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78/W/RN/12 Organic Manuring - Wheat, Potatoes

Rothamsted Research

Rothamsted Research (1979) *78/W/RN/12 Organic Manuring - Wheat, Potatoes* ; Yields Of The Field Experiments 1978, pp 99 - 102 - DOI: <https://doi.org/10.23637/ERADOC-1-30>

78/W/RN/12

ORGANIC MANURING

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

Sponsor: G.E.G. Mattingly.

The 14th year, winter wheat, potatoes.

For previous years see 'Details' 1973 and 74-77/W/RN/12.

Design for each crop: 2 blocks of 8 plots split into 8.

Whole plot dimensions: 8.53 x 30.5.

Treatments: From 1966 to 1971 the experiment had a preliminary period designed to build up organic matter, derived from different sources. An arable rotation was started on two blocks in 1972 and the remaining two blocks in 1973. Organic manures were last applied in 1971, the leys were ploughed in autumn 1971 and 1972 before starting the rotation. The experiment now tests all combinations of:-

Whole plots

1. MANURE	Organic manures and fertilisers in the preliminary period:
FYM	Farmyard manure
STRAW	Straw
PEAT	Peat
GREENMNR	Green manures
FERT-FYM	Fertilisers equivalent to FYM
FERT-STR	Fertilisers equivalent to straw
CLOVRLEY	Grass/clover ley, no N
GRASSLEY	Grass ley with N for each cut

Sub plots

2. N Fertiliser nitrogen (kg N) as 'Nitro-Chalk 25':

WHEAT	POTATOES
0	0
30	75
60	150
90	225
120	300
150	375
180	450
210	525

Standard applications:

Winter wheat: Manures: 110 kg P₂O₅ as superphosphate, 60 kg K₂O as muriate of potash. Weedkillers: Mecōp^{op}, bromoxynil, and ioxynil ('Brittox' at 3.5 kg in 280 l).

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Potatoes: Manures: (0:20:20) at 1210 kg in winter, (0:20:20) at 1210 kg in spring. 60 kg Mg as kieserite. Weedkillers: Linuron at 1.3 kg plus paraquat at 0.42 kg ion in 280 l. Fungicides: Mancozeb at 1.3 kg on three occasions, in 280 l on the first, in 420 l on the second, in 420 l with insecticide on the third. Fentin acetate with maneb ('Fennite A' at 1.7 kg in 280 l). Insecticide: Pirimicarb at 0.14 kg, on one occasion with fungicide, in 420 l. Haulm desiccant: Undiluted BOV at 170 l.

Seed: Winter wheat: Maris Huntsman at 210 kg.
Potatoes: Pentland Crown.

Cultivations, etc.:-

Winter wheat: PK applied: 10 Nov, 1977. Ploughed: 11 Nov. Spring-tine cultivated with crumbler attached, seed sown: 14 Nov. N applied: 11 Apr, 1978. Weedkiller applied: 10 May. Combine harvested: 25 Aug.
Potatoes: Heavy spring-tine cultivated three times: 15 July, 1977, 18 July, 9 Aug. Ploughed: 30 Sept. Winter PK applied: 6 Jan, 1978. Reploughed: 9 Feb. Spring PK applied: 30 Mar. Deep-tine cultivated: 31 Mar. N applied: 14 Apr. Kieserite applied: 20 Apr. Rotary cultivated, potatoes planted: 24 Apr. Weedkillers applied: 15 May. Grubbed: 6 June. Earthed up: 9 June. Mancozeb applied: 5 July, 20 July. Mancozeb applied with insecticide: 11 Aug. Fentin acetate with maneb applied: 23 Aug. Haulm desiccant applied: 23 Sept. Lifted: 11 Oct.

NOTE: Because of an error in weighing, yield of one plot of potatoes, treatment combination MANURE FERT FYM, N O, was lost. An estimated value was used in the analysis.

