ROTHAMSTED RESEARCH

Yields of the Field Experiments 1876

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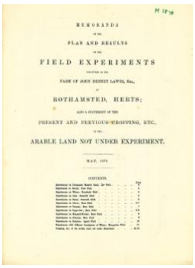

Experiments on Wheat; Broadbalk Field

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 24 years (1852 and since). Unless otherwise stated, the Manures are sown in the Autumn before the seed.

(Area under experiment, about 13 acres.)

1 acre	= (about)	0·40 Hectare	or	1·59 Prussian Morgen.
1 bushel	= (about)	0·36 Hectolitre	or	0·66 Prussian Scheffel.
1 lb. (pound avoir.)	= (about)	0·45 Kilogramme	or	0·91 Zollverein Pfund.
1 cwt. (hundredweight)	= (about)	51·0 Kilogrammes	or	1·02 Centner.
1 bushel per acre	= (about)	0·9 Hectolitre per Hectare	or	0·42 Pr. Scheffel per Pr. Morgen.
1 lb. per acre	= (about)	1·12 Kilogramme per Hectare	or	0·57 Zollv. Pfd. per Pr. Morgen.
1 cwt. per acre	= (about)	125·5 Kilogrammes per Hectare	or	0·64 Centner per Pr. Morgen.

Plots.	Manures, per acre, per annum.	Produce per Acre. Average per Annum. Dressed Corn. Quantity. 12 Years, 1852–63.	12 Years, 1864–75.	24 Years, 1852–75.	Weight per Bushel. 12 Years, 1852–63.	12 Years, 1864–75.	24 Years, 1852–75.	Total Straw. 12 Years, 1852–63.	12 Years, 1864–75.	24 Years, 1852–75.	Thirty-Second Season, 1875. Dressed Corn. Quantity.	Weight per Bushel.	Total Straw.	Plots.
		Bushels.	Bushels.	Bushels.	lbs.	lbs.	lbs.	Cwts.	Cwts.	Cwts.	Bushels.	lbs.	Cwts.	
0	Superphosphate of Lime (three times as much as on No. 5 and succeeding Plots)	18¼	16¼	17¼	57½	59¼	58½	16½	13	14¾	10⅜	59⅜	10¼	0
1	Sulphates of Potass, Soda, and Magnesia (twice as much as on No. 5 and succeeding Plots)	16⅜	12¼	14⅜	57¼	59⅛	58¼	15¾	10⅜	13	8⅛	58½	7¾	1
2	Farmyard Manure (14 tons every year)	35⅜	35	35¼	59¼	60⅝	60	34⅝	32⅝	33⅝	28⅞	60½	33¼	2
3	Unmanured continuously	15½	12⅜	14	56½	59	57¾	14⅞	9¾	12⅜	8⅝	60	9	3
4	Unmanured for Crop of 1852, and since; previously Superphos. (made with Muriatic Acid), and Sulph. Ammonia	17	13	15	57¼	59½	58¼	15½	10½	13	7⅝	59⅝	8⅛	4
5 (a and b)	200 lbs. (1) Sulphate Potass, 100 lbs. (2) Sulphate Soda, 100 lbs. Sulphate Magnesia, 3½ cwts. Superphosphate of Lime (3)	18½	13¾	16⅛	57⅞	59¾	58⅞	16⅞	11¼	14⅛	9¼	59⅜	10	5 (a and b)
6 (a and b)	200 lbs. (1) Sulphate Potass, 100 lbs. (2) Sulphate Soda, 100 lbs. Sulphate Mag., 3½ cwts. Superphos., 200 lbs. Amm.-salts (4)	28⅜	22⅜	25⅜	58⅝	60⅛	59½	26⅞	20¼	23½	16⅜	60⅜	17⅞	6 (a and b)
7 (a and b)	200 lbs. (1) Sulphate Potass, 100 lbs. (2) Sulphate Soda, 100 lbs. Sulphate Mag., 3½ cwts. Superphos., 400 lbs. Amm.-salts	36⅜	32⅛	34¼	58½	60¼	59¼	37½	31⅝	34⅝	25⅞	59½	30½	7 (a and b)
8 (a and b)	200 lbs. (1) Sulphate Potass, 100 lbs. (2) Sulphate Soda, 100 lbs. Sulphate Mag., 3½ cwts. Superphos., 600 lbs. Amm.-salts	38	37	37½	57¾	60¼	59	42⅛	40¼	41¼	29⅞	58⅛	38⅝	8 (a and b)
9 a	200 lbs. (1) Sulphate Potass, 100 lbs. (2) Sulphate Soda, 100 lbs. Sulphate Mag., 3½ cwts. Superphos., 550 lbs. Nitrate Soda (5)	34½	39⅛	36⅞	57	59⅞	58½	39½	44⅝	42⅛	30½	57⅞	42⅜	9 a
9 b	550 lbs. Nitrate of Soda (5). (The Nitrate for both 9a and 9b always sown in the Spring.)	25⅞	24½	25¼	55½	57⅝	56½	28½	26⅛	27¼	16½	55⅝	21⅛	9 b
10 a	400 lbs. Ammonia-salts alone, for 1845, and each year since; Mineral Manure in 1844	22⅝	21⅛	21⅞	55⅞	58	56⅞	23¼	18½	20⅞	12¾	54½	14	10 a
10 b	400 lbs. Ammonia-salts alone, for 1845, and each year since (except 1846 and 1850); Mineral Manure 1844, '48, '50	27	23	25	57	58⅜	57⅝	27⅜	20⅛	23¾	14⅝	55½	15⅞	10 b
11 (a and b)	400 lbs. Ammonia-salts, 3½ cwts. Superphosphate	29⅝	25⅜	27½	56½	58⅛	57⅜	28⅞	22⅞	25⅞	17⅞	55	20½	11 (a and b)
12 (a and b)	400 lbs. Ammonia-salts, 3½ cwts. Superphosphate, and 366½ lbs. (6) Sulphate of Soda	35⅛	31⅛	33⅛	58¼	59¾	59⅛	35¼	28	31⅝	25¼	57⅝	27⅛	12 (a and b)
13 (a and b)	400 lbs. Ammonia-salts, 3½ cwts. Superphosphate, and 200 lbs. (6) Sulphate of Potass	34⅝	32⅛	33⅜	58½	60¾	59⅝	35⅝	30⅝	33⅛	27⅛	60¼	29⅛	13 (a and b)
14 (a and b)	400 lbs. Ammonia-salts, 3½ cwts. Superphosphate, and 280 lbs. (6) Sulphate of Magnesia	35	31¼	33⅛	58⅜	60⅛	59¼	35¾	28⅜	32	26¼	58½	27⅞	14 (a and b)
15 a	200 lbs. (1) Sulph. Pot., 100 lbs. (2) Sulph. Sod., 100 lbs. Sulph. Mag., 3½ cwts. Superphos. (7); 400 lbs. Amm.-salts, in Spring (8)	33¼	31¼	32¼	58½	60¾	59⅝	33⅞	29½	31¾	23⅝	59⅞	26	15 a
15 b	200 lbs. (1) Sulph. Pot., 100 lbs. (2) Sulph. Sod., 100 lbs. Sulph. Mag., 3½ cwts. Superphos. (7); 400 lbs. Amm.-salts, in Spring (9)	34⅞	32⅛	33½	58⅝	60⅞	59¾	35⅞	30¾	33⅜	27½	60½	31⅛	15 b
16 (a and b)	1852–64, 13 years, 200 lbs. Sulph. Potass, 100 lbs. Sulph. Soda, 100 lbs. Sulph. Mag., 3½ cwts. Superphos., and 800 lbs. Ammonia-salts; average produce 39½ bush. Corn, 46⅝ cwts. Straw. 1865 and since, unmanured; average produce (9 years, 1865–73) 17 bushels Corn, 15⅝ cwts. Straw	38½	19½	29	57½	60¼	59	46	17⅞	31⅞	10⅛	59⅝	10⅝	16 (a and b)
(10) 17 (a and b)	400 lbs. Ammonia-salts	32⅝	28⅞	30¾ (12)	58⅝	60¼	59½ (12)	33½	27⅜	30⅝ (12)	11⅝	59¼	12 (14)	17 (a and b)
(10) 18 (a and b)	200 lbs. (1) Sulphate Potass, 100 lbs. (2) Sulphate Soda, 100 lbs. Sulphate Magnesia, and 3½ cwts. Superphosphate	18⅞	14⅞	16⅞ (13)	58	59⅜	58⅞ (13)	17⅞	12⅞	15⅜ (13)	25⅝	59	26⅞ (15)	18 (a and b)
19	3½ cwts. Superphosphate of Lime (11), 300 lbs. Sulphate of Ammonia, and 500 lbs. Rape-cake	31⅝	28⅝	30⅛	58⅛	58⅞	58½	31½	25⅛	28¼	22⅞	56½	22¼	19
20	Unmanured continuously	15⅝	12	13⅞ (16)	57	58½	57¾ (16)	15⅜	11⅛	13¼ (16)	8⅛	57	9⅛	20
21	200 lbs. (1) Sulph. Potass, 100 lbs. (2) Sulph. Soda, 100 lbs. Sulph. Mag., 3½ cwts. Superphos., 100 lbs. Muriate Amm.	22¼	19⅜	20¾	57⅞	59⅝	58¾	20⅞	16⅜	18⅝	13	59¾	12¼	21
22	200 lbs. (1) Sulph. Potass, 100 lbs. (2) Sulph. Soda, 100 lbs. Sulph. Mag., 3½ cwts. Superphos., 100 lbs. Sulphate Amm.	21¾	19⅜	20½	57¾	59⅝	58¾	20⅝	16	18⅜	13¾	60¼	13¼	22

