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Yields of the Field Experiments 1979

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Rothamsted Research

Rothamsted Research (1980) *79/W/RN/6 Arable Reference Plots - Oats, Sugar Beet, Barley, Ley, Potatoes, Permanent Grass ;* Yields Of The Field Experiments 1979, pp 67 - 70 **- DOI: https://doi.org/10.23637/ERADOC-1-45**

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79/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 20th 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 71-78/W/RN/6.

Design: 1 block of 12 plots for each crop.

Whole plot dimensions: 2.74 x 2.13.

Treatments: All combinations of:-

Blocks

1. CROP	Crops:-
	After old grass (1960-73):
BARLEY/G	Barley
	In arable rotation since 1960:
BARLEY/A	Barley
LEY	Ley
POTATOES	Potatoes
S BEET	Sugar beet
OATS	Oats
Also:	
PERMGRAS	Permanent grass, sown autumn 1973

Plots

2. MANURE Fertilisers and farmyard manure:-

0
N1
P
N1P
K
NIK
PK
N1PK
N2PK
D
N1PKD
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: K20 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 follows the arable rotation, the crop in 1979 being barley. A new block was sown to permanent grass in 1974.
(2) Potatoes and sugar beet test on sub plots: - v 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: Insecticide: Phorate at 2 kg as granules. Weedkillers: Ioxynil at 0.32 kg and mecoprop at 0.94 kg in 280 l; ioxynil at 0.42 kg and mecoprop at 1.3 kg in 280 l, on both occasions with fungicide. Fungicide: Tridemorph at 0.53 kg on two occasions with weedkiller.
Sugar beet: Manures: Boron at 0.92 kg B203 as borax in 1120 l. Insecticide: Pirimicarb at 0.14 kg in 280 l on two occasions.
Barley: Weedkillers: Ioxynil at 0.42 kg and mecoprop at 1.3 kg in 280 l, with fungicide. Fungicide: Tridemorph at 0.53 kg on two occasions the first with weedkiller the second with benodanil. Benodanil at 0.56 kg in 280 l with tridemorph.
Potatoes: Weedkillers: Linuron at 1.0 kg plus paraquat at 0.28 kg ion in 280 l. Insecticide: Pirimicarb at 0.14 kg on two occasions, alone in 280 l on the first occasion, with the fungicide on the second occasion. Fungicide: Mancozeb at 1.3 kg in 280 l on two occasions, the first with insecticide.

Seed: Winter oats: Peniarth, sown at 210 kg.
Sugar beet: Klein E, sown at 5.6 kg.
Barley: Julia, sown at 180 kg.
Potatoes: Pentland Crown.
Grass-clover ley: RvP 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: Plots dug by hand, P, K and balancing Mg applied, raked, phorate applied, raked, seed sown, raked in: 2 Oct, 1978. Weedkillers and fungicide applied: 17 Nov. First half N applied: 27 Mar, 1979. Second half N applied: 23 Apr. Weedkillers and fungicide applied: 9 May. Harvested: 26 July.
Sugar beet: FYM applied, plots dug by hand: 14 Nov, 1978. P and K applied: 27 Feb, 1979. First N applied, Mg applied to half plots, rotary cultivated, seed sown, raked in: 23 Mar. Second N and boron applied: 30 Apr. Singled: 7 June. Insecticide applied twice: 27 June, 16 July. Lifted: 10 Oct.
Barley: Balancing Mg applied: 25 Oct, 1978. Plots dug by hand: 13 Nov. P and K applied: 27 Feb, 1979. First N applied, raked, seed sown, raked in: 5 Apr. Second N, weedkillers and tridemorph applied: 9 May. Tridemorph and benodanil applied: 20 June. Harvested: 16 Aug.
Potatoes: FYM applied, plots dug by hand: 5 Dec, 1978. P and K applied: 27 Feb, 1979. First N applied, rotary cultivated, Mg applied to half plots, raked, potatoes planted and earthed up: 9 May. Second N applied, weedkillers applied: 30 May. Insecticide applied: 27 June. Insecticide and fungicide applied: 16 July. Lifted plots without K, fungicide applied to remainder: 20 Aug. Remaining plots lifted: 1 Oct.

