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## Yields of the Field Experiments 1973

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### **73/W/RN/6 - Arable Reference Plots - Oats, Sugar Beet, Barley, Ley, Potatoes, Old Grass**

#### **Rothamsted Research**

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73/W/RN/6

ARABLE REFERENCE PLOTS

Object: To study the long term effects of FYM and N, P and K fertilisers on the yield and mineral content of crops - Woburn Stackyard C.

Sponsor: F.V. Widdowson.

The fourteenth year, oats, sugar beet, barley, ley, potatoes and old grass.

For previous years see 60/B/3(t), 61-65/B/2, 66/B/2(t), 67/B/2(t), 68/B/3(t), 69/W/RN/6, 70/W/RN/6(t) and 71-72/W/RN/6.

Design: 1 block of 12 plots for each crop.

Whole plot dimensions: 2.74 x 2.13.

Treatments: Fertilisers and farmyard manure:-

	MANURE
None	O
N1	N1
P	P
N1 P	N1P
K	K
N1 K	N1K
PK	PK
N1 PK	N1PK
N2 PK	N2PK
D	D
N1 PK D	N1PKD
N2 PK D	N2PKD

N1,2 (kg N): 31.5, 63 (ley): 63, 126 (barley and oats): 126, 252 (sugar beet and potatoes): 188, 376 (permanent grass) as ammonium nitrate.

P: P205 at 63 kg as triple superphosphate.

K: K2O at 252 kg as potassium bicarbonate.

D: Farmyard manure at 25 tonnes (permanent grass): 50 tonnes (sugar beet and potatoes): none to other crops.

Standard applications:

Winter oats: First weedkiller: Dichlorprop and MCPA ('Mephetol Plus' at 5.6 l in 450 l). Second weedkiller: Ioxynil at 0.42 kg with mecoprop at 1.3 kg in 450 l.

Sugar beet: Manures: Boron at 7.3 kg B2O3 as 0.8% solution of borax. Insecticide: Menazon at 0.28 kg in 340 l on three occasions.

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Barley: Weedkiller: Ioxynil at 0.42 kg with mecoprop at 1.3 kg in 340 l.  
Potatoes: Insecticide: Menazon at 0.28 kg in 340 l. Insecticide with  
fungicide: Menazon at 0.28 kg with mancozeb at 1.3 kg in 340 l  
on two occasions.  
Old grass: Manures: Epsom salts at 500 kg.

Seed: Winter oats: Peniarth sown at 260 kg.  
Sugar beet: Klein E sown at 5.6 kg.  
Barley: Julia, dressed with ethirimol, sown at 180 kg.  
Grass-clover ley: R.V.P Italian Ryegrass and Hungaropoly red clover.  
Potatoes: Desiree.

Cultivations, etc.:-

Winter oats: Balancing Mg applied, plots dug by hand: 4 Sept, 1972. P  
and K applied, seed drilled: 17 Oct. First N applied: 6 Mar, 1973.  
First weedkiller applied: 6 Apr. Second N applied: 26 Apr.  
Second weedkiller applied: 9 May. Harvested: 31 July.

Sugar beet: FYM applied, plots dug by hand: 23 Nov, 1972. P and K applied:  
23 Feb, 1973. First N applied, rotary cultivated, Mg applied to half  
plots, seed drilled: 22 Mar. Boron applied: 26 Mar. Second N applied,  
singled: 17 May. Insecticide applied: 15 June, 4 July, 18 July.  
Lifted: 11 Oct.

Barley: Balancing Mg applied: 17 Oct, 1972. Plots dug by hand: 23 Nov.  
P and K applied, seed drilled: 23 Feb, 1973. Seed redrilled because  
of damage by mice and birds, first N applied: 16 Mar. Second N  
applied: 26 Apr. Weedkiller applied: 9 May. Harvested: 31 July.

Grass-clover ley: Seeds drilled in barley stubble: 16 Aug, 1972. P and  
K applied: 11 Dec. N applied: 6 Mar, 1973. Cut three times: 21 May,  
20 July, 24 Sept.

Potatoes: FYM applied, plots dug by hand: 23 Nov, 1972. P and K applied:  
23 Feb, 1973. First N applied, Mg applied to half plots, rotary  
cultivated, potatoes planted, earthed up: 6 Apr. Second N applied:  
31 May. Insecticide applied: 15 June. Insecticide with fungicide  
applied: 4 July, 18 July. Lifted plots without K: 1 Aug. Remaining  
plots lifted: 5 Sept.

Old grass: P, K and Epsom salts applied: 11 Dec, 1972. FYM applied:  
23 Feb, 1973. N applied: 6 Mar, 31 May, 20 July. Cut three times:  
31 May, 20 July, 24 Sept.

- 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 sugar beet tops, potato tubers and leaves  
was determined.  
(3) The percentage of K in potato leaves was determined.



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TABLES OF MEANS

TONNES/HECTARE

	OATS		SUGAR BEET		BARLEY	
	GRAIN	STRAW	ROOTS	TOPS	GRAIN	STRAW
MANURE						
O	3.41	3.20	19.3	10.6	2.07	1.62
N1	4.95	4.75	27.0	16.7	3.18	3.76
P	2.45	2.49	17.4	10.8	2.00	1.81
N1P	4.71	4.35	25.8	21.9	2.31	3.15
K	2.20	2.42	23.6	10.8	2.21	1.86
N1K	4.44	5.68	43.4	21.4	4.59	3.94
PK	3.80	3.93	19.1	10.6	2.48	2.08
N1PK	5.40	7.88	42.5	17.8	5.42	5.18
N2PK	4.87	8.27	47.8	34.9	5.54	6.75
D	3.78	3.86	40.5	25.3	3.78	3.12
N1PKD	5.88	7.67	48.7	31.6	5.34	6.34
N2PKD	4.28	9.79	57.8	43.6	4.28	7.94
Mean D.M. %	84.6	62.1			85.4	70.4

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TONNES/HECTARE

MANURE	LEY: DRY MATTER			POTATOES TOTAL TUBERS	OLD GRASS: DRY MATTER		
	1st cut	2nd cut	3rd cut		1st cut	2nd cut	3rd cut
			Total of 3 cuts				Total of 3 cuts
O	1.15	1.38	1.11	11.3	1.62	0.57	0.36
N1	2.99	0.82	0.60	13.7	3.60	1.41	1.35
P	1.35	1.05	0.90	12.8	1.48	0.48	0.27
N1P	3.73	0.84	0.43	14.2	3.50	1.50	1.38
K	3.14	4.15	2.86	12.6	2.39	1.03	0.64
N1K	4.72	3.03	2.60	22.4	4.97	1.92	1.61
PK	3.93	4.71	2.47	17.1	2.89	1.27	0.51
N1PK	5.73	4.20	2.85	23.6	5.11	2.07	1.35
N2PK	6.77	2.88	2.26	40.2	6.11	2.24	1.28
D	3.77	3.82	2.74	27.5	3.09	0.91	0.50
N1PKD	6.08	4.42	3.16	44.2	5.61	1.94	1.55
N2PKD	7.08	3.41	2.60	55.2	6.59	2.63	1.30
Mean D.M. %	21.4	17.8	21.6	20.3	22.8	24.6	29.7
							25.7