ROTHAMSTED RESEARCH

Yields of the Field Experiments 1978

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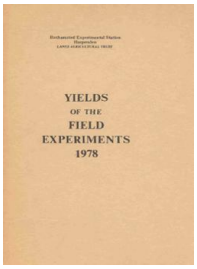

78/R/RN/5 Arable Reference Plots - Barley, Ley, Potatoes, Wheat, Kale, Permanent Grass

Rothamsted Research

Rothamsted Research (1979) *78/R/RN/5 Arable Reference Plots - Barley, Ley, Potatoes, Wheat, Kale, Permanent Grass ;* Yields Of The Field Experiments 1978, pp 81 - 85 **- DOI: https://doi.org/10.23637/ERADOC-1-30**

78/R/RN/5

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 - Great Field IV.

Sponsor: F.V. Widdowson.

The 23rd year of the rotation, barley, ley, potatoes, winter wheat, kale.
The 19th year of the same rotation on the additional plots.
The 22nd year of permanent grass.

For previous years see 58/Bc/1(t), 59/Bc/1(t), 60/B/3(t), 61-64/B/2, 65/B/2(t), 66/B/2(t), 67/B/2, 68/B/3(t) and 69-77/R/RN/5.

Design: 1 block of 12 plots for each crop on original plots. 1 block of 7 plots for each crop on additional plots.

Whole plot dimensions: 2.13 x 2.44.

Treatments: Fertilisers and farmyard manure:

MANURE

Original plots

0
N1
P
N1P
K
N1K
PK
N1PK
N2PK
D
N1PKD
N2PKD

N1, 2 (kg N): 19, 38 (ley): 56, 112 (barley): 75, 150 (wheat): 125, 250 (potatoes - 75, 150 until 1975): 125, 250 (kale and permanent grass) as 'Nitro-Chalk'

P: 63 kg P205 as superphosphate

K: 250 kg K20 as muriate of potash

D: 38 tonnes FYM (permanent grass): 50 tonnes (kale and potatoes): none to other crops.

NOTE: Since 1977 all wheat on these plots receives a standard dressing of 82 kg MgO as Epsom salts. Before 1976 potatoes tested 0 v 82 kg MgO on sub plots, dressing balanced-up after harvest before wheat.

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Additional plots

MANURE

O	None
F	N PK
FMGCA	N PK Mg Ca
FMGS	N PK Mg S
FCAS	N PK Ca S
FMGCAS	N PK Mg Ca S
FMGCASTE	N PK Mg Ca S TE

F: N PK
N: N applied as urea. N1 to wheat, N2 to other crops. Rates as above.
P: 126 kg P205 as potassium dihydrogen phosphate
K: 251 kg K20 total. As potassium dihydrogen phosphate (83 kg K20) on all NPK plots. In addition plots without S receive 168 kg K20 as potassium chloride, plots with S receive 92 kg K20 as potassium sulphate plus 76 kg K20 as potassium chloride. Since 1978 all F plots received in addition 126 kg K20 for potatoes - applied in autumn as potassium chloride.
Mg: 126 kg MgO as magnesium chloride
Ca: 126 kg CaO as calcium carbonate
S: 30 kg S supplied by potassium sulphate
TE: Trace element mixture including Mn, Cu, Zn, B, Mo, Ca, Fe. Test varies with crop.

Standard applications:
Barley: Weedkillers: Ioxynil at 0.53 kg and mecoprop at 1.6 kg in 280 l applied with the fungicide. Fungicide: Tridemorph at 0.53 kg in 280 l.
Potatoes: Weedkillers: Linuron at 0.93 kg with paraquat at 0.28 kg ion in 280 l. Fungicide: Mancozeb at 1.3 kg in 280 l on two occasions, the second with insecticide. Insecticide: Pirimicarb at 0.14 kg.
Winter Wheat: Ioxynil at 0.63 kg and mecoprop at 1.9 kg in 280 l. Fungicides: Tridemorph at 0.53 kg in 280 l. Carbendazim at 0.25 kg and maneb at 1.6 kg in 280 l.
Kale: Insecticides: Pirimicarb at 0.14 kg, menazon at 0.28 kg, HCH, derris, and thiram ('Hexil Plus' at 0.28 kg) all in 280 l.

Seed: Barley: Maris Mink, sown at 200 kg.
Grass-clover ley: RvP Italian ryegrass and Hungaropoly red clover.
Potatoes: Pentland Crown.
Winter Wheat: Maris Hobbit, sown at 220 kg.
Kale: Thousand Headed.

Cultivations, etc.:-
Barley: Additional plots dug by hand: 11 July, 1977. Original plots dug by hand: 11 Nov. P, K, Ca, Mg, and S applied: 16 Feb, 1978. N applied, rotary cultivated, seed sown: 13 Mar. Weedkillers applied: 19 May. Trace elements applied: 7 June. Harvested by hand: 22 Aug.
Grass-clover ley: Additional plots rotary cultivated, seed sown: 16 Aug, 1977. Original plots rotary cultivated, seed sown: 23 Aug. P, K, Ca, Mg and S applied: 15 Dec. N applied: 13 Mar, 1978. Trace elements applied to additional plots: 17 May. Cut: 25 May, 27 Aug, and 20 Sept.

