Memoranda of the Field Experiments at Rothamsted, May 1873


MEMORANDA
OF THE
PLAN AND RESULTS
OF THE
FIELD EXPERIMENTS
CONDUCTED ON THE
FARM OF JOHN BENNET LAWES, Esq.,
AT
ROTHAMSTED, HERTS.
MAY, 1873.

Full Table of Content

Experiments on the Economy 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 ¼ acre each.

Plot No.	Manures per Acre, &c.	Produce per Acre. Dressed Corn. Quantity.	Dressed Corn. Weight per Bushel.	Total Straw.
		Bushels.	lbs.	cwts.
1	Unmanured. Seed 1 bushel, dibbled 6 inches apart in the rows	23¾	59·3	24½
2	146 lbs. (1) Sulphate Ammonia. Seed 1 bushel; Holes dibbled 6 inches apart in the rows; manure (mixed with Ashes) put in, and seed above	31½	59·1	36¼
3	292 lbs. Sulphate Ammonia. Seed 1 bushel; Manure (mixed with Ashes) sown broadcast, seed dibbled 6 inches apart in the rows	28¾	58·3	35⅝

(1) Containing Nitrogen equal to that in 15 bushels of grain, with its average proportion of Straw.

Experiments upon Barley. Thirty-acres Field. Plots ½ acre each.

Plot. No.	Manures per Acre, &c.	Produce per Acre. Dressed Corn. Quantity.	Dressed Corn. Weight per Bushel.	Total Straw.
		Bushels.	lbs.	cwts.
1	Unmanured. Seed 3 bushels; drilled	40½	53·9	24⅝
2	1 cwt. Superphosphate, 1 cwt. Nitrate Soda. Seed 3 bushels; Manures mixed with Ashes and sown broadcast; seed drilled	49⅞	53·3	30½
3	1 cwt. Superphosphate, 1 cwt. Nitrate Soda. Seed 3 bushels; Manures mixed with Ashes and drilled; seed drilled above	49½	53·4	28½
4	1 cwt. Superphosphate, 1 cwt. Nitrate Soda. Seed 3 bushels; Manures, Ashes, and Seed mixed, and drilled together	51	53·0	30⅜
5	1 cwt. Superphosphate, 1 cwt. Nitrate Soda. Seed 1½ bushel; Holes dibbled, 6 inches apart in the rows; Manures (mixed with Ashes) put in, and Seed above	51½	53·3	28¼
6	2 cwts. Superphosphate, 2 cwts. Nitrate Soda. Seed 3 bushels; Manures mixed with Ashes and sown broadcast; seed drilled	56¼	51·6	32⅞

Second Season, 1872.

Experiments upon Barley. Thirty-acres Field. Plots ½ acre each.

Plot. No.	Manures per Acre, &c.	Produce per Acre. Dressed Corn. Quantity.	Dressed Corn. Weight per Bushel.	Total Straw.
		Bushels.	lbs.	cwts.
1	Unmanured. Seed 2½ bushels, drilled	33⅛	54·4	19½
2	3 cwts. Superphosphate, 2 cwts. Nitrate Soda. Seed 2½ bushels; Manures made up to 15 bushels per acre with Ashes, and sown broadcast; seed drilled	46½	54·1	30⅛
3	3 cwts. Superphosphate, 2 cwts. Nitrate Soda. Seed 2½ 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	47⅞	53·6	31⅛
4	1 cwt. Superphosphate, 1 cwt. Nitrate Soda. Seed 2½ bushels; Manures and Seed made up to 15 bushels per acre with Ashes, and the whole (Manure, Seed, and Ashes) drilled together	42⅜	54·1	26½
5	1 cwt. Superphosphate, 1 cwt. Nitrate Soda. Seed 2½ 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	43½	53·1	27

Third Season, 1873.

Some experiments are in progress in which a given quantity of Nitrate of Soda (generally at the rate of 1 cwt. per acre) has, by means of plaster of Paris and other substances, been 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 since, the coated seeds sown in the field have not come up regularly, and it remains to be seen whether the result will eventually be favourable. Even if it were so, there are practical difficulties in the way of so preparing the seed, which might render the method inapplicable in ordinary practice.

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