

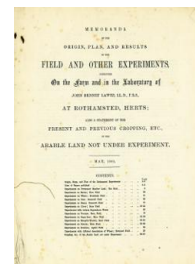
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ROTHAMSTED
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Memoranda of the Field Experiments at Rothamsted: May 1881

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Experiments on Permanent Meadow Land; the Park

Rothamsted Research

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THE PARK.
EXPERIMENTS WITH DIFFERENT MANURES ON PERMANENT MEADOW LAND.

The Land has probably been laid down with Grass for some centuries. No fresh seed has been artificially sown within the last 40 years certainly; nor is there record of any having been sown since the Grass was first laid down. The experiments commenced in 1856, at which time the character of the herbage appeared uniform over all the Plots. Excepting as explained in the Table, and in the foot-notes, the same description of Manure has been applied year after year to the same Plot.

During the first 19 years of the experiments, 1856-1874, the first crop only, each year, was mown, made into hay, removed from the land, and weighed. As a rule, the second crop was fed-off by sheep having no other food, the object being not to disturb the condition of the manuring. A given number was allotted to each Plot, according to the amount of produce, penned upon a portion of it, and the area extended, day by day, until the whole was eaten down. Frequently, however, the animals suffered considerably; and in 1866, 1870, 1873, and 1874, the second crops (and third, if any) were cut, and spread on the respective Plots. In the twentieth season, 1875, the second crops being unusually heavy, and the weather favourable, they were, for the first time, cut, weighed as hay, and removed. In 1877 and 1878 the second crops were again made into hay, weighed, and removed. In 1879 the second crops were cut, sampled, carted, and weighed, green; the dry matter in the weighed samples was determined, and the produce reckoned into hay by adding one-fourth to the calculated dry matter per acre. In 1880 the second crops were again made into hay, weighed and removed. It is intended in future to adopt this plan whenever the weather will permit. Owing to this change in the treatment of the crops, the average produce per annum is given, separately, for the first 20 years, 1856-1875, first crops only, and for the succeeding 5 years, 1876-1880, first and second crops (18).

(Area under experiments, about 7 acres.)

