ROTHAMSTED RESEARCH

Yields of the Field Experiments 1973

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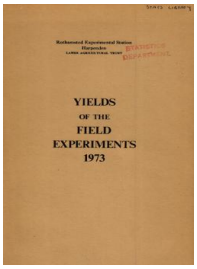

73/W/RN/12 - Organic Manuring - Potatoes, Wheat

Rothamsted Research

Rothamsted Research (1974) *73/W/RN/12 - Organic Manuring - Potatoes, Wheat ;* Yields Of The Field Experiments 1973, pp 121 - 127 **- DOI: https://doi.org/10.23637/ERADOC-1-98**

73/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 ninth year, winter wheat 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), 71/W/RN/12(t) and 72/W/RN/12(t).

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

Whole plot dimensions: 8.53 x 30.5. Area harvested: Potatoes - 0.00087 -, Winter wheat - 0.00173.

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

Whole plots: 1. Organic manures and fertilisers in the preliminary period:

	MANURE
Farmyard Manure	FYM
Straw	Straw
Peat	Peat
Green manures	Greenmnr
Fertilisers equivalent to FYM	Fert-FYM
Fertilisers equivalent to straw	Fert-Str
Grass/clover ley no N	Clovrley
Grass ley with N for each cut	Grassley

Sub plots: 2. Fertiliser nitrogen (kg N) in 1973: N

Wheat	Potatoes	Wheat	Potatoes
None	None	0	0
25	50	25	50
50	100	50	100
75	150	75	150
100	200	100	200
125	250	125	250
150	300	150	300
175	350	175	350

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Fertilisers applied for potatoes 1973 to balance differential crop removals in 1972 (kg):

	P205	K20
Farmyard manure	38	88
Straw	None	None
Peat	None	None
Green manures	25	50
Fertilisers equivalent to FYM	None	None
Fertilisers equivalent to Straw	None	None
Grass/clover ley no N	None	75
Grass ley with N for each cut	None	126

Basal applications:
Potatoes: Manures: Superphosphate at 230 kg P205, muriate of potash at 240 kg K20 in the autumn and at the same rates in spring. Epsom salts at 100 kg MgO. Weedkillers: Linuron at 1.2 kg plus paraquat at 0.56 kg ion in 280 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg in 390 l on the first occasion and in 370 l on the second occasion.
Winter wheat: Weedkillers: Paraquat at 0.56 kg ion in 280 l. Ioxynil at 0.63 kg with mecoprop at 1.9 kg in 280 l.

Seed: Winter wheat: Cappelle sown at 200 kg. Potatoes: Pentland Crown.

Cultivations, etc.:-
Winter wheat: Deep-tine cultivated: 30 Sept, 1972. Seed sown (mixed varieties in error): 20 Oct. Paraquat applied: 17 Nov. Seed re-sown: 24 Nov. N applied: 13 Apr. Ioxynil and mecoprop applied: 26 Apr. Combine harvested: 23 Aug.
Potatoes: Basal K applied: 16 Nov, 1972. Basal P applied: 17 Nov. Ploughed: 30 Nov. Balancing P and K applied: 26 Mar, 1973. Basal P applied: 27 Mar. Basal K applied: 29 Mar. N applied: 5 Apr. Basal Mg applied, rotary cultivated, potatoes planted: 6 Apr. Weedkiller applied: 9 May. Grubbed: 1 June. Rotary ridged: 4 June. Fungicide with insecticide applied: 5 July. Fungicide applied: 26 July, 13 Aug. Haulm mechanically destroyed: 19 Sept. Sprayed with undiluted BOV at 220 l: 24 Sept. Lifted: 10 Oct.

NOTE: (1) Leaf samples of both wheat and potatoes were taken for boron analysis.
(2) Soil samples were taken in the spring and mid-season for P, K and Mg analysis.
(3) Winter wheat. One plot treatment MANURE-Fert-Str, N0 was badly damaged by rabbits. Values for grain and straw estimated from visual scores made just before harvest were used in the analysis.

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Standard errors per plot.

Winter wheat, grain, tonnes/hectare:	Whole plot:	0.491 or 10.5% (7 d.f.)
	Sub plot:	0.455 or 9.8% (56 d.f.)
Potatoes, total tubers, tonnes/hectare:	Whole plot:	5.39 or 10.8% (7 d.f.)
	Sub plot:	4.44 or 8.9% (56 d.f.)

Corrections to 'Yields' 1972 (p. 108):-

1. Basal applications to potatoes of P_2O_5 and K_2O should read '230 kg P_2O_5' and '240 kg K_2O' in both autumn and spring.
2. Standard errors per plot for potatoes should read:
   Whole plot: 3.07 or 9.0% (7 d.f.)
   Sub plot: 3.05 or 9.0% (56 d.f.)

