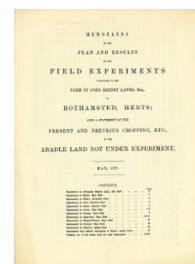


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Experiments on Wheat; Broadbalk Field

Rothamsted Research

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BROADBALK FIELD.

EXPERIMENTS ON THE GROWTH OF WHEAT YEAR AFTER YEAR ON THE SAME LAND; WITHOUT MANURE, AND WITH DIFFERENT KINDS OF MANURE. Previous Cropping—1839, Turnips, with Farmyard Manure; 1840, Barley; 1841, Peas; 1842, Wheat; 1843, Oats; the last four Crops Unmanured. First Experimental Wheat Crop in 1844. Wheat every year since; and, with some exceptions, nearly the same description of Manure on the same Plots each year—especially during the last 26 years (1852 and since). Unless otherwise stated, the Manures are sown in the Autumn before the seed.

(Area under experiment, about 13 acres.)

PLOTS.	Manures, per acre, per annum.	PRODUCE PER ACRE.												PLOTS.			
		Average per Annum.															
		Dressed Corn.						Total Straw.									
		Weight per Bushel.						Quantity.									
		Quantity.		12 Years, 1842-51.		12 Years, 1842-51.		12 Years, 1842-51.		12 Years, 1842-51.		12 Years, 1842-51.			12 Years, 1842-51.		Total Straw, 1876.
0	Superphosphate of Lime (three times as much as on No. 5 and succeeding Plots)	18 1/2	16 1/2	17 1/2	15 1/2	16 1/2	17 1/2	15 1/2	16 1/2	17 1/2	15 1/2	16 1/2	17 1/2	15 1/2	16 1/2	17 1/2	0
1	Sulphates of Potash, Soda, and Magnesia (twice as much as on No. 5 and succeeding Plots)	16 1/2	14 1/2	15 1/2	13 1/2	14 1/2	15 1/2	13 1/2	14 1/2	15 1/2	13 1/2	14 1/2	15 1/2	13 1/2	14 1/2	15 1/2	1
2	Farmyard Manure (14 tons every year)	35 1/2	35	35 1/2	35	35 1/2	35	35 1/2	35	35 1/2	35	35 1/2	35	35 1/2	35	35 1/2	2
3	Unmanured continuously	15 1/2	14	15 1/2	14	15 1/2	14	15 1/2	14	15 1/2	14	15 1/2	14	15 1/2	14	15 1/2	3
4	Unmanured for Crop of 1852, and since; previously Superphosphate (made with Muriatic Acid), and Sulphate Ammonia	17	13	15	15 1/2	17 1/2	15 1/2	17 1/2	15 1/2	17 1/2	15 1/2	17 1/2	15 1/2	17 1/2	15 1/2	17 1/2	4
5 (a and b)	200 lbs. c) Sulphate Potash, 100 lbs. c) Sulphate Soda, 100 lbs. Sulphate Magnesia, 3 1/2 cwt. Superphosphate of Lime c)	18 1/2	16 1/2	17 1/2	15 1/2	16 1/2	17 1/2	15 1/2	16 1/2	17 1/2	15 1/2	16 1/2	17 1/2	15 1/2	16 1/2	17 1/2	5 (a and b)
6 (a and b)	200 lbs. c) Sulphate Potash, 100 lbs. c) Sulphate Soda, 100 lbs. Sulphate Mag., 3 1/2 cwt. Superphos., 200 lbs. Ammonia-salts c)	28 1/2	22 1/2	25 1/2	25 1/2	28 1/2	22 1/2	25 1/2	25 1/2	28 1/2	22 1/2	25 1/2	25 1/2	28 1/2	22 1/2	25 1/2	6 (a and b)
7 (a and b)	200 lbs. c) Sulphate Potash, 100 lbs. c) Sulphate Soda, 100 lbs. Sulphate Mag., 3 1/2 cwt. Superphos., 400 lbs. Ammonia-salts c)	36 1/2	32 1/2	34 1/2	34 1/2	36 1/2	32 1/2	34 1/2	34 1/2	36 1/2	32 1/2	34 1/2	34 1/2	36 1/2	32 1/2	34 1/2	7 (a and b)
8 (a and b)	200 lbs. c) Sulphate Potash, 100 lbs. c) Sulphate Soda, 100 lbs. Sulphate Mag., 3 1/2 cwt. Superphos., 600 lbs. Ammonia-salts c)	34 1/2	31 1/2	32 1/2	32 1/2	34 1/2	31 1/2	32 1/2	32 1/2	34 1/2	31 1/2	32 1/2	32 1/2	34 1/2	31 1/2	32 1/2	8 (a and b)
