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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
- **Pages 3-4:** 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
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- Rothamsted (1991) *Guide to the Classical Field Experiments*, Rothamsted Experimental Station, Lawes Agricultural Trust, Harpenden UK **DOI:** [10.23637/ERADOC-1-189](https://doi.org/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](https://doi.org/10.23637/ERADOC-1-34447)

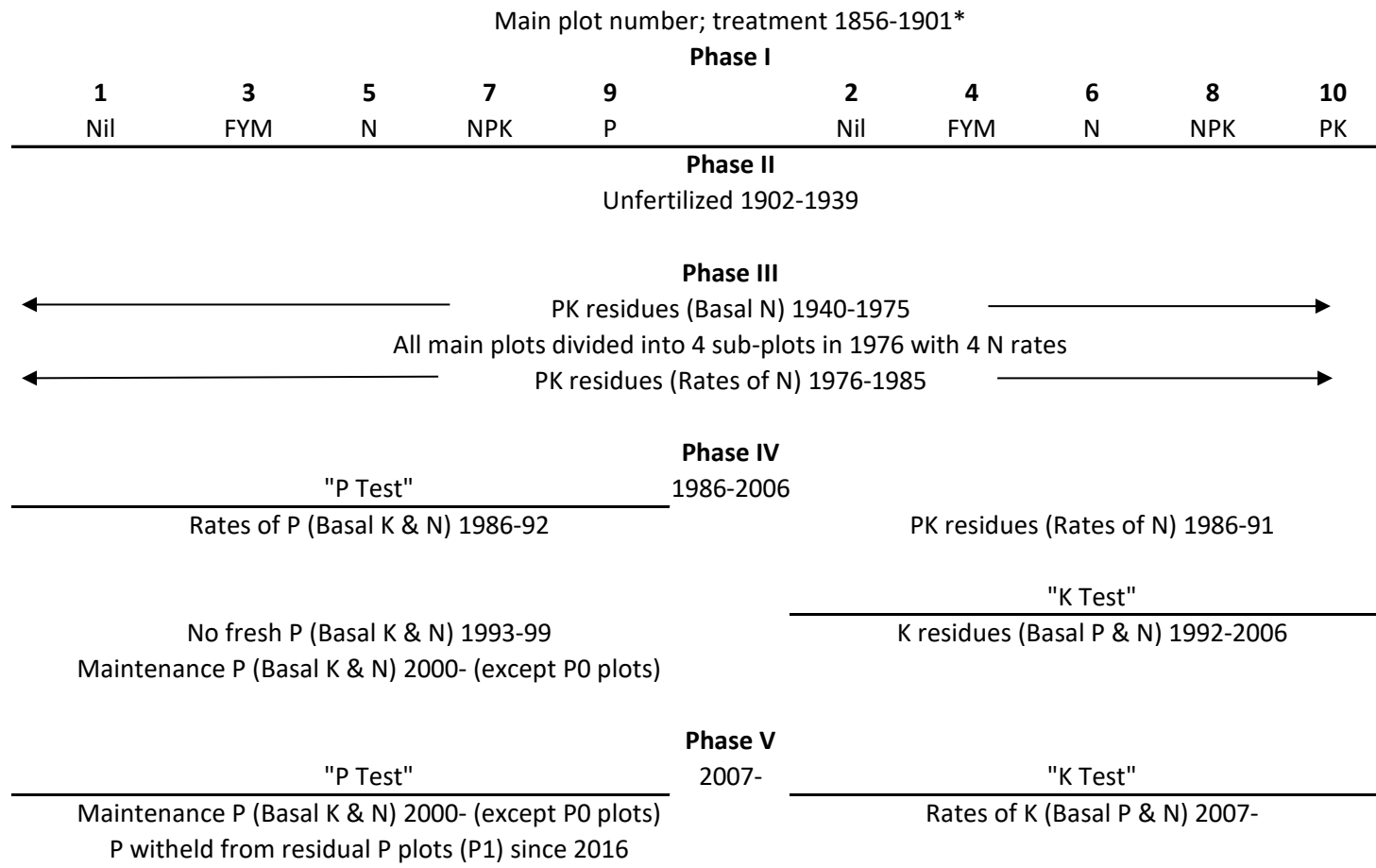
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Exhaustion Land Experiment overview



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

* See 'Exhaustion Land plan & fertilizer treatments, Phases I & II' for full details of fertilizer treatments 1856-1901

Sources of data:

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

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Johnston, A.E., Poulton, P.R., White, R.P. and Macdonald, A.J. (2016) "Determining the longer term decline in plant-available soil phosphorus from short-term measured values", Soil Use and Management doi:10.1111/sum.12253

[DOI: 10.1111/sum.12253](https://doi.org/10.1111/sum.12253)

Poulton, P. R. , Johnston, A. E. and White, R. P. (2013) "Plant-available soil phosphorus. Part I: the response of winter wheat and spring barley to Olsen P on a silty clay loam", Soil Use and Management, 29, 4-11

[10.1111/j.1475-2743.2012.00450.x](https://doi.org/10.1111/j.1475-2743.2012.00450.x)

Exhaustion Land Experiment Plan

1940-1985

Phase III

↗ N

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

(not to scale)

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

1940-1948: 75 kg N ammonium sulphate, all plots

1949-1963: 63 kg N ammonium sulphate, 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 1980

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, Phase I:

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 until 1882, FYM only 1883-1901

FYM (N*P) : FYM plus N* and P until 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 1876-96, 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

1902-1940, Phase II:

No fertilizer or manure applied, cereals grown most years

Sources of data:

Rothamsted (1970) "Details of the Classical and Long-Term Experiments up to 1967",

Rothamsted Experimental Station, Lawes Agricultural Trust, Harpenden UK

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Rothamsted (1991) "Guide to the Classical Field Experiments",

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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

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Yields of the Field Experiments books, Lawes Agricultural Trust, Harpenden, UK

<http://www.era.rothamsted.ac.uk/eradoc/books/2>