and Straw per acre. Averages over* 60 *years* (1852-1911), *and over* 10 (1902-1911). *Also Produce in* 1911.

Plot	Abbreviated Description of Manures.	Dressed Grain.			Straw.		
		Average, 60 years (1852-1911).	Average, 10 years (1902-1911).	Season 1911.	Average, 60 years (1852-1911).	Average, 10 years (1902-1911).	Season 1911.
		Bush.	Bush.	Bush.	Cwt.	Cwt.	Cwt.
1 O	No Minerals and no Nitrogen	12·7	9·3	4·9	8·4	6·2	5·5
2 O	Superphosphate only, do.	19·7	17·6	11·9	10·0	9·2	9·1
3 O	Alkali Salts only, do.	15·2	10·1	4·3	8·8	8·2	5·3
4 O	Complete Minerals, do.	19·7	15·9	5·9	11·1	12·4	7·8
1 A	Ammonium-salts alone	25·5	19·7	13·8	14·7	13·0	12·5
2 A	Superphosphate and Ammonium-salts	38·2	29·7	10·3	22·0	19·3	11·6
3 A	Alkali Salts and do.	28·0	20·3	11·8	16·9	15·6	14·1
4 A	Complete Minerals and do.	41·5	38·4	28·5	25·0	25·3	22·9
1 AA	Nitrate of Soda alone	29·3	23·0	16·2	17·8	16·1	17·8
2 AA	Superphosphate and Nitrate of Soda	43·1	38·6	26·1	26·3	26·5	24·7
3 AA	Alkali Salts and do.	30·0	21·4	12·5	19·3	16·1	14·5
4 AA	Complete Minerals and do.	42·7	37·8	28·9	27·3	26·3	23·7
1 AAS	As Plot 1 AA and Silicate of Soda	32·8*	28·0	19·7	19·7*	18·5	18·4
2 AAS	As Plot 2 AA do. do.	42·3*	37·2	26·0	26·0*	25·9	24·6
3 AAS	As Plot 3 AA do. do.	35·2*	29·0	17·6	21·7*	20·3	18·1
4 AAS	As Plot 4 AA do. do.	43·6*	40·4	27·5	27·7*	27·1	24·8
1 C	Rape Cake alone	38·3	33·4	27·4	22·1	20·7	20·7
2 C	Superphosphate and Rape Cake	40·5	35·4	28·2	23·6	22·0	20·8
3 C	Alkali Salts and do.	36·9	33·1	21·6	22·3	21·9	18·6
4 C	Complete Minerals and do.	40·5	38·2	25·7	24·5	24·4	20·1
7-1	Unmanured (after dung 20 years, 1852-71)	24·8†	18·3	9·5	14·8†	12·9	10·5
7-2	Farmyard Manure	47·1	44·3	23·0	29·6	31·7	24·0

* 48 years (1864-1911). † 40 years (1872-1911).

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.

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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