9 { a } { b }	200 lbs. c) Sulphate Potash, 100 lbs. c) Sulphate Soda, 100 lbs. Sulphate Mag., 3 1/2 cwt. Superphos., 550 lbs. Nitrate Soda c)	34 1/2	31 1/2	32 1/2	32 1/2	34 1/2	31 1/2	32 1/2	32 1/2	34 1/2	31 1/2	32 1/2	32 1/2	34 1/2	31 1/2	32 1/2	9 { a } { b }
10 { a } { b }	550 lbs. Nitrate of Soda c). (The Nitrate for both 9a and 9b always sown in the Spring)	22 1/2	21 1/2	21 1/2	21 1/2	22 1/2	21 1/2	21 1/2	21 1/2	22 1/2	21 1/2	21 1/2	21 1/2	22 1/2	21 1/2	21 1/2	10 { a } { b }
11 (a and b)	400 lbs. Ammonia-salts alone, for 1845, and each year since (Mineral Manure in 1844)	29 1/2	25 1/2	27 1/2	27 1/2	29 1/2	25 1/2	27 1/2	27 1/2	29 1/2	25 1/2	27 1/2	27 1/2	29 1/2	25 1/2	27 1/2	11 (a and b)
12 (a and b)	400 lbs. Ammonia-salts, 3 1/2 cwt. Superphosphate	35 1/2	31 1/2	33 1/2	33 1/2	35 1/2	31 1/2	33 1/2	33 1/2	35 1/2	31 1/2	33 1/2	33 1/2	35 1/2	31 1/2	33 1/2	12 (a and b)
13 (a and b)	400 lbs. Ammonia-salts, 3 1/2 cwt. Superphosphate, and 366 1/2 lbs. c) Sulphate of Soda	34 1/2	31 1/2	32 1/2	32 1/2	34 1/2	31 1/2	32 1/2	32 1/2	34 1/2	31 1/2	32 1/2	32 1/2	34 1/2	31 1/2	32 1/2	13 (a and b)
14 (a and b)	400 lbs. Ammonia-salts, 3 1/2 cwt. Superphosphate, and 280 lbs. c) Sulphate of Potash	35	31 1/2	33 1/2	33 1/2	35	31 1/2	33 1/2	33 1/2	35	31 1/2	33 1/2	33 1/2	35	31 1/2	33 1/2	14 (a and b)
15 { a } { b }	200 lbs. c) Sulph. Pot., 100 lbs. c) Sulph. Sod., 100 lbs. Sulph. Mag., 3 1/2 cwt. Superphos., c) 400 lbs. Amm.-salts, in Spring c)	33 1/2	31 1/2	32 1/2	32 1/2	33 1/2	31 1/2	32 1/2	32 1/2	33 1/2	31 1/2	32 1/2	32 1/2	33 1/2	31 1/2	32 1/2	15 { a } { b }
16 (a and b)	1865-64, 13 years, 200 lbs. Sulph. Potash, 100 lbs. Sulph. Soda, 100 lbs. Sulph. Mag., 3 1/2 cwt. Superphos., and 800 lbs. Ammonia-salts; average produce 39 1/2 bush. Corn, 46 1/2 cwt. Straw	38 1/2	34 1/2	36 1/2	36 1/2	38 1/2	34 1/2	36 1/2	36 1/2	38 1/2	34 1/2	36 1/2	36 1/2	38 1/2	34 1/2	36 1/2	16 (a and b)
17 (a and b)	1865 and since, unmanured; average produce (11 years, 1865-75) 16 1/2 bushels Corn, 14 1/2 cwt. Straw	18 1/2	17 1/2	18 1/2	18 1/2	18 1/2	17 1/2	18 1/2	18 1/2	18 1/2	17 1/2	18 1/2	18 1/2	18 1/2	17 1/2	18 1/2	17 (a and b)
18 (a and b)	200 lbs. c) Sulphate Potash, 100 lbs. c) Sulphate Soda, 100 lbs. Sulphate Magnesia, and 3 1/2 cwt. Superphosphate	18 1/2	17 1/2	18 1/2	18 1/2	18 1/2	17 1/2	18 1/2	18 1/2	18 1/2	17 1/2	18 1/2	18 1/2	18 1/2	17 1/2	18 1/2	18 (a and b)
19	3 1/2 cwt. Superphosphate of Lime c), 300 lbs. Sulphate of Ammonia, and 500 lbs. Rape-cake	18 1/2	17 1/2	18 1/2	18 1/2	18 1/2	17 1/2	18 1/2	18 1/2	18 1/2	17 1/2	18 1/2	18 1/2	18 1/2	17 1/2	18 1/2	19
20	Unmanured continuously	15 1/2	14	15 1/2	14	15 1/2	14	15 1/2	14	15 1/2	14	15 1/2	14	15 1/2	14	15 1/2	20
21	200 lbs. c) Sulph. Potash, 100 lbs. c) Sulph. Soda, 100 lbs. Sulph. Mag., 3 1/2 cwt. Superphos., 100 lbs. Muriate Ammonia	22 1/2	20 1/2	21 1/2	21 1/2	22 1/2	20 1/2	21 1/2	21 1/2	22 1/2	20 1/2	21 1/2	21 1/2	22 1/2	20 1/2	21 1/2	21
22	200 lbs. c) Sulph. Potash, 100 lbs. c) Sulph. Soda, 100 lbs. Sulph. Mag., 3 1/2 cwt. Superphos., 100 lbs. Sulphate Ammonia	21 1/2	19 1/2	20 1/2	20 1/2	21 1/2	19 1/2	20 1/2	20 1/2	21 1/2	19 1/2	20 1/2	20 1/2	21 1/2	19 1/2	20 1/2	22

