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Details of the Classical and Long-term Experiments Up to 1967

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Residual Values - Rothamsted

Rothamsted Research

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RESIDUAL VALUES EXPERIMENT, LITTLE HOOS, 1904–26

This experiment tested the direct action and residual effect over the three following years of five nitrogenous and three phosphatic manures. Swedes, barley, mangolds and wheat were grown (one crop each year), mainly in the order given. Clover hay was taken in 1917 and 1923, without direct applications of the manures, and in 1925 the experiment lay fallow. One series of five plots was assigned to each manure. Each set had an untreated plot and the remaining four plots showed the four stages of exhaustion of the manure in question.

Treatments. The manures and the usual dressings per acre were:

Nitrogen set:

(i) Farmyard manure made with ordinary feeding 16 tons
(ii) Farmyard manure made by cattle receiving rich cake feeding 16 tons
(iii) Shoddy, 1 ton till 1907, then 8½ cwt
(iv) Guano 8 cwt
(v) Rape dust 10 cwt

Phosphate set:

(vi) Superphosphate 5·3 cwt
(vii) Bone meal 3·8 cwt
(viii) Basic slag 5·3 cwt

For details see Finney (1).

Basal dressings. The nitrogen set (including untreated plots) had basal dressings of superphosphate and sulphate of potash as required; the phosphate set likewise had sulphate of ammonia and sulphate of potash.

Plot arrangement. The eight series were applied to eight strips running side by side across the field, the nitrogen set and the phosphate set each being kept together. The untreated plots ran diagonally across the field but the order of the manurial treatments within the series was systematic. The plots were 0·125 acres.

When two cycles had been completed, Hall (2) made a preliminary assessment of the results, and after the experiment had ended Finney (1) examined the whole data in the light of the various changes that had been made in dressings and sequence of cropping, drawing up tables that exhibited the more valid comparisons. The following table is derived from Finney's data. Swedes and mangolds are taken together; the cereals are expressed in bushels (1 bushel wheat = 60 lb approximately, 1 bushel barley = 52 lb approximately); the number of years for which a complete set of balanced data is averaged is given after each crop.

References

1. Finney, D. J. (1940). The Little Hoos field experiment on the residual values of certain manures. *Emp. J. exp. Agric.* **8**, 111–125.
2. Hall, A. D. (1913). The duration of the action of manures. *Jl R. agric. Soc.* **74**, 119–126.

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TABLE 24

Residual values experiment, Little Hoos, 1904–26

	Nitrogen manures					Phosphate manures		
	Ordinary FYM	Cake-fed FYM	Shoddy	Guano	Rape-dust	Super phos-phate	Bone meal	Basic slag
				Roots, swedes and mangolds: tons				
				Means over four seasons				
Untreated	8·7	8·7	8·7	8·7	8·7	6·5	6·5	6·5
Years since manured								
0	12·1	13·1	10·3	11·6	10·3	9·9	8·4	8·7
1	10·3	11·5	10·8	9·0	9·1	9·3	9·2	9·3
2	10·3	10·3	9·3	9·1	8·9	8·9	7·7	8·4
3	8·7	8·3	8·1	8·2	8·1	8·3	7·2	7·9
Mean	10·3	10·8	9·9	9·5	9·1	9·1	8·1	8·6
				Wheat, grain: bushels				
				Means over four seasons				
Untreated	19·2	19·2	19·2	19·2	19·2	24·2	24·2	24·2
Years since manured								
0	27·4	31·4	22·7	25·4	24·2	24·2	25·3	27·6
1	24·0	27·2	23·6	18·9	19·6	25·1	26·6	26·9
2	23·6	23·2	22·0	18·5	19·8	25·0	25·6	26·2
3	23·1	23·3	19·6	19·1	19·3	23·3	25·2	28·3
Mean	24·5	26·3	21·9	20·5	20·7	24·4	25·7	27·3
				Barley, grain: bushels				
				Means over three seasons				
Untreated	24·5	24·5	24·5	24·5	24·5	27·9	27·9	27·9
Years since manured								
0	41·4	45·4	36·6	42·2	37·1	38·5	34·7	37·4
1	38·6	40·9	23·7	24·1	28·1	30·7	29·1	33·1
2	35·9	33·5	25·0	21·5	24·6	30·3	29·1	30·5
3	32·7*	35·4*	29·5	23·2	23·4	29·7	31·0	31·8
Mean	37·1	38·8	28·7	27·7	28·3	32·3	31·0	33·2

* Contains one seven-year residual

				Clover, hay: cwt				
				Means over two seasons				
Untreated	49·2	49·2	49·2	49·2	49·2	43·9	43·9	43·9
Years since manured								
1	69·8	71·2	51·5	49·7	46·4	48·3	46·9	55·3
2	65·7	69·2	45·0	46·6	50·4	49·8	46·0	48·4
3	64·4	68·4	48·6	51·3	48·3	46·7	42·5	51·2
4	61·2*	64·8*	43·8	48·0	48·2	47·9	42·5	51·2
Mean	65·3	68·4	47·2	48·9	48·3	48·2	45·4	51·7

* Contains one eight-year residual.

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