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Grass-clover ley: Barley stubble lightly cultivated, seeds sown, raked in: 15 Aug, 1978. P and K applied: 17 Nov. N applied: 27 Mar, 1979. Cut: 7 June, 23 July, 18 Sept.
Permanent Grass: P and K applied: 17 Nov, 1978. FYM applied: 27 Feb, 1979. N applied in three equal amounts: 27 Mar, 7 June, 23 July. Cut: 7 June, 23 July, 18 Sept.

NOTES: (1) Samples were taken for determination of dry matter for each crop and percentages of N, P and K.
(2) The percentages of Mg in sugar beet tops, potato tubers and leaves were determined.
(3) The percentages of K in potato leaves in July were determined.

TONNES/HECTARE

***** TABLES OF MEANS *****

	BARLEY/G		BARLEY/A		LEY : DRY MATTER			
	GRAIN	STRAW	GRAIN	STRAW	1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE								
0	1.67	1.50	1.17	1.13	0.99	1.00	1.06	3.05
N1	2.29	2.89	2.44	2.94	2.69	1.07	1.08	4.84
P	1.73	1.52	1.17	1.18	1.27	0.96	1.13	3.36
N1P	1.85	2.61	2.21	2.88	2.69	0.75	0.53	3.97
K	1.97	1.68	1.45	1.22	2.44	2.91	2.82	8.16
N1K	4.11	3.56	4.08	4.04	2.97	2.19	2.54	7.69
PK	1.84	1.58	1.71	1.46	3.05	2.45	2.68	8.18
N1PK	4.51	4.34	4.44	4.45	4.29	2.64	3.73	10.66
N2PK	5.29	6.03	5.27	6.20	5.09	2.64	2.60	10.33
D	2.82	2.28	2.43	2.10	4.21	3.12	2.46	9.79
N1PKD	5.24	5.26	4.77	4.91	5.21	2.72	2.57	10.51
N2PKD	5.42	6.56	5.69	7.14	6.27	2.43	2.37	11.07
MEAN DM%	81.4	77.9	82.3	79.3	19.5	29.9	22.6	24.0

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TONNES/HECTARE

***** TABLES OF MEANS *****

	POTATOES TOTAL TUBERS -	MG	MEAN	ROOTS WASHED	S BEET SUGAR %	TOTAL SUGAR	TOPS
MANURE							
0	8.9	9.6	9.2	12.0	15.7	1.88	10.9
N1	6.8	8.5	7.7	19.8	15.3	3.04	23.6
P	8.9	9.6	9.2	11.3	15.9	1.79	10.4
N1P	10.6	9.6	10.1	17.6	14.9	2.62	18.8
K	18.8	26.0	22.4	11.3	16.4	1.85	10.1
N1K	36.6	38.3	37.4	29.6	17.8	5.27	27.5
PK	22.2	26.7	24.4	14.4	16.5	2.37	11.6
N1PK	44.4	46.1	45.3	34.7	17.7	6.13	33.0
N2PK	40.7	27.7	34.2	35.9	16.5	5.92	39.3
D	39.3	36.9	38.1	28.4	18.3	5.20	19.5
N1PKD	52.3	49.5	50.9	41.7	18.0	7.49	32.3
N2PKD	46.1	44.1	45.1	46.8	17.1	8.01	43.7

	OATS GRAIN	STRAW	PERMGRAS : DRY MATTER 1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE						
0	1.48	2.25	2.56	0.88	0.84	4.28
N1	4.13	4.67	3.04	1.20	1.85	6.09
P	1.29	2.04	2.47	1.00	0.71	4.19
N1P	4.28	4.77	3.22	1.16	1.81	6.18
K	1.42	2.41	2.67	0.93	1.19	4.78
N1K	3.95	5.37	3.46	1.67	1.84	6.97
PK	1.62	2.70	3.32	1.21	1.13	5.66
N1PK	3.64	5.21	4.03	1.71	1.79	7.54
N2PK	6.23	9.55	4.82	1.63	1.89	8.34
D	2.27	2.93	3.53	1.18	1.35	6.05
N1PKD	4.75	7.17	2.96	1.78	2.14	6.88
N2PKD	6.23	10.23	4.88	2.41	2.07	9.36
MEAN DM%	71.1	45.1	21.7	35.1	23.7	26.8

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