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72/W/RN/12 Organic Manuring - Leys, Rye, Potatoes

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72/W/RN/12

ORGANIC MANURING

Object: To study, from crop yields and soil analyses, the cumulative effects of a range of types of organic matter - Woburn Stackyard B.

Sponsor: G.E.G. Mattingly.

The eighth year, leys, rye and potatoes.

For previous years see 66/C/31(t), 67/C/24(t), 68/C/18(t), 69/W/RN/12(t), 70/W/RN/12(t) and 71/W/RN/12(t).

Whole plot dimensions: 8.53 x 30.5. Area harvested: Potatoes - 0.00087, rye - 0.00421, leys - 0.00524.

The first phase of this experiment, building up organic matter, ended in autumn 1971 and the second, testing, phase started in 1972. Blocks I and III were ploughed, including the leys, for a rotation of potatoes, winter wheat, sugar beet and barley. Blocks II and IV remained in rye and leys in 1972 preparatory to following the same rotation from 1973. Organic manures are no longer applied.

Balancing fertilisers applied in autumn 1971 for potatoes (kg)

Treatment(T)	P2O5	K2O	MgO
DG	25	50	None
ST	None	None	None
PT	None	None	13
GM	None	38	None
FD	None	None	None
FS	None	None	None

The leys in 1972 (Blocks II and IV) and the leys ploughed up for potatoes (Blocks I and III) received the same fertiliser in autumn 1971.

LC	None	126	None
LN	50	376	25

Treatments:

Rates of nitrogen to potatoes 1972 on eighth plots:-

0, 50, 100, 150, 200, 250, 300, 350 kg N as 'Nitro-Chalk'.

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Basal applications:

Potatoes: 100 kg P₂O₅ as superphosphate, 200 kg K₂O as muriate of potash in autumn, 100 kg P₂O₅ as superphosphate, 200 kg K₂O as muriate of potash, 100 kg MgO as Epsom salts in spring. Weedkiller: Linuron at 1.1 kg with paraquat at 0.42 kg ion in 370 l. Fungicide: Mancozeb at 1.3 kg in 430 l. Fungicide with insecticide: Mancozeb at 1.3 kg with demeton-s-methyl at 0.25 kg in 430 l.

Rye: 60 kg P₂O₅, 120 kg K₂O as (0:14:28), 40 kg MgO as Epsom salts, 40 kg N as 'Nitro-Chalk'.

Leys: Lc and Ln: 60 kg P₂O₅, 120 kg K₂O as (0:14:28), 40 kg MgO as Epsom salts. Ln only: 126 kg N as 'Nitro-Chalk' in the spring and after each cut except the last.

Seed: Potatoes: Pentland Crown.

Rye: King II sown at 190 kg.

Cultivations, etc.:

Potatoes: Basal P and K applied: 26 Oct, 1971. Ploughed: 28 Oct. Balancing P, K and Mg applied: 14 Jan, 1972. Basal K applied: 7 Apr. Basal P applied: 8 Apr. Basal Mg and test N applied: 13 Apr. Rotary cultivated, potatoes planted: 19 Apr. Weedkiller applied: 11 May. Grubbed: 31 May. Rotary ridged: 19 June. Fungicide applied: 5 July. Fungicide with insecticide applied: 27 July. Sprayed with undiluted BOV at 200 l: 22 Sept. Lifted: 26 Sept.

Rye: PK applied: 11 Oct, 1971. Mg applied, ploughed: 12 Oct. Seed drilled: 23 Oct. N applied: 18 Apr, 1972. GM plots undersown with Essex Broad Red Clover at 30 kg: 26 Apr. Combine harvested: 29 Aug.

Leys: Basal PK and Mg applied: 25 Oct, 1971. Balancing P, K and Mg applied: 12 Jan, 1972. N applied to LN plots: 8 Mar, 26 June. Cut once: 15 June.

NOTE: Soil samples were taken after harvest for P, K and Mg analysis.

Standard errors per plot.