(1) 300 lbs. per annum for Crop of 1858, and previously.
(2) 200 lbs. per annum for Crop of 1858, 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) 9a 475 lbs. Nitrate Soda in 1852, 275 lbs. in 1853 and 1854, 550 lbs. each year since; 9b 475 lbs. in 1852, 550 lbs. each year since; 550 lbs. is reckoned to contain the same amount of Nitrogen as 400 lbs. "Ammonia-salts."
(6) For 1858, and previously—1½ time as much.
(7) For 1872 and previously, made with Muriatic instead of Sulphuric Acid.
(8) For 1872 and previously, 400 lbs. Sulphate Ammonia, 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 Ammonia-salts, alternated with Mineral Manures.
(13) Averages of Mineral Manures, alternated with Ammonia-salts.
(14) Plots 17 had the Mineral Manures for the Crop of 1875.
(15) Plots 18 had the Ammonia-salts for the Crop of 1875.
(16) Averages of 12 years, 11 years, and 23 years only; as, in 1868, owing to a mistake in carting, the produce could not be ascertained.

The Plots marked "(a and b)" are divided into duplicate portions, "a" and "b," respectively, which are manured alike; excepting that, for the crops of 1864-5-6 and 7, the "a" portions of plots 5, 6, 7, 8, 9, 16, and 17 (or 18), received a mixture of soluble Silicates in addition to the other Manures, but, hitherto, without any material effect; and for the crops of 1868, and since, cut straw (that produced in the previous season) 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.