(1) 300 lbs. per annum for Crop of 1858, and previously.
 (2) 200 lbs. per annum for Crop of 1855, and previously.
 (3) "Superphosphate of Lime" in all cases, excepting for Plot 19, made from 200 lbs. Bone-ash, 150 lbs. Sulphuric acid sp. gr. 1.7 (and water).
 (4) The "Ammonia-salts," in all cases, equal parts Sulphate and Muriate of Ammonia of Commerce.
 (5) 92, 475 lbs. Nitrate Soda in 1852, 275 lbs. in 1853, and 1854, 550 lbs. each year since. No Sulphate of Potash, Soda, or Magnesia, or Superphosphate, in 1852, 1853, or 1854. 92, 475 lbs. Nitrate in 1852, 350 lbs. each year since. 350 lbs. Nitrate is stated to contain the same amount of Nitrogen as 400 lbs. "Ammonia-salts."
 (6) For 1858, and previously, made with Muriate instead of Sulphuric Acid.
 (7) For 1872, and previously, 400 lbs. Sulphate Ammonia, sown in the Autumn.
 (8) For 1872 and previously, 300 lbs. Sulphate Ammonia and 500 lbs. Rape-cake, sown in the Autumn.
 (9) For 1872 and previously, 300 lbs. Sulphate Ammonia and 500 lbs. Rape-cake, sown in the Autumn.
 (10) The Manures of Plots 17 and 18 are, year by year, transposed.

(11) Made with Muriatic instead of Sulphuric Acid.
 (12) Averages of Mineral Manures, alternated with Ammonia-salts.
 (13) Averages of Ammonia-salts, alternated with Mineral Manures.
 (14) Plots 17 had the Ammonia-salts for the Crop of 1876.
 (15) Plots 18 had the Mineral Manures for the Crop of 1876.
 (16) Averages of 12 years, 11 years, and 23 years only; as, in 1868, owing to a mistake in carting, the produce did not get ascertained.
 (17) Plots "a and b" are divided into duplicates, "a" and "b," respectively, which are manured alike, but for the crops of 1864-5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18, received a mixture of soluble Silicates in addition to the other Manures, but without material effect; and for the crops of 1868, and since, cut straw (that produced in the previous seasons) has been applied (instead of Silicates) on the "a" portions of plots 5, 6, 7, 8, 11, 12, 13, 14, and 17 (or 18); also for the crop of 1874, and since, the straw of the previous season has been cut up and applied to the "a" portion of plot 15.