Potatoes, total tubers: tonnes/hectare: Whole plot: 0.52 or 0.5%
(7 d.f.)

Sub plot: 1.05 or 1.1%
(56 d.f.)

Rye, grain, tonnes/hectare:

Whole plot: 0.208 or 6.8%
(5 d.f.)

Sub plot: 0.202 or 6.6%
(18 d.f.)

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TABLES OF MEANS

LEY. 1ST AND ONLY CUT

DRY MATTER: TONNES/HECTARE

ROTATION

LC	LN
3.88	6.75

Mean D.M. %: 24.2

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POTATOES

TOTAL TUBERS: TONNES/HECTARE

N: KG/HA

	0	50	100	150	200	250	300	350	Mean
T									
DG	27.6	31.2	35.0	34.5	41.2	45.2	40.4	47.5	37.8
ST	21.2	27.0	31.5	31.5	31.9	32.8	37.5	38.3	31.5
PT	18.6	30.7	29.5	37.6	40.3	45.2	44.8	47.1	36.7
GM	27.7	33.2	33.4	37.5	37.5	39.8	43.7	43.6	37.0
FD	20.3	24.7	25.0	28.1	32.1	32.9	35.5	41.7	30.0
FS	19.9	25.6	28.1	30.3	32.6	33.7	35.8	37.9	30.5
LC	29.4	30.3	37.7	34.9	36.6	35.7	39.9	45.8	36.3
LN	26.7	25.5	31.0	33.2	28.7	34.2	38.1	36.9	31.8
Mean	23.9	28.5	31.4	33.4	35.1	37.5	39.5	42.4	34.0

STANDARD ERRORS OF DIFFERENCES

T	N	T
		N
3.07	1.08	4.19
Unless same level of		
T		3.05

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POTATOES

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

N: KG/HA

	0	50	100	150	200	250	300	350	Mean
T									
DG	95.3	94.8	95.3	96.2	95.7	95.7	95.9	97.5	95.8
ST	95.6	94.8	93.5	96.2	95.1	95.3	95.7	96.3	95.3
PT	95.8	94.7	94.2	95.5	96.2	96.2	96.9	97.0	95.8
GM	96.0	95.7	95.2	93.1	95.8	96.7	95.9	96.8	95.6
FD	94.9	93.3	91.6	90.9	93.2	93.4	94.1	97.2	93.6
FS	94.3	92.8	95.3	95.0	96.0	95.4	96.6	96.6	95.2
LC	96.2	94.0	96.9	96.6	97.3	96.9	97.6	98.4	96.7
LN	96.7	92.7	96.0	96.4	96.3	96.9	95.8	96.9	96.0
Mean	95.6	94.1	94.7	95.0	95.7	95.8	96.1	97.1	95.5

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RYE

GRAIN: TONNES/HECTARE

N: KG/HA

	25	75	125	175	Mean
T					
DG	3.73	3.63	3.84	3.71	3.73
ST	2.83	2.96	2.97	3.18	2.98
PT	2.74	2.54	2.51	2.83	2.66
GM	3.60	3.69	3.97	3.73	3.75
FD	2.45	2.84	2.58	2.54	2.60
FS	2.69	2.77	2.76	2.70	2.73
Mean	3.00	3.07	3.10	3.12	3.07

STANDARD ERRORS OF DIFFERENCES

T	N	T
		N
0.208	0.082	0.272
Unless same level of		
T		0.202

Mean D.M. %: 83.3

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RYE

STRAW: TONNES/HECTARE

N: KG/HA

	25	75	125	175	Mean
T					
DG	5.46	5.59	5.40	4.95	5.35
ST	4.28	4.68	4.32	4.97	4.56
PT	4.07	3.84	3.64	4.12	3.92
GM	4.88	5.00	4.93	4.72	4.88
FD	3.41	4.10	3.19	4.24	3.73
FS	4.04	4.26	4.16	4.15	4.15
Mean	4.36	4.58	4.27	4.52	4.43

Mean D.M. %: 91.5