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# Numerical Results of the Field Experiments 1968

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## 68/B/3 Reference Plots Rothamsted and Woburn

### Rothamsted Research

Rothamsted Research (1970) *68/B/3 Reference Plots Rothamsted and Woburn ; Numerical Results Of The Field Experiments 1968*, pp 83 - 93 - DOI: <https://doi.org/10.23637/ERADOC-1-58>

68/B/3.1

REFERENCE PLOTS

ROTHAMSTED (R) GREAT FIELD IV AND HIGHFIELD IX

AND

WOBURN (W) STACKYARD SERIES C, 1968

(ERA, ERG, WERA and WERF)

For details of previous years' results and for rates of fertilisers, etc., see 'Results' 58/Bc/1, 59/Bc/1, 60/B/3, 61/B/2, 62/B/2, 63/B/2, 64/B/2, 65/B/2, 66/B/2 and 67/B/2. For conifer seedbeds and transplants see 63/B/2, 64/B/2, 65/B/2, 66/B/2, 67/B/2.

Great Field IV (R): A test of none v 44 lb Mg as magnesium sulphate is applied to half plots on potatoes (excluding additional plots).

Stackyard Series C (W): The test of manganese sulphate and magnesium sulphate to oats is discontinued. A test of none v 44 lb Mg as magnesium sulphate is applied to half plots on potatoes and sugar beet. Balancing dressings are applied to untreated half plots after harvest. The variety of oats is now Pendrwm.

Conifer seedbeds and transplants. Bed 2. Grand Fir (*Abies grandis*) replaced Norway Spruce (*Picea abies*) in both the transplants and seedbeds.

Cultivations, etc.:-

Great Field IV (R):-

Winter wheat: Plots dug by hand, P, K, Mg, Ca and S applied: 27 Sept, 1967. Seed drilled: 6 Oct. First N dressing applied (excluding additional plots): 1 Mar, 1968. Second N dressing applied, all N applied to additional plots: 24 Apr. Trace element spray applied: 26 Apr. Harvested: 29 Aug.

Kale: FYM applied, plots dug by hand: 13 Nov, 1967. P, K, Mg, Ca and S applied: 23 Feb, 1968. Plots rotary cultivated, seed drilled, first N dressing applied to additional plots: 27 Mar. N applied (excluding additional plots): 24 Apr. Second N dressing applied to additional plots: 23 May. Sprayed with dimethoate at 4 oz in 50 gals: 31 May. Trace element spray applied: 11 June. Sprayed with malathion, dimethoate and DDT (Pestex at 10 fluid oz in 50 gals): 11 July. Harvested: 18 Oct.

Barley: Dug by hand: 10 Nov, 1967. P, K, Ca, Mg and S applied: 23 Feb, 1968. Plots rotary cultivated, seed drilled: 8 Mar. N applied: 4 Apr. Trace element spray applied: 14 May. Harvested: 21 Aug.

Grass-clover ley: Undersown in barley: 14 Apr, 1967. P, K, Ca, Mg and S applied: 23 Feb, 1968. N applied: 1 Mar. Trace element spray applied: 18 Apr. Cut four times: 23 Oct, 1967, 31 May, 1968, 19 July, 3 Oct.

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Potatoes: FYM applied, plots dug by hand: 15 Nov, 1967. P, K, Ca, Mg and S applied: 23 Feb, 1968. First N dressings applied to additional plots, all N applied to remaining plots, plots rotary cultivated, Mg applied to half plots, potatoes planted: 27 Mar. Second N dressing applied to additional plots: 23 May. Earthed up: 24 May. Sprayed with dimethoate at 4 oz in 50 gals: 31 May. Trace element spray applied: 11 June. Sprayed with malathion, dimethoate and DDT (Pestex at 10 fluid oz in 50 gals): 11 July. Sprayed twice with dimethoate, fentin acetate and maneb (Rogor 20W at 1.5 lb and Fennite at 1.5 lb in 80 gals): 15 July and 12 Aug. Lifted: Plots of main experiment with neither K nor FYM and no fertiliser plots of additional plots: 30 Aug, remainder: 24 Sept.

Permanent grass: FYM, P and K applied: 23 Feb, 1968. N applied, first dressing: 1 Mar, second: 20 May, third: 19 July. Cut three times: 20 May, 19 July, 3 Oct.

- NOTES: (1) Yields of dry matter were obtained for each crop.  
(2) The percentages of N, P and K, and on additional plots of N, P, K, Mg, Ca and S, were measured for each crop.  
(3) The percentage of Mg was measured in potato tubers on the main experiment.