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WHEAT

GRAIN TONNES/HECTARE

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

N	0	30	60	90	120	150	180	210	MEAN
MANURE									
FYM	1.68	2.91	4.26	4.86	5.40	5.39	5.41	5.98	4.49
STRAW	1.44	3.83	3.88	4.78	5.15	5.11	3.84	4.67	4.09
PEAT	1.45	2.72	3.96	4.43	4.69	5.31	5.07	5.19	4.10
GREENMNR	1.36	2.53	3.98	4.70	4.76	4.89	5.09	5.34	4.08
FERT-FYM	1.35	2.50	3.65	4.36	4.81	4.91	5.09	5.43	4.01
FERT-STR	1.32	2.80	3.63	4.23	5.34	4.47	4.43	4.58	3.85
CLOVRLEY	1.85	3.16	4.48	5.23	5.22	5.33	5.09	5.33	4.46
GRASSLEY	1.50	3.34	4.47	4.98	5.20	4.88	5.05	5.03	4.31
MEAN	1.49	2.97	4.04	4.70	5.07	5.03	4.88	5.19	4.17

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	MANURE	N	MANURE N
SED	0.452	0.194	0.683
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
MANURE			0.548

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	7	0.452	10.8
BLOCK.WP.SP	56	0.548	13.1

GRAIN MEAN DM% 82.6

STRAW TONNES/HECTARE

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

N	0	30	60	90	120	150	180	210	MEAN
MANURE									
FYM	1.04	2.34	3.05	3.17	4.18	3.19	3.39	3.94	3.04
STRAW	0.87	2.12	2.34	3.18	3.29	3.48	3.09	3.66	2.75
PEAT	0.76	2.10	3.07	3.16	2.94	3.41	3.33	3.87	2.83
GREENMNR	0.89	1.62	2.48	3.21	3.10	3.26	2.98	3.81	2.67
FERT-FYM	0.84	1.53	2.37	3.18	3.11	2.85	2.82	3.49	2.53
FERT-STR	0.83	1.85	2.37	3.20	3.49	3.12	3.12	3.40	2.67
CLOVRLEY	1.04	1.58	2.95	3.17	3.57	3.78	2.34	3.44	2.73
GRASSLEY	0.74	2.42	3.00	3.29	3.04	3.07	2.97	3.50	2.75
MEAN	0.88	1.95	2.70	3.20	3.34	3.27	3.00	3.64	2.75

STRAW MEAN DM% 89.6

SUB PLOT AREA HARVESTED 0.00173

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POTATOES

TOTAL TUBERS TONNES/HECTARE

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

N	0	75	150	225	300	375	450	525	MEAN
MANURE									
FYM	21.8	30.7	37.8	49.0	49.0	44.7	49.3	50.8	41.6
STRAW	29.4	35.8	47.9	50.3	43.3	55.8	58.5	56.6	47.2
PEAT	9.2	20.5	21.8	35.3	39.9	45.1	42.2	45.8	32.5
GREENMNR	14.4	18.4	39.4	41.2	33.2	35.6	45.8	47.1	34.4
FERT-FYM	30.2	25.0	29.9	36.9	38.7	43.4	37.8	44.2	35.8
FERT-STR	24.5	25.4	29.9	38.8	43.6	46.4	49.1	44.4	37.8
CLOVRLEY	31.6	44.6	49.5	52.2	51.0	54.6	54.5	52.4	48.8
GRASSLEY	35.1	47.7	58.0	61.7	63.5	65.1	64.1	63.8	57.4
MEAN	24.5	31.0	39.3	45.7	45.3	48.8	50.2	50.6	41.9

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	MANURE	N	MANURE N
SED	5.74	1.68	7.26
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
MANURE			4.75

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	7	5.74	13.7
BLOCK.WP.SP	56	4.75	11.3

PERCENTAGE WARE 3.81 CM (1.5INCH) RIDDLE

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

N	0	75	150	225	300	375	450	525	MEAN
MANURE									
FYM	94.8	95.3	96.5	96.6	97.1	95.7	96.9	96.6	96.2
STRAW	96.9	97.6	97.6	97.3	96.6	97.4	96.1	96.3	97.0
PEAT	86.9	91.1	95.3	95.0	95.9	94.7	95.8	97.3	94.0
GREENMNR	95.0	93.2	95.3	96.4	94.8	96.0	97.1	96.5	95.5
FERT-FYM	96.7	93.7	95.3	95.3	95.9	96.0	94.9	95.2	95.4
FERT-STR	95.8	95.1	92.8	96.4	96.0	95.7	95.6	96.9	95.5
CLOVRLEY	97.5	97.8	96.3	97.2	97.5	97.0	97.2	97.1	97.2
GRASSLEY	98.5	97.2	96.7	97.8	96.6	96.7	97.6	96.6	97.2
MEAN	95.3	95.1	95.7	96.5	96.3	96.1	96.4	96.6	96.0

SUB PLOT AREA HARVESTED 0.00087