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TABLES OF MEANS

WINTER WHEAT

GRAIN: TONNES/HECTARE

N

	0	25	50	75	100	125	150	175	Mean
MANURE									
FYM	3.11	3.34	4.61	4.91	5.71	5.69	5.57	5.52	4.81
Straw	2.06	3.14	4.67	5.60	5.91	5.82	5.56	5.42	4.77
Peat	1.28	3.34	3.65	4.88	5.18	4.88	5.35	5.00	4.19
Greenmnr	2.50	3.62	5.16	5.23	5.85	5.50	5.38	5.62	4.86
Fert-FYM	1.78	2.83	3.94	4.83	4.71	5.24	5.17	5.20	4.21
Fert-Str	1.19	2.88	4.05	4.54	4.92	4.71	4.83	4.42	3.94
Clovrley	3.92	5.40	5.60	6.23	5.74	5.62	5.71	5.05	5.41
Grassley	3.47	4.75	5.96	5.85	5.64	5.52	5.11	4.49	5.10
Mean	2.41	3.66	4.70	5.26	5.46	5.37	5.34	5.09	4.66

STANDARD ERRORS OF DIFFERENCES

MANURE	N	MANURE N
0.491	0.161	0.649

Except when comparing means with same level of MANURE 0.455

Mean D.M. % 85.1

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WINTER WHEAT

STRAW: TONNES/HECTARE

N

	0	25	50	75	100	125	150	175	Mean
MANURE									
FYM	2.69	3.31	4.36	5.33	4.92	6.16	6.48	6.11	4.92
Straw	1.62	3.15	4.41	4.95	5.16	5.23	6.38	6.36	4.66
Peat	1.28	3.12	3.68	4.01	5.24	5.57	5.49	5.24	4.20
Greenmnr	2.23	3.33	4.51	4.51	6.34	5.25	6.21	5.97	4.79
Fert-FYM	1.73	2.85	4.01	4.77	4.80	5.36	5.29	5.82	4.33
Fert-Str	0.86	2.94	3.78	4.03	4.88	4.77	4.69	4.86	3.85
Clovrley	2.99	4.71	5.18	5.73	6.12	5.92	6.03	6.74	5.43
Grassley	3.00	4.06	5.47	5.19	5.77	6.44	6.18	6.26	5.30
Mean	2.05	3.44	4.42	4.81	5.40	5.59	5.84	5.92	4.68

Mean D.M. % 80.3

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POTATOES

TOTAL TUBERS: TONNES/HECTARE

	N							
	0	50	100	150	200	250	300	350	Mean
MANURE									
FYM	32.3	41.8	49.4	54.6	56.2	54.1	59.9	61.7	51.2
Straw	31.1	39.5	49.7	51.6	57.0	60.8	61.9	58.7	51.3
Peat	22.9	31.7	39.4	41.6	49.2	49.1	52.4	55.3	42.7
Greenmnr	32.9	40.8	41.3	43.1	54.3	50.7	50.3	54.6	46.0
Fert-FYM	22.9	34.2	40.3	44.7	49.8	50.5	51.2	52.7	43.3
Fert-Str	26.2	34.1	44.3	47.7	48.5	46.0	53.2	62.3	45.3
Clovrley	49.0	57.9	57.0	62.9	59.2	63.4	64.1	66.5	60.0
Grassley	50.5	56.1	59.6	59.9	63.1	56.7	64.6	61.9	59.0
Mean	33.5	42.0	47.6	50.8	54.7	53.9	57.2	59.2	49.9

STANDARD ERRORS OF DIFFERENCES

MANURE	N	MANURE N
5.39	1.57	6.81
Except when comparing means with same level of MANURE		4.44

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POTATOES

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

N

MANURE	0	50	100	150	200	250	300	350	Mean
FYM	96.2	98.2	98.1	98.9	98.2	98.3	98.3	98.4	98.1
Straw	97.5	97.3	98.8	97.1	98.0	97.5	98.1	97.9	97.8
Peat	92.3	96.7	97.3	97.7	97.2	98.4	98.1	97.2	96.9
Greenmnr	96.7	97.9	97.5	97.2	98.3	98.5	97.6	97.7	97.7
Fert-FYM	94.0	95.8	97.7	97.4	97.4	97.3	98.1	97.3	96.9
Fert-Str	93.2	96.3	95.4	98.3	97.4	97.8	97.7	97.8	96.7
Clovrley	97.5	98.3	98.0	98.4	98.3	98.4	98.2	97.5	98.1
Grassley	98.2	98.1	98.0	98.1	97.9	97.8	98.6	98.3	98.1
Mean	95.7	97.3	97.6	97.9	97.8	98.0	98.1	97.8	97.5

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