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# Memoranda of the Field Experiments at Rothamsted: May 1881



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## Experiments With Various Leguminous Plants

### Rothamsted Research

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EXPERIMENTS ON ROOT-CROPS.—BARN FIELD.

Experiments with Turnips were commenced in 1843. Eight acres, divided into numerous Plots, were set apart for the purpose, and the crop was grown for ten consecutive years on the same land; "Norfolk Whites" 1843-1848, and "Swedes" 1849-1852; on some Plots without manure, and on others with different descriptions of manure. Barley was then grown for three consecutive seasons, 1853-1855, without manure, in order to test the comparative corn-growing condition of the different Plots, and also to equalise their condition, as far as possible, by the exhaustion of some of the most active and immediately available constituents supplied by the previous manuring. A new series of experiments with Swedes was arranged in 1856, having regard to the character of the manures previously applied on the different Plots, and to the results previously obtained. This second series was continued for fifteen years, namely, from 1856 to 1870 inclusive. The results obtained with Norfolk Whites in the first three years, 1843, 1844, and 1845, were published in the 'Journal of the Royal Agricultural Society of England,' vol. viii. Part II, 1847; and an abstract of the results obtained from 1845 to 1870 inclusive, is given in the Table below. During the five years, 1871-1875, the land was devoted to experiments with Sugar-Beet, for particulars of which see pp. 18 and 19. In 1876 experiments with Mangold-wurzel were substituted, and are still in progress (see pages 20 and 21).

(Area under experiment, about 8 acres; quantities, average, per acre, per annum.)

NORFOLK WHITE TURNIPS; FOUR SEASONS, 1845-1848; Roots and Leaves carted off the Land.

SERIES 1. Manures as under; no Cross-dressing.		Each Plot as Series 1, and Cross-dressed as under—											
		SERIES 2. No Cross-dressing.		SERIES 3. 160 lbs. Sulphate Ammonia. 75 lbs. Muriate Ammonia.		SERIES 4. 160 lbs. Sulphate Ammonia. 75 lbs. Muriate Ammonia. 1840 lbs. Rape-cake.		SERIES 5. 1840 lbs. Rape-cake.					
		Average Produce, per Acre, per Annum.											
PLOTS.		Roots.		Leaves.		Roots.		Leaves.		Roots.		Leaves.	
		Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.
3	Gypsum 1845; without Manure 1846 and since (average 1846, 7, 8)	1	4	0	17	1	7	1	0	5	10	3	19
4	Superphosphate, each year; Potass, Soda, and Magnesia, 1847-8 ..	8	1	2	15	9	15	4	3	10	5	6	11
5	Superphosphate, each year; .. .. .	8	16	2	19	9	18	4	8	10	1	6	3
6	Superphosphate, each year; and Potass 1847-8 .. .. .	8	0	2	19	9	16	5	4	10	7	6	17
7	Superphosphate, each year; .. .. .	8	0	2	19	9	16	5	4	10	7	6	17

SWEDISH TURNIPS; FOUR SEASONS, 1849-1852; Roots and Leaves carted off the Land (excepting 1849, when the Leaves were too small to weigh or remove).

SERIES 1. Manures as under; no Cross-dressing.		Each Plot as Series 1, and Cross-dressed, as under, in 1849 and 1850. No Cross-dressing in 1851 and 1852.												
		SERIES 2. No Cross-dressing.		SERIES 3. 200 lbs. Ammonia-salts.		SERIES 4. 200 lbs. Ammonia-salts. 2000 lbs. Rape-cake.		SERIES 5. 2000 lbs. Rape-cake.						
		Average Produce, per Acre, per Annum.												
PLOTS.		Roots.		Leaves.		Roots.		Leaves.		Roots.		Leaves.		
		Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	
3	Without Manure, 1846 and since .. .. .	2	6	0	6	3	17	0	6	7	0	17	7	14
4	Superphosphate, Sulphates Potass and Magnesia, and Soda-ash ..	7	17	0	10	9	9	0	11	13	1	0	18	12
5	Superphosphate .. .. .	7	9	0	11	8	14	0	13	11	4	1	1	10
6	Superphosphate, and Sulphate Potass .. .. .	6	16	0	9	8	14	0	10	12	8	0	17	11
7	Superphosphate, and Sulphate Potass .. .. .	6	16	0	9	8	14	0	10	12	8	0	17	11

BARLEY, without Manure (after Roots manured as above); THREE SEASONS, 1853-1855.

