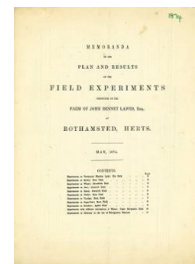


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# Memoranda of the Field Experiments at Rothamsted May 1874



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## Experiments on Economy in the Use of Nitrogenous Manures

### Rothamsted Research

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EXPERIMENTS WITH A VIEW TO ECONOMY IN THE USE OF EXPENSIVE NITROGENOUS MANURES.

It is found that generally less than half the nitrogen supplied in such manures as guano, ammonia-salts, or nitrate of soda, is recovered in the increase of the crop for which they are used; that a considerable quantity may remain in the soil in a comparatively inactive state, yielding increase very slowly; and that a considerable quantity may be carried away by drainage, and lost. It seemed desirable, therefore, to commence a series of

experiments to determine whether any saving can be effected by applying comparatively small quantities near to the seed, instead of larger amounts in the usual mode of broadcast sowing and harrowing-in.

It is also intended to make experiments with a view to ascertain the best periods of the year for the application of such manures to different crops.

FIRST SEASON, 1871.—Experiments upon Wheat. Little Hoos Field. Plots  $\frac{1}{4}$  acre each.

PLOT No.	MANURES PER ACRE, &c.	PRODUCE PER ACRE.		
		Dressed Corn,		Total Straw.
		Quantity.	Weight per Bushel.	
		Bushels.	lbs.	cwts.
1	Unmanured. Seed 1 bushel, dibbled 6 inches apart in the rows .. .. .	23 $\frac{3}{4}$	59.3	24 $\frac{1}{2}$
2	{146 lbs. Sulphate Ammonia (containing Nitrogen = 15 bushels grain, and its straw). Seed 1 bushel; .. } {Holes dibbled 6 inches apart in the rows; manure (mixed with Ashes) put in, and seed above .. .. }	31 $\frac{1}{2}$	59.1	36 $\frac{1}{2}$
3	{292 lbs. Sulphate Ammonia. Seed 1 bushel; .. .. . } {Manure (mixed with Ashes) sown broadcast, seed dibbled 6 inches apart in the rows } .. .. .	28 $\frac{1}{2}$	58.3	35 $\frac{1}{2}$

FIRST SEASON, 1871.—Experiments upon Barley. Thirty-acres Field. Plots  $\frac{1}{2}$  acre each.

PLOT No.	MANURES PER ACRE, &c.	Bushels.	lbs.	cwts.
1	Unmanured. Seed 3 bushels; drilled .. .. .	40 $\frac{1}{2}$	53.9	24 $\frac{3}{4}$
2	{1 cwt. Superphosphate, 1 cwt. Nitrate Soda. Seed 3 bushels; } {Manures mixed with Ashes and sown broadcast; seed drilled .. .. }	49 $\frac{1}{2}$	53.3	30 $\frac{1}{2}$
3	{1 cwt. Superphosphate, 1 cwt. Nitrate Soda. Seed 3 bushels; .. } {Manures mixed with Ashes and drilled; seed drilled above .. .. }	49 $\frac{1}{2}$	53.4	28 $\frac{1}{2}$
4	{1 cwt. Superphosphate, 1 cwt. Nitrate Soda. Seed 3 bushels; } {Manures, Ashes, and Seed mixed, and drilled together .. .. }	51	53.0	30 $\frac{1}{2}$
5	{1 cwt. Superphosphate, 1 cwt. Nitrate Soda. Seed 1 $\frac{1}{2}$ bushel; .. } {Holes dibbled, 6 inches apart in the rows; Manures (mixed with Ashes) put in, and Seed above } .. .. }	51 $\frac{1}{2}$	53.3	28 $\frac{1}{2}$
6	{2 cwts. Superphosphate, 2 cwts. Nitrate Soda. Seed 3 bushels; } {Manures mixed with Ashes and sown broadcast; seed drilled } .. .. .	56 $\frac{1}{2}$	51.6	32 $\frac{1}{2}$

SECOND SEASON, 1872.—Experiments upon Barley. Thirty-acres Field. Plots  $\frac{1}{2}$  acre each.