Stackyard Series C (W):-

Winter oats: Plots dug by hand: 20 Sept, 1967. P and K applied: 28 Sept. Seed drilled: 18 Oct. First N dressing applied: 12 Mar, 1968. Second N dressing applied: 30 Apr. Sprayed with ioxynil at 9 oz and mecoprop at 27 oz in 50 gals: 3 May. Harvested: 12 Aug.

Sugar beet: Balancing Mg applied to half plots: 5 Oct, 1967. FYM applied, plots dug by hand: 4 Dec. P and K applied: 22 Mar, 1968. First N dressing applied, plots rotary cultivated, Mg applied to half plots, seed drilled: 26 Mar. Singled, second N dressing applied: 5 June. Sprayed twice with malathion, dimethoate and DDT (Pestex at 10 fluid oz in 50 gals): 12 June and 3 July. Sprayed with dimethoate (Rogor 20W at 1.5 lb in 50 gals): 18 July. Harvested: 10 Oct.

Barley: Plots dug by hand: 5 Dec, 1967. P and K and first N dressing applied, plots rotary cultivated, seed drilled: 12 Mar, 1968. Second N dressing applied: 30 Apr. Harvested: 21 Aug.

Grass-clover ley: Undersown in barley: 16 Mar, 1967. N, P and K applied: 12 Mar, 1968. Cut four times: 18 Oct, 1967, 28 May, 1968, 18 July, 10 Oct.

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Potatoes: FYM applied: 4 Dec, 1967. Plots dug by hand: 5 Dec. P and K applied: 22 Mar, 1968. First N dressing applied, plots rotary cultivated, potatoes planted, Mg applied to half plots: 28 Mar. Second N dressing applied, plots earthed up: 5 June. Sprayed with malathion, dimethoate and DDT (Pestex at 10 fluid oz in 50 gals): 12 June. Sprayed twice with dimethoate, fentin acetate and maneb (Rogor 20W at 1.5 lb and Fennite at 1 lb in 50 gals): 18 July and 12 Aug. Lifted plots with neither K nor FYM: 10 Sept, remainder: 23 Sept.

Permanent grass: FYM, first N dressing and P and K applied: 12 Mar, 1968. Second N dressing applied: 28 May. Third N dressing applied: 23 July. Cut three times: 28 May, 18 July, 10 Oct.

- NOTES: (1) Samples were taken for determination of dry matter for each crop, and the percentage of N, P and K.  
(2) The percentage of Mg in the leaves of sugar beet and in potato tubers was determined.  
(3) Surface soil samples were taken from each block for a determination of soil pH.

Grazed Reference Plots (Highfield IX (R)):-

Cultivations, etc.: P and K fertilisers applied, ground chalk applied to appropriate plots: 6 Dec, 1967. First N dressings applied: 13 Mar, 1968. Sample cuts taken four times: 6 May, 27 June from 2 blocks, 1 July from remaining 2 blocks, 3 Sept, 28 Oct. Sampling cages moved after each cut. N dressing applied after each cut except the last.

- NOTES: (1) The percentages of N, P and K in the dry grass were measured.  
(2) Visual estimates were made of the percentage surface area covered by clover leaves.

Conifer seedbeds and transplants:

Bed 1: Formalin (250 ml. in 4 l. water per sq. yd.) applied: 18 Jan, 1968. All manures (other than N) dug in: 19 Mar. Seed sown: 28 - 29 Mar. T.V.O. pre-emergence spray: 22 Apr. N top dressed: 14 June, 12 July, 2 Aug, 13 Sept.

Bed 2: Seedbeds as for Bed 1. Transplants plots lined out: 28 - 29 Mar, 1968. All manures (other than N) as for seedbeds. N top dressed on transplants: 6 May, 14 June, 12 July, 2 Aug.

- NOTES: (1) Height assessments and samples for analyses as in 1967.  
(2) Plots lacking N, P, K and Mg had typical deficiency symptoms.

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Standard errors per plot.

Highfield IX (R), Grass Dry matter:	
1st cut:	3.51 or 20.3% (39 d.f.)
2nd cut:	4.14 or 9.8% (39 d.f.)
3rd cut:	3.81 or 10.8% (39 d.f.)
4th cut:	3.64 or 17.4% (39 d.f.)
Total of 4 cuts:	8.25 or 7.1% (39 d.f.)
Stackyard Series (C) W, Sitka Spruce Bed 1:	
Mean height:	0.189 or 8.8% (11 d.f.)
Plant number:	92.7 or 10.6% (11 d.f.)

NOTE: In 1968 (and previous years) the sub plot tests of Mg and Mn are ignored in the tables. The figures presented are means over sub plot treatment.