PLOTS.		SERIES 1.		SERIES 2.		SERIES 3.		SERIES 4.		SERIES 5.	
		Dressed Corn.	Straw.	Dressed Corn.	Straw.	Dressed Corn.	Straw.	Dressed Corn.	Straw.	Dressed Corn.	Straw.
		Bushels.	Cwts.	Bushels.	Cwts.	Bushels.	Cwts.	Bushels.	Cwts.	Bushels.	Cwts.
3	.. .. .	18 $\frac{3}{4}$	12 $\frac{1}{2}$	20 $\frac{1}{2}$	12 $\frac{3}{4}$	20 $\frac{1}{2}$	12 $\frac{3}{4}$	24 $\frac{1}{2}$	15 $\frac{3}{4}$	25 $\frac{1}{2}$	16
4	.. .. .	20 $\frac{1}{2}$	12 $\frac{1}{2}$	22 $\frac{1}{2}$	13 $\frac{1}{2}$	22 $\frac{1}{2}$	13 $\frac{1}{2}$	25	14 $\frac{3}{4}$	25 $\frac{1}{2}$	14 $\frac{1}{2}$
5	.. .. .	21	11 $\frac{3}{4}$	23	12 $\frac{3}{4}$	23	12 $\frac{3}{4}$	26 $\frac{1}{2}$	15	27	15 $\frac{1}{2}$
6	.. .. .	18 $\frac{3}{4}$	10 $\frac{3}{4}$	20 $\frac{1}{2}$	11 $\frac{3}{4}$	20 $\frac{1}{2}$	11 $\frac{3}{4}$	25	14 $\frac{3}{4}$	25	14 $\frac{3}{4}$
7	.. .. .	18 $\frac{3}{4}$	10 $\frac{3}{4}$	20 $\frac{1}{2}$	11 $\frac{3}{4}$	20 $\frac{1}{2}$	11 $\frac{3}{4}$	25	14 $\frac{3}{4}$	25	14 $\frac{3}{4}$

SWEDISH TURNIPS; FIFTEEN SEASONS, 1856-1870. (?) Roots and Leaves carted off the Land.

SERIES 1. Manures as under; no Cross-dressing.		Each Plot as Series 1, and Cross-dressed as under—											
		SERIES 2. 5 years, 1856-1860. 3000 lbs. Saw-dust. 328 lbs. Nitric Acid.		SERIES 3. 5 years, 1856-1860. 200 lbs. Ammonia-salts.		SERIES 4. 5 years, 1856-1860. 200 lbs. Ammonia-salts. 3000 lbs. Sawdust.		SERIES 5. 5 years, 1856-1860. 3000 lbs. Sawdust.					
		Average Produce, per Acre, per Annum.											
PLOTS.		Roots.		Leaves.		Roots.		Leaves.		Roots.		Leaves.	
		Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.	Tons. cwt.
1	Farmyard Manure, 14 tons .. .. .	6	4	0	17	7	9	1	2	8	8	1	4
2	Farmyard Manure, 14 tons, and Superphosphate .. .. .	6	7	0	16	7	13	1	3	8	5	1	5
3	Without Manure, 1846, and since .. .. .	0	11	0	3	0	19	0	4	0	13	0	3
4	Superphosph., each year; Sulph. Potass, Soda, and Magnesia, 1856-60	2	16	0	8	5	2	0	16	4	12	0	14
5	Superphosph., each year .. .. .	2	12	0	9	4	13	0	18	3	16	0	15
6	Superphosphate, each year; Sulphate Potass, 1856-1860 .. .. .	2	7	0	7	4	11	0	14	4	5	0	13
7	Superphosph., each year; Sulph. Potass, and 36 $\frac{1}{2}$ Amm.-salts, 1856-60	2	12	0	7	4	13	0	14	4	12	0	14
8	Unman. 1853, and since; previously part Unman.; part Superphosph.	1	3	0	4	1	13	0	5	1	2	0	5

NOTE.—"Sulphate of Ammonia" is estimated to contain 23 per cent. Ammonia, and "Muriate of Ammonia" 21 per cent. "Ammonia-salts," in each case, equal parts Sulphate and Muriate of Ammonia of commerce; and the mixture is estimated to contain 25 per cent. Ammonia. The 328 lbs. Nitric Acid (Sp. gr. 1.35), mixed with sawdust, and used as a cross-dressing on the Plots of Series 2, from 1856-1860, were estimated to contain Nitrogen = 50 lbs. Ammonia.

(?) The crops of 1859 and 1860 failed, and were ploughed in; but, as the manures were applied, and there would be accumulation within the soil for the succeeding crops, the average produce is calculated as for 15 years, that is the produce of the 13 years in, in each case, divided by 15.