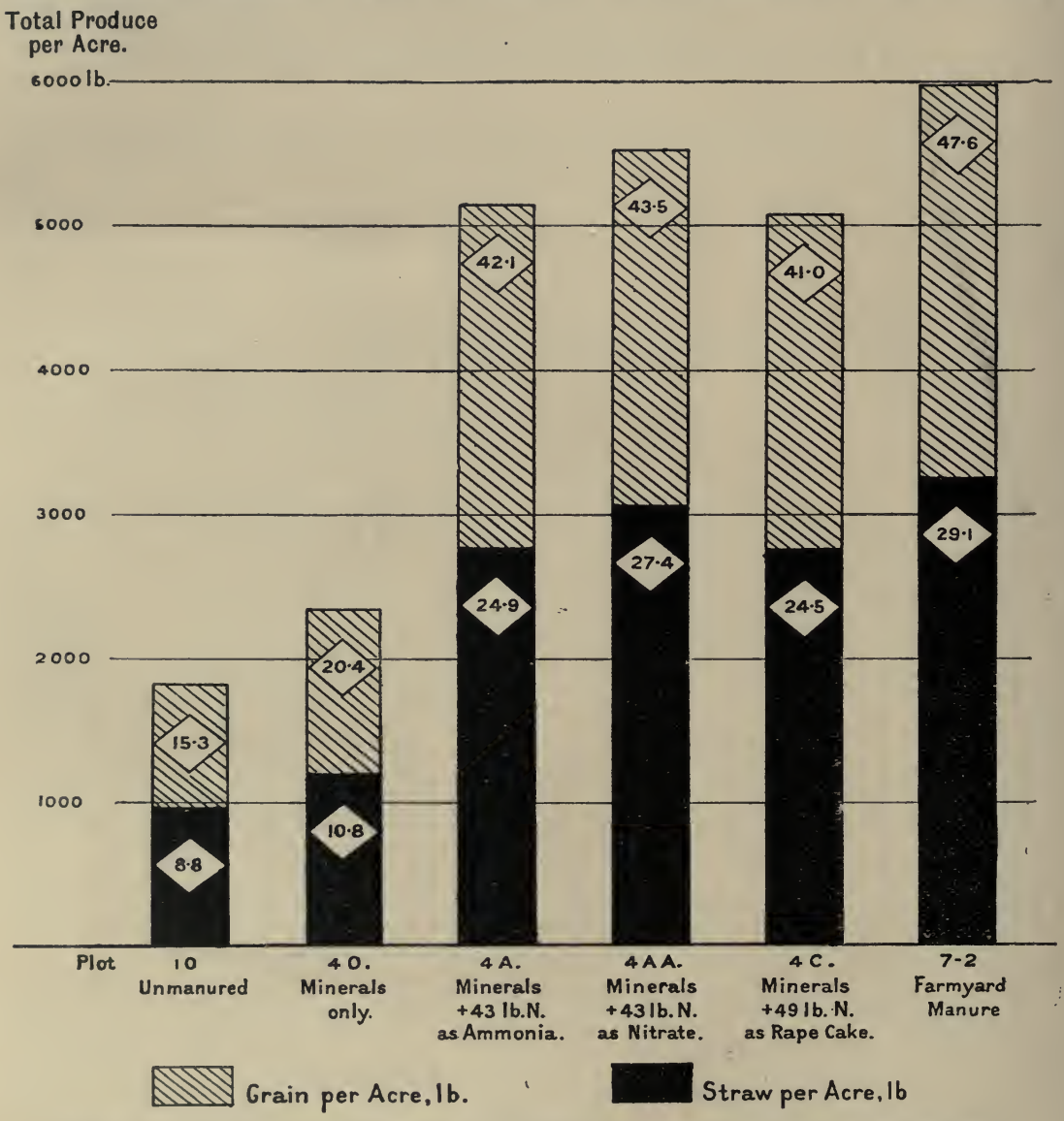

Fig. 11.—Yield in Barley (Grain and Straw) with different sources of Nitrogen. Averages for 51 years (1852-1902).

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

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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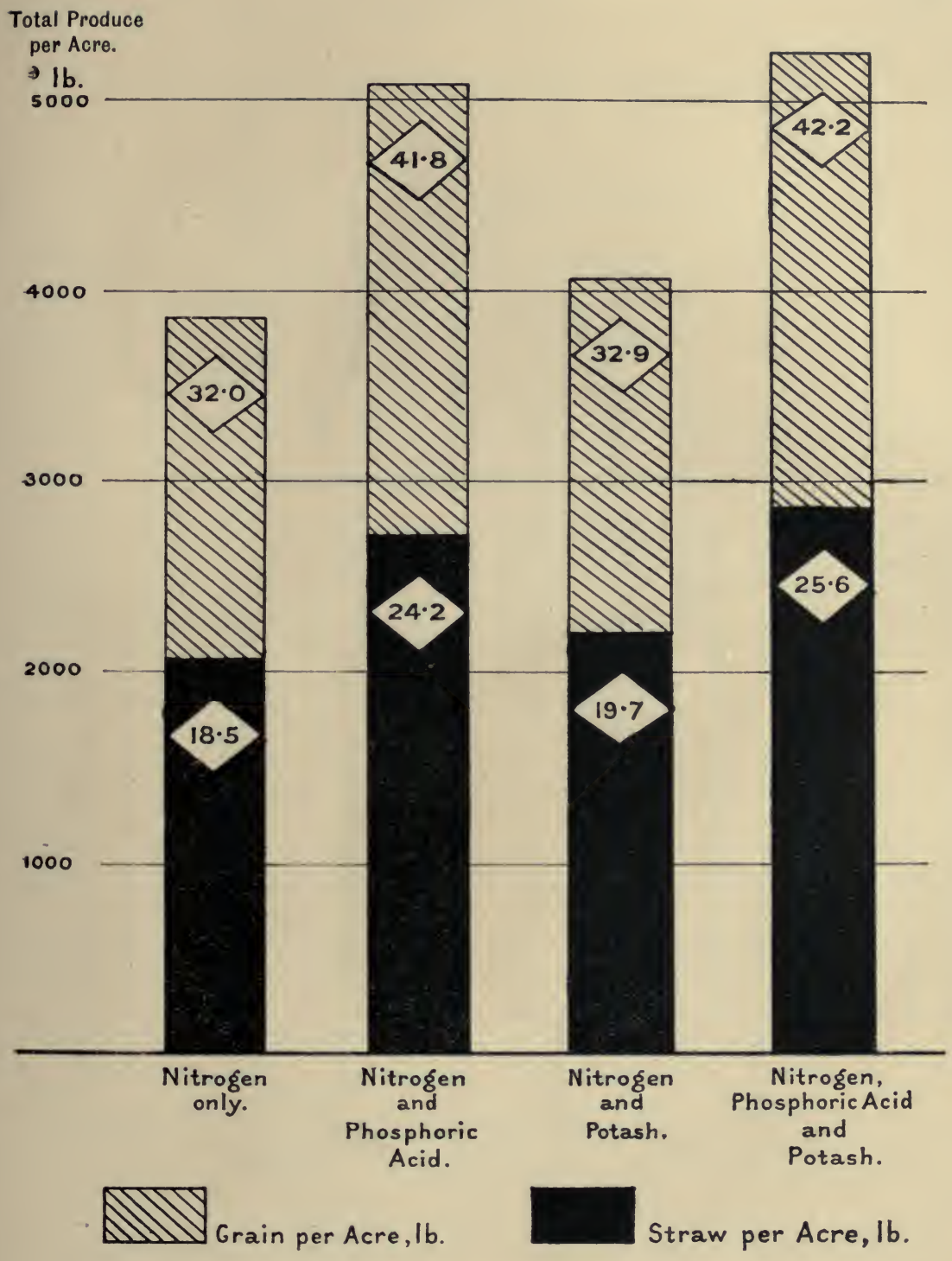