SUMMARY OF RESULTS

GREAT FIELD IV (R): ORIGINAL PLOTS

Treatment	WINTER GRAIN		WHEAT: STRAW		KALE: TOTAL WEIGHT		BARLEY: GRAIN STRAW		LEY: DRY MATTER				PERMANENT GRASS: DRY MATTER			
	GRAIN	STRAW	GRAIN	STRAW	GRAIN	STRAW	1st cut	2nd cut	3rd cut	4th cut	Total of 4 cuts	1st cut	2nd cut	3rd cut	Total of 3 cuts	
None	23.8	31.5	9.38	17.3	0.7	16.3	7.3	4.4	28.7	4.24	8.3	15.6	14.5	38.4		
N1	22.2	33.2	10.07	15.8	0.6	30.3	10.9	6.9	48.7	3.46	12.2	14.3	21.6	48.1		
P	16.0	26.7	14.41	18.1	2.3	28.5	17.3	7.8	55.9	3.03	8.0	12.4	16.0	36.4		
N1P	12.4	23.5	20.84	15.8	1.8	30.6	9.3	6.2	47.9	3.22	15.9	16.7	23.9	56.5		
K	30.2	40.5	12.16	14.8	5.4	30.6	22.0	9.5	67.5	15.20	9.6	13.6	21.1	44.3		
N1K	34.2	54.8	11.46	24.6	7.0	40.2	23.3	11.3	81.8	16.73	22.7	21.7	24.0	68.4		
PK	33.6	48.7	12.50	19.3	7.9	39.8	23.3	10.7	81.7	16.88	12.9	18.6	19.9	51.4		
N1PK	38.7	54.4	24.14	38.7	4.6	38.8	16.3	10.0	69.7	19.25	22.2	21.6	26.7	70.5		
N2PK	42.2	65.4	31.42	45.9	4.2	50.6	13.8	14.4	83.0	23.39	35.6	24.4	21.0	81.0		
D	38.7	53.6	20.32	29.8	9.2	38.8	31.1	16.1	95.2	23.73	28.7	19.6	27.5	75.8		
N1PKD	44.7	69.8	34.20	42.1	3.6	45.0	18.9	15.7	83.2	26.87	40.1	24.0	31.4	95.5		
N2PKD	41.5	72.6	39.58	54.0	2.3	52.0	18.0	14.7	87.0	31.04	45.3	26.1	27.2	98.6		
Mean D.M. %:	83.1	77.2		76.6	19.3	20.8	20.9	19.4	20.1		23.2	24.8	21.7	23.2		

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GREAT FIELD IV (R): ADDITIONAL PLOTS

LEY: DRY MATTER

Treatment	WINTER WHEAT:		KALE: TOTAL WEIGHT	BARLEY:		1st cut	2nd cut	3rd cut	4th cut	Total of 4 cuts	POTATOES: TOTAL TUBERS
	GRAIN	STRAW		GRAIN	STRAW						
None	30.2	39.5	9.72	15.2	11.3	2.2	22.2	9.2	6.4	40.0	6.01
N2PK	49.6	73.4	37.33	43.3	40.1	6.2	52.8	16.3	17.4	92.7	22.54
N2 PK Mg Ca	45.2	69.5	36.46	44.9	45.3	7.6	44.2	20.7	15.9	88.4	18.84
N2 PK Mg S	50.6	65.4	36.46	46.6	47.1	6.3	48.2	17.3	18.6	90.4	17.50
N2 PK Ca S	49.6	71.2	28.82	45.6	45.4	4.7	53.6	20.4	18.1	96.8	19.29
N2 PK Mg Ca S	46.4	72.4	36.12	46.7	47.8	8.8	48.0	19.2	17.4	93.4	18.60
N2 PK Mg Ca S TE	48.7	67.4	37.16	48.9	43.8	6.3	48.4	18.6	16.3	89.6	20.10
Mean D.M. %:	83.8	81.4		84.1	82.2	17.0	22.3	21.6	18.4	19.8	

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STACKYARD SERIES C (W)

Treatment	OATS		SUGAR BEET			BARLEY	
	GRAIN	STRAW	ROOTS	SUGAR %	TOTAL SUGAR	GRAIN	STRAW
None	17.5	15.8	4.78	14.2	13.6	11.9	12.1
N1	34.5	35.3	6.33	13.3	16.8	26.6	29.2
P	16.7	15.5	5.56	13.7	15.2	14.8	13.1
N1P	35.6	35.4	6.18	13.4	16.6	23.4	26.4
K	16.2	15.6	8.49	15.5	26.3	13.5	11.6
N1K	34.0	43.4	11.88	15.7	37.3	26.5	30.8
PK	16.8	16.6	8.64	15.5	26.8	13.3	11.5
N1PK	30.2	47.8	12.50	15.3	38.2	27.4	32.2
N2PK	38.7	59.6	13.43	14.8	39.8	28.4	44.6
D	21.6	18.6	14.66	15.8	46.3	20.7	18.8
N1PKD	34.5	50.1	14.82	15.4	45.6	25.4	40.6
N2PKD	34.2	72.2	19.91	15.4	61.3	26.5	37.6
Mean D.M. %:	78.1	53.2				82.2	68.5