PLOT No.	MANURES PER ACRE, &c.	Bushels.	lbs.	cwts.
1	Unmanured. Seed 2 $\frac{1}{2}$ bushels, drilled .. .. .	33 $\frac{1}{2}$	54.4	19 $\frac{1}{2}$
2	{3 cwts. Superphosphate, 2 cwts. Nitrate Soda. Seed 2 $\frac{1}{2}$ bushels; .. } {Manures made up to 15 bushels per acre with Ashes, and sown broadcast; seed drilled .. .. }	46 $\frac{1}{2}$	54.1	30 $\frac{1}{2}$
3	{3 cwts. Superphosphate, 2 cwts. Nitrate Soda. Seed 2 $\frac{1}{2}$ bushels; .. } {The Superphosphate mixed with 40 lbs. slaked Lime to neutralize the acid, the Nitrate added, and the whole made up to 15 bushels per acre with Ashes, and sown broadcast; Seed drilled .. .. }	47 $\frac{1}{2}$	53.6	31 $\frac{1}{2}$
4	{1 cwt. Superphosphate, 1 cwt. Nitrate Soda. Seed 2 $\frac{1}{2}$ bushels; .. } {Manures and Seed made up to 15 bushels per acre with Ashes, and the whole (Manure, Seed, and Ashes) drilled together .. .. }	42 $\frac{1}{2}$	54.1	26 $\frac{1}{2}$
5	{1 cwt. Superphosphate, 1 cwt. Nitrate Soda. Seed 2 $\frac{1}{2}$ bushels; .. } {Manures and Seed made up to 15 bushels per acre with a mixture of half Lime and half Ashes, and the whole (Manure, Seed, Lime, and Ashes) drilled together .. .. }	43 $\frac{1}{2}$	53.1	27

THIRD SEASON, 1873.

Some experiments were conducted in which a given quantity of Nitrate of Soda (generally at the rate of 1 cwt. per acre) was, by means of plaster of Paris, and other substances, made to adhere to the seed, forming a coating upon it. Experiments in pots, well watered and kept in a greenhouse, showed that barley so coated germinated well, and gave strong and healthy plants; but owing to the wetness of the weather previously, to the consequent lateness of sowing, and to the scarcity of rain afterwards, the coated seeds sown in the field came up so irregularly, that it was considered not worth while to keep the crop separate at harvest. Even if it had not been so, there are practical difficulties in the way of so preparing the seed, which might render the method inapplicable in ordinary practice.

FOURTH SEASON, 1874.—Experiments upon Barley. Barn Field. Plots  $\frac{1}{4}$  acre each.

PLOT No.	MANURES PER ACRE, &c.	PRODUCE PER ACRE.		
		Dressed Corn,		Total Straw.
		Quantity.	Weight per Bushel.	
		Bushels.	lbs.	cwts.
1	Unmanured. Seed 2 bushels, dibbled 6 inches apart in the rows .. .. .			
2	{1 cwt. Superphosphate, 1 cwt. Nitrate Soda, 2 cwts. Ashes; Seed 2 bushels; .. } {All mixed, made into a paste with water, and dibbled 6 inches apart in the rows } .. .. .			
3	{1 cwt. Superphosphate, 1 cwt. Nitrate Soda, 80 lbs. slaked Lime; Seed 2 bushels } {All mixed, and dibbled 6 inches apart in the rows .. .. . }			
4	{1 cwt. Superphosphate, 1 cwt. Nitrate Soda, 2 cwts. Ashes; Seed 2 bushels; .. } {Manures mixed and sown broadcast; Seed drilled .. .. . }			