PLOTS.	Manures, per acre, per Annum.	PRODUCE PER ACRE, WEIGHED AS HAY.									
		Average per Annum, 20 Years, 1856-75. (First Crops only.)		Average per Annum, 5 Years, 1876-80. (First and Second Crops.)		Average per Annum, 20 Years, 1856-75. (First and Second Crops.)		Twenty-fifth Season, 1880.		Total.	
		Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
1	(1856-63, 8 years, 14 tons Farmyard Manure, and 200 lbs. Ammonia-salts (1); average produce 49½ cwts. (1))	48½	37½	32½	47½	32½	47½	15	8½	22½	1
2	(1856-63, 8 years, 14 tons Farmyard Manure; average produce 42½ cwts. (1))	41½	367	23½	36½	23½	36½	11	7½	18½	2
3	Unmanured, continuously	22½	20	16½	19½	16½	19½	7½	6½	14½	3
4	3½ cwts. Superphosphate of Lime (2)	21½	22½	23½	23½	23½	23½	9	9	18	4
5	3½ cwts. Superphosphate of Lime, and 400 lbs. Ammonia-salts	33½	30½	33½	33½	33½	33½	13½	9½	24½	1
6	400 lbs. Ammonia-salts	30½	22	19½	14½	19½	14½	8½	8½	17	5
7	(1856-63, 13 years, 400 lbs. Ammonia-salts; average produce 30½ cwts. (1))	31½	30½	26½	33½	26½	33½	23½	6½	30	6
8	(1856-78 800 lbs., 1879 and since, 500 lbs. Sul. Pot., 100 lbs. Sul. Soda, 100 lbs. Sul. Mag., 3½ cwts. Superph., and prod. (7 yrs., 1869-75) 31½ cwts. (1))	33½	36½	35½	35½	35½	35½	22½	6½	29	7
9	(1856-61, 6 years, 300 lbs. Sulph. Potass., 200 lbs. Sulph. Soda, 100 lbs. Sulph. Magnesia, and 3½ cwts. Superphosphate; average produce 36 cwts. (1))	33½	26½	26½	37½	26½	37½	16½	4½	21	8
10	(1856-78 800 lbs., 1879 and since, 500 lbs. Sul. Pot., 100 lbs. Sul. Soda, 100 lbs. Sul. Mag., 3½ cwts. Superph., and 400 lbs. Ammonia-salts)	53½	46½	51	73½	51	73½	40½	15	55½	9
11	(1856-61, 6 yrs., 300 lbs. Sulph. Potass., 200 lbs. Sulph. Soda, 100 lbs. Sulph. Magnesia, 3½ cwts. Superphos., 400 lbs. Amm.-salts; av. prod. 54½ cwts. (1))	52½	39½	46½	60½	46½	60½	25½	14½	40½	10
12	(1856-78 300 lbs., 1879 and since, 500 lbs. Sulph. Potass., 100 lbs. Sulph. Magnesia, 3½ cwts. Superphos., 400 lbs. Amm.-salts; av. prod. 42½ cwts. (1))	63½	57½	57½	62½	57½	62½	30	32	62	11
13	(1856-78 300 lbs., 1879 and since, 500 lbs. Sul. Pot., 100 lbs. Sul. Soda, 100 lbs. Sul. Mag., 3½ cwts. Superph., and 400 lbs. Sul. Sod. (3))	25	22½	24	17½	24	17½	44½	9½	27½	12
14	Unmanured continuously	53½	60½	57½	59	57½	59	51½	17	68½	13
15	(1856-78 300 lbs., 1879 and since, 500 lbs. Sul. Pot., 100 lbs. Sul. Soda, 100 lbs. Sul. Mag., 3½ cwts. Superph., and 400 lbs. Sul. Sod. (3))	36½	35	38½	43½	35	43½	19	9½	28½	14
16	(1856-78 300 lbs., 1879 and since, 500 lbs. Sul. Pot., 100 lbs. Sul. Soda, 100 lbs. Sul. Mag., 3½ cwts. Superph., and 400 lbs. Sul. Sod. (3))	45½	47½	44½	46½	44½	46½	37½	11	48½	15
17	275 lbs. Nitrate of Soda, 1858-78 300 lbs., 1879 and since, 500 lbs. Sulph. Potass., 100 lbs. Sulph. Soda, 100 lbs. Sulph. Mag., and 3½ cwts. Superph.	34½	38½	38½	38½	38½	38½	21½	14	35½	16
18	Mixture supplying the quantity of Potass., Soda, Lime, Magnesia, Phosphoric acid, Silica, and Nitrogen, contained in 1 ton of Hay (commencing 1865)	21	33½	32½	34½	32½	34½	15	20	34½	17
19	275 lbs. Nitrate of Soda, 290 lbs. Sulphate of Potass., and 3½ cwts. Superphosphate (commencing 1872)	..	38½	38½	38½	38½	38½	31½	15½	56½	18
20	327 lbs. Nitrate of Potass., and 3½ cwts. Superphosphate (commencing 1872)	..	36½	36½	36½	36½	36½	29½	13	42½	19
											20

(1) "Ammonia-salts"—in all cases equal parts Sulphate and Muriate of Ammonia of Commerce.
 (2) The "Superphosphate of Lime" is, in all cases, made from 200 lbs. Bone-ash, 150 lbs. Sulphuric Acid Sp. Gr. 1.7 (and water).
 (3) Plots 6, 8, and 10, had, besides the Manures specified, 2000 lbs. Sawdust per acre per annum for the first 7 years, 1856-1862, but without effect.
 (4) 200 lbs. 1856-1862 inclusive.
 (5) 500 lbs. in 1862 and 1863. (6) Only 400 lbs. in 1856-60-61.
 (7) The application of Silicates did not commence until 1862; 8 years (1862-1870), 200 lbs. Silicate Lime, and 200 lbs. Silicate Soda; 1871, and since, 400 lbs. Silicate Soda.
 (8) As the second crops were not removed in 1876, those of 1875, which were, are brought in to give the 5 years, average of second crops.
 (9) 550 lbs. Nitrate of Soda is reckoned to contain the same amount of Nitrogen as 400 lbs. of Ammonia-salts.
 (10) The manures specified were first applied in 1859 (previously, 1856-7 and 8, Sawdust only).
 (11) Averages of 8 years, 10 years, and 18 years, as these experiments did not commence until 1868.
 (12) Averages of 4 years, 10 years, and 11 years, as the experiment only commenced in 1866.
 (13) Averages of 4 years only, 1872-75.
 (14) As the second crops were not removed in 1876, those of 1875, which were, are brought in to give the 5 years, average of second crops.