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STACKYARD SERIES C (W)

Treatment	LEY: DRY MATTER					Total of 4 cuts	POTATOES		PERMANENT GRASS: DRY MATTER			Total of 3 cuts
	1st cut	2nd cut	3rd cut	4th cut	TOTAL TUBERS		1st cut	2nd cut	3rd cut			
None	3.3	14.6	15.6	10.5	44.0	4.16	14.9	7.7	13.0	35.6		
N1	2.4	27.4	13.5	9.2	52.5	4.07	20.8	15.6	20.8	57.2		
P	3.4	15.1	13.2	10.1	41.8	3.82	14.2	8.3	12.6	35.1		
N1P	3.8	27.6	12.0	7.9	51.3	4.10	21.4	16.1	19.7	57.2		
K	10.9	21.3	26.9	15.2	74.3	5.10	18.6	9.0	13.7	41.3		
N1K	8.5	30.6	25.6	14.1	78.8	9.80	31.2	18.6	27.5	77.3		
PK	12.0	14.7	23.3	16.6	66.6	7.96	21.1	9.9	14.3	45.3		
N1PK	9.8	34.6	23.4	16.8	84.6	10.68	32.2	19.6	25.0	76.8		
N2PK	6.3	43.2	15.7	14.9	80.1	15.31	36.2	21.1	28.4	85.7		
D	10.9	19.9	23.5	15.5	69.8	16.20	29.7	9.9	16.6	56.2		
N1PKD	10.1	38.2	24.5	15.9	88.7	22.73	38.8	17.8	30.8	87.4		
N2PKD	7.4	45.8	21.2	15.4	89.8	27.76	45.7	25.5	33.0	104.2		
Mean D.M. %:	17.5	19.4	22.5	19.1	19.6		19.0	24.1	20.9	21.3		

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STACKYARD C (W). Bed 1

SITKA SPRUCE

Treatment	MEAN HEIGHT: INCHES	PLANT NUMBER: PER SQ YARD
	(±0.134)	(±65.5)
None	1.68 (1)	890 (2)
PK Mg	1.34	870
NK Mg	1.43	867
NP Mg	1.81	927
NPK	1.82	828
NPK Mg	2.53 (1)	807 (2)
NPK Mg F	2.99	825
C	2.24	858
C NPK Mg	2.99	1008
L NPK Mg	2.73	951
Mean	2.15	877

(1) (±0.094)

(2) (±46.4)

Bed 2 plots 1 - 6 (Transplant)

	O	A	B	Mean
	MEAN HEIGHT: INCHES			
SS	8.59	14.43	15.13	12.71
GF	6.55	7.66	8.93	7.72

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Bed 2 Plots 7 - 12 Seed bed

	O	A	B	Mean
MEAN HEIGHT: INCHES				
SS	1.10	2.63	2.78	2.17
GF	1.11	1.71	1.77	1.53
PLANT NUMBERS: PER SQ YD				
SS	954	948	1146	1016
GF	588	690	726	668

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HIGHFIELD IX (R)

GRASS: DRY MATTER

	1st cut	2nd cut	3rd cut	4th cut	Total of 4 cuts
PK	(±1.75)	(±2.07)	(±1.90)	(±1.82)	(±4.12)
NO 00	8.5	30.5	32.8	17.9	89.7
N1 00	13.7	40.3	36.7	20.8	111.5
A1 00	14.4	44.0	34.1	21.8	114.4
NO 10	11.5	33.5	31.5	18.4	95.0
N1 10	17.5	42.1	36.1	26.1	121.7
A1 10	22.7	44.2	34.1	23.3	124.3
NO 01	10.4	33.9	31.1	13.4	88.8
N1 01	20.3	46.3	35.0	20.1	121.7
A1 01	21.5	46.0	32.2	25.6	125.3
NO 11	8.2	33.0	35.3	16.7	93.3
N1 11	25.9	47.6	37.1	21.5	132.1
A1 11	24.1	46.4	39.1	23.9	133.4
N2 11	21.5	50.6	36.5	20.8	129.3
A2 11	21.9	52.7	40.0	22.4	136.9
Mean	17.3	42.2	35.1	20.9	115.5

Mean D.M. %: 1st cut: 17.4  
 2nd cut: 18.1  
 3rd cut: 16.8  
 4th cut: 13.6  
 Total of 4 cuts: 16.5