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Yields of the Field Experiments 1975

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75/ W/RN/6 - Arable Reference Plots - Permanent Grass, Oats, Sugar-beet, Barley, Ley, Potatoes

Rothamsted Research

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75/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 sixteenth year, oats, sugar beet, barley, ley, potatoes, permanent 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 71-74/W/RN/6.

Design: 1 blocks of 12 plots for each crop.

Whole plot dimensions: 2.74 x 2.13.

Treatments: All combinations of:-

Blocks: 1. Crops:-

After old grass (1960-73):

	CROP
Ley	LEY/G
In arable rotation since 1960:	
Barley	BARLEY
Ley	LEY/A
Potatoes	POTATOES
Sugar beet	SUGRBET
Oats	OATS
Permanent grass, sown autumn 1973	PERMGRAS

Plots: 2. 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: P₂O₅ 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.

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- NOTES: (1) The old grass block was dug in autumn 1973 and now follows the arable rotation the crop in 1975 being ley. A new block was sown to permanent grass on adjacent land.
- (2) Potatoes and sugar beet test on sub plots: 0, Mg (82 kg MgO as Epsom salts). Yields are recorded from potatoes only. Untreated sub plots receive 82 kg MgO after potato and sugar beet harvest.

Standard applications:

Winter oats: Weedkiller: Ioxynil at 0.17 kg with mecoprop at 0.51 kg in 450 l.

Sugar beet: Manures: Boron at 0.92 kg B2O3 as borax in 1120 l. Insecticide: Menazon at 0.28 kg in 280 l on two occasions.

Barley: Weedkiller: Ioxynil at 0.17 kg with mecoprop at 0.51 kg in 450 l. Fungicide: Tridemorph at 0.53 kg in 340 l.

Potatoes: Insecticide: Menazon at 0.28 kg in 280 l on two occasions the second being with fungicide. Fungicide: Mancozeb at 1.3 kg in 280 l on two occasions the first being with insecticide.

Permanent Grass and leys: Manures: MgO at 82 kg as Epsom salts.

Seed: Winter oats: Peniarth, sown at 210 kg.

Sugar beet: Klein E, sown at 5.6 kg.

Barley: Julia, dressed with ethirimol, sown at 150 kg.

Potatoes: Maris Piper.

Grass-clover ley: R.V.P. Italian ryegrass and Hungaropoly red clover.

Permanent grass: S215 Meadow fescue at 20 kg, S24 perennial ryegrass at 20 kg, crested dogstail at 7 kg, chewings fescue at 7 kg, smooth stalked meadow grass at 7 kg, alsike clover at 4 kg, wild white clover at 2 kg. Mixture sown at 67 kg.

Cultivations, etc.:

Winter oats: Balancing Mg applied: 10 Sept, 1974. Plots dug by hand, P and K applied: 17 Sept. Seed sown: 21 Oct. First half N applied: 19 Mar, 1975. Weedkiller applied: 25 Apr. Second half N applied: 13 May. Harvested: 24 July.

Sugar beet: FYN applied, plots dug by hand: 25 Nov, 1974. P and K applied: 18 Feb, 1975. Rotary cultivated, first half N applied, Mg applied to half plots, raked in, seed drilled: 25 Apr. Singled: 11 June. Second half N applied: 12 June. Insecticide applied: 18 June, 21 July. Boron applied: 3 July. Lifted: 13 Oct.

Barley: Balancing Mg applied: 8 Nov, 1974. Plots dug by hand: 25 Nov. P and K applied: 18 Feb, 1975. First half N applied, rotary cultivated, raked, seed sown, raked: 4 Mar. Second half N applied: 13 May. Weedkiller applied: 21 May. Fungicide applied: 11 June. Harvested: 12 Aug.

Grass-clover ley: Both blocks: Rotary cultivated, ryegrass seed sown, clover seed broadcast, raked: 9 Aug, 1974. P, K and basal Mg applied: 26 Nov. N applied: 19 Mar, 1975. Cut three times: 30 May, 21 July, 1 Oct.

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Potatoes: FYM applied, plots dug by hand: 25 Nov, 1974. P and K applied: 18 Feb, 1975. First half N applied, rotary cultivated, raked, Mg applied to half plots, potatoes planted, earthed up: 13 May. Second half N applied: 12 June. Insecticide applied: 18 June. Insecticide with fungicide applied: 21 July. Fungicide applied: 7 Aug. Lifted plots with neither K nor FYM: 12 Sept. Remaining plots lifted: 29 Sept.

Permanent grass: P, K and basal Mg applied: 26 Nov, 1974. First third N applied: 19 Mar, 1975. Second third N applied: 30 May. Third third N applied: 4 Sept. Cut three times: 30 May, 28 Aug, 29 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 sugar beet tops, potato tubers and leaves was determined.
- (3) The percentage of K in potato leaves in July was determined.

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TONNES/HECTARE

MANURE	OATS		ROOTS (WASHED)	SUGAR BEET		TOPS	BARLEY		-	POTATOES	
	GRAIN	STRAW		SUGAR %	TOTAL SUGAR		GRAIN	STRAW		MG	MEAN
0	1.55	2.02	4.8	13.9	0.66	6.3	2.01	1.55	4.2	5.7	4.9
N1	2.89	3.78	5.5	12.8	0.70	9.4	2.84	2.89	5.0	5.2	5.1
P	1.73	2.16	6.5	14.1	0.92	6.3	1.99	1.41	5.0	4.3	4.7
N1P	3.75	4.42	3.9	13.2	0.52	9.1	2.28	2.64	5.1	4.2	4.6
K	1.98	2.32	7.9	14.4	1.13	6.7	2.14	1.59	16.8	14.0	15.4
N1K	2.65	4.46	11.4	14.0	1.60	12.5	3.19	4.09	14.5	16.2	15.4
PK	1.74	2.67	6.7	14.4	0.96	6.0	2.28	1.69	12.7	13.4	13.1
N1PK	3.69	6.22	8.2	13.6	1.12	10.6	4.54	4.61	19.0	17.0	18.0
N2PK	4.28	6.00	15.2	14.2	2.16	16.7	5.72	5.73	15.9	15.0	15.4
D	2.82	3.84	10.8	14.7	1.58	9.6	2.86	2.31	19.0	18.2	18.6
N1PKD	3.88	8.01	15.0	14.2	2.13	14.0	4.89	5.13	20.8	24.2	22.5
N2PKD	5.28	8.67	16.7	13.7	2.29	17.6	5.92	6.00	24.4	30.3	27.4
MEAN DM%	77.1	49.8					89.4	90.6			