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Potatoes: FYM applied to original plots. All plots dug: 25 Oct, 1977. P, K, Ca, Mg, and S applied: 16 Feb, 1978. First half N applied, rotary cultivated twice, potatoes planted: 11 May. Weedkillers applied: 25 May. Second half N applied to additional plots: 13 June. Trace elements applied to additional plots: 20 June. Fungicide applied: 7 July. Insecticide applied with fungicide: 4 Aug. All plots not given K or FYM lifted by hand: 9 Aug. Remaining plots lifted: 21 Sept.

Winter Wheat: Mg applied to original plots, all plots dug by hand: 7 Oct, 1977. P, K, Ca, Mg, and S applied, seed sown: 17 Oct. Weedkiller applied: 30 Mar, 1978. N applied: 14 Apr. Trace elements applied: 17 May. Tridemorph applied: 22 May. Carbendazim and maneb applied: 12 June. Harvested by hand: 21 Aug.

Kale: FYM applied to original plots, all plots dug by hand: 25 Oct, 1977. P, K, Mg, Ca and S applied: 16 Feb, 1978. All N applied to original plots and first half N to additional plots, seed sown: 17 May. Second half N applied to additional plots: 27 June. Trace elements applied to additional plots: 7 July. Pirimicarb applied: 19 Sept. Menazon applied: 26 Sept. 'Hexil Plus' applied: 3 Oct. Harvested by hand: 17 Oct.

Permanent Grass: P and K applied: 15 Dec, 1977. FYM applied: 17 Feb, 1978. N applied three times: 13 Mar, 22 May, 28 July. Cut three times: 22 May, 27 July, 6 Oct.

NOTES: (1) Potato leaves were assessed for K and Mg.
(2) Despite the use of insecticides the kale became severely infested with caterpillars and was harvested early to prevent further loss.

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GREAT FIELD IV (R):ORIGINAL PLOTS

TONNES/HECTARE

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

	WINTER WHEAT:		KALE: FRESH	BARLEY:		LEY : DRY MATTER 1ST	2ND	3RD	TOTAL OF
	GRAIN	STRAW	WEIGHT	GRAIN	STRAW	CUT	CUT	CUT	3 CUTS
MANURE									
0	5.28	4.64	13.1	2.79	2.66	1.75	3.06	1.95	6.76
N1	5.64	5.55	11.3	1.74	2.39	3.53	3.45	2.25	9.23
P	2.60	3.04	18.3	2.03	2.43	2.78	4.93	2.89	10.60
N1P	2.46	3.34	33.1	1.07	1.89	3.47	2.97	1.50	7.93
K	4.44	4.07	13.9	3.88	2.95	2.65	4.75	2.63	10.03
N1K	6.91	6.36	14.8	4.80	3.46	3.11	4.04	2.14	9.29
PK	5.87	4.97	19.2	4.38	3.34	3.60	6.82	3.57	13.99
N1PK	7.66	6.92	40.1	4.78	4.40	3.65	6.08	3.24	12.97
N2PK	8.11	7.92	54.1	5.84	5.16	4.37	5.44	3.31	13.12
D	6.66	6.29	27.0	4.81	3.95	3.94	5.91	3.91	13.77
N1PKD	8.55	8.22	49.7	6.00	5.14	3.60	6.39	3.46	13.45
N2PKD	8.42	8.12	61.9	6.58	6.16	5.66	6.42	4.10	16.19
MEAN DM%	83.6	61.8		70.1	52.4	20.0	24.4	22.0	22.1

	POTATOES: TOTAL TUBERS	PERMANENT GRASS : DRY MATTER 1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE					
0	11.3	0.94	1.36	0.63	2.93
N1	10.2	1.89	1.90	1.72	5.52
P	8.6	1.16	1.14	0.61	2.91
N1P	7.3	2.43	1.99	2.01	6.44
K	30.8	1.24	1.79	0.88	3.91
N1K	38.9	2.96	2.71	1.96	7.63
PK	41.1	1.06	1.56	0.91	3.53
N1PK	60.3	2.92	2.54	1.73	7.19
N2PK	71.3	4.43	3.28	2.80	10.50
D	52.3	4.84	2.28	1.65	8.76
N1PKD	69.5	5.81	3.10	2.60	11.50
N2PKD	73.3	4.80	5.59	3.65	14.04
MEAN DM%		24.4	31.9	28.5	28.3

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GREAT FIELD IV (R): ADDITIONAL PLOTS

TONNES/HECTARE

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

	WINTER WHEAT: GRAIN	WINTER WHEAT: STRAW	KALE: FRESH WEIGHT	BARLEY: GRAIN	BARLEY: STRAW	POTATOES: TOTAL TUBERS
MANURE						
0	4.27	3.64	17.4	1.97	2.24	16.6
F	7.74	7.05	56.7	5.20	4.46	69.6
FMGCA	7.66	6.66	57.5	6.58	5.37	78.5
FMGS	7.04	6.42	55.8	5.82	4.66	67.3
FCAS	7.68	7.14	53.2	6.50	5.49	71.5
FMGCAS	7.48	6.87	61.9	6.41	5.52	68.8
FMGCASTE	7.32	7.32	55.8	6.09	5.05	70.3
MEAN DM%	83.9	59.6		74.8	56.1	

	LEY : DRY MATTER 1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE				
0	1.95	2.95	1.83	6.74
F	5.26	4.76	3.42	13.44
FMGCA	5.32	4.46	3.42	13.20
FMGS	4.74	4.84	3.26	12.84
FCAS	5.18	5.40	3.66	14.23
FMGCAS	5.12	4.87	3.43	13.41
FMGCASTE	5.16	4.97	3.42	13.55
MEAN DM%	21.8	23.4	20.8	22.0

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