Exhaustion Land Experiment plan and fertilizer treatments, Phase III, 1940-1985

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Description: Plans and details of the fertilizer treatments applied to the Rothamsted Exhaustion Land Experiment, Phase III (1940-1985), not to scale.

- **Page 1:** Cover page
- **Page 2:** Experiment overview, 1856-present day
- **Page 3:** Experiment plan Phase III

Site: R/EX/4. Hoos Field, Rothamsted Experimental Farm, Rothamsted Research, West Common, Harpenden, Hertfordshire, AL5 2JQ, UK. Latitude 51.812883, Longitude -0.375931

Derived from:

- Rothamsted Experimental Station (1970) *Details of the Classical and Long-Term Experiments up to 1967*, Rothamsted Experimental Station, Lawes Agricultural Trust, Harpenden UK **DOI:** 10.23637/ERADOC-1-192
- Rothamsted (1991) *Guide to the Classical Field Experiments*, Rothamsted Experimental Station, Lawes Agricultural Trust, Harpenden UK **DOI:** 10.23637/ERADOC-1-189
- Johnston, A. E. and Poulton, P. R.(1977) "Yields on the Exhaustion Land and changes in NPK content of the soils due to cropping and manuring, 1852-1975", Rothamsted Experimental Station Annual Report for 1976, Part 2, (53-85) **DOI**: 10.23637/ERADOC-1-34447

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Exhaustion Land Experiment overview

Phase I

Plot numbers 'Smiths Wheat' experiment, 1856-1875

V	IV	III	II	I	V	IV	III	II	I
Nil	Nil	N	NPKNaMg	PKNaMg	Nil	Nil	N	NPKNaMg	PKNaMg

Plot numbers Potato experiment, 1876-1901

1	3	5	7	9	2	4	6	8	10
Nil	FYM	N	NPKNaMg	P	Nil	FYM	N*	N*PKNaMg	PKNaMg

Phase II

Unfertilized 1902-1939

Phase III

PK residues (Basal N) 1940-1975

All main plots divided into 4 sub-plots in 1976 with 4 N rates

PK residues (Rates of N) 1976-1985

Phase IV

1986-2006

"P Test"

Rates of P (Basal K & N) 1986-92

No fresh P (Basal K & N) 1993-99

Maintenance P (Basal K & N) 2000- (except P0 plots)

PK residues (Rates of N) 1986-91

"K Test"

K residues (Basal P & N) 1992-2006

Phase V

2007-

"P Test"

Maintenance P (Basal K & N) 2000- (except P0 plots)

P witheld from residual P plots (P1) since 2016

"K Test"

Rates of K (Basal P & N) 2007-

Cropping: 1856-1875 winter wheat; 1876-1901 potatoes.
1902-1991 spring barley most years, fallow in 1920, 1967 & 1975.
1992 onwards winter wheat (except 2001 when w wheat failed so re-sown to spring wheat)

Exhaustion Land Experiment Plan

1940-1985 **Phase III** ↗ N

Plot 10 **N3** **N2** (PKNaMg) (1876-1901) **N1** **N0**	**Plot 8** **N3** **N2** (N*PKNaMg) (1876-1901) **N1** **N0**	**Plot 6** **N3** **N2** (N*) (1876-1901) **N1** **N0**	**Plot 4** **N3** **N2** (FYM(N*P)) (1876-1901) **N1** **N0**	**Plot 2** **N3** **N2** (Nil (FYM)) (1876-1901) **N1** **N0**
Plot 9 **N3** **N2** (P) (1876-1901) **N1** **N0**	**Plot 7** **N3** **N2** (NPKNaMg) (1876-1901) **N1** **N0**	**Plot 5** **N3** **N2** (N) (1876-1901) **N1** **N0**	**Plot 3** **N3** **N2** (FYM(P)) (1876-1901) **N1** **N0**	**Plot 1** **N3** **N2** (Nil) (1876-1901) **N1** N0

(not to scale)

Annual Treatments per hectare, 1940-1985, Phase III:

1940-1948: 75 kg N ammonium sulphate, all plots
1949-1960: 63 kg N ammonium sulphate, all plots
1961-1963: 63 kg N calcium ammonium nitrate, all plots
1964-1974: 88 kg N calcium ammonium nitrate, all plots
1976-1985: Divided into 4 subplots given 4 rates of N:
- N0: No N
- N1: 48 kg N calcium ammonium nitrate
- N2: 96 kg N calcium ammonium nitrate
- N3: 144 kg N calcium ammonium nitrate

N rates rotate each year N0>N3>N2>N1, eg N0 1976, N3 1977, N2 1978, N1 1979, N0 198(

No other fertilizer or manure was applied 1902-1985

Spring barley grown in most years, except 1920, 1967 and 1975 when no crop was grown

Annual Treatments per hectare, 1856-1901:

- Nil : No fertilizer or manure
- FYM : 35 of farmyard manure since 1876
- Nil (FYM) : FYM 1876-1881, no fertilizer or manure 1882-1901
- FYM (P) : FYM plus P 1876-1882, FYM only 1883-1901
- FYM (N*P) : FYM plus N* and P 1876-1881, FYM plus P 1882, FYM only 1883-1901
- N : 96 kg N as ammonium salts (ammonium sulphate & ammonium chloride)
- N* : 96 kg N as sodium nitrate
- P : 34 kg P (as superphosphate 1856-96, from basic slag 1897-1901)
- K : 137 kg K as potassium sulphate (91 kg K 1859-74)
- Na : 16 kg Na as sodium sulphate
- Mg : 11 kg Mg as magnesium sulphate

1902-1939, Phase II:

No fertilizer or manure applied, cereals grown most years