FIG. 12.—Effect of Mineral Manures on the yield of Barley (Grain and Straw). Mean of Series A, AA, and C. 51 years (1852-1902).
The figures in the labels indicate bushels of Grain and cwt. of Straw.

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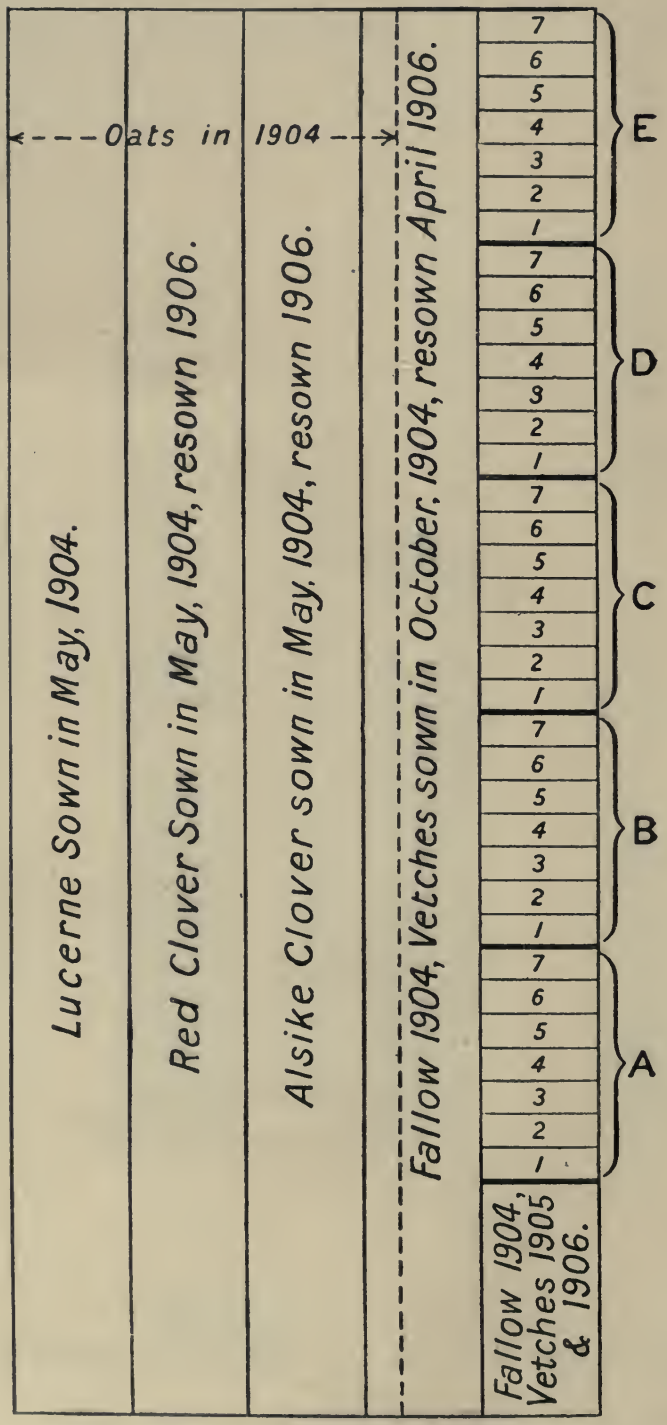
F.—*Hoos Field Leguminous Plots. Season* 1906.



[Total area under experiment, about 3 acres.]

These crops were left for a time, then cereals were introduced, as shown in Table XIX., p. 41.

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