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Yields of the Field Experiments 1974

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74/W/RN/12 Organic Manuring - Sugar Beet, Wheat

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74/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 tenth year, sugar beet and winter wheat.

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), 72/W/RN/12(t) and 73/W/RN/12.

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

Whole plot dimensions: 8.53 x 30.5. Sub plot area harvested:
Sugar beet: 0.00130. 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	Greenmanr
Fertilisers equivalent to FYM	Fert-FYM
Fertilisers equivalent to straw	Fert-Str
Grass/clover ley no N	Cloverley
Grass ley with N for each cut	Grassley

Sub plots: 2. Fertiliser nitrogen (kg N) in 1974:

Sugar beet	Wheat	S. Beet	Wheat
None	None	0	0
40	25	40	25
80	50	80	50
120	75	120	75
160	100	160	100
200	125	200	125
240	150	240	150
280	175	280	175

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Standard applications:

Sugar beet: Manures: Ground chalk at 5 tonnes. (0:20:20) in autumn at 1140 kg. (0:20:20) in the seedbed at 580 kg. MgO at 100 kg as Epsom salts. Boron at 6.7 kg B2O3 (as 'Solubor') applied with the second application of insecticide. Insecticide: Demeton-s-methyl at 0.25 kg in 280 l followed by 0.21 kg in 390 l. Weedkillers: Aminotriazole at 4.5 kg with ammonium thiocyanate at 4.1 kg in 370 l. Phenmedipham at 1.1 kg in 340 l.

Winter wheat: Manures: P2O5 at 110 kg as superphosphate. K2O at 60 kg as muriate of potash. Weedkiller: Ioxynil at 0.63 kg with mecoprop at 1.9 kg in 280 l.

Seed: Sugar beet: Klein E, sown at 8.0 kg.

Winter wheat: Cappelle, dressed with dieldrin, sown at 190 kg.

Cultivations, etc.:-

Sugar beet: Aminotriazole with ammonium thiocyanate applied: 13 Sept, 1973. Ground chalk applied: 27 Sept. Subsoiled, tines 140 cm apart and 50 cm deep: 20 Oct. PK applied: 25 Oct. Ploughed: 13 Nov. Spring-tine cultivated: 30 Mar, 1974. N applied: 4 Apr. PK and Mg applied, power harrowed, seed sown: 5 Apr. Phenmedipham applied: 26 May. Singled: 29-30 May. Insecticide applied: 5 June. Boron and insecticide applied: 24 June. Lifted: 22-29 Nov.

Winter wheat: P and K applied, deep-tine cultivated, spring-tine cultivated: 18 Oct, 1973. Seed sown: 22 Oct. Weedkiller applied: 5 Apr, 1974. N applied: 10 Apr. Combine harvested: 29 Aug.

Standard errors per plot.

Sugar beet. Roots (washed), tonnes/hectare:	Whole plot: 1.19 or 4.9% (7 d.f.)
	Sub plot: 2.01 or 8.3% (56 d.f.)
Total sugar, tonnes/hectare:	Whole plot: 0.178 or 4.7% (7 d.f.)
	Sub plot: 0.317 or 8.5% (56 d.f.)
Tops, tonnes/hectare:	Whole plot: 1.78 or 7.9% (7 d.f.)
	Sub plot: 3.09 or 13.8% (56 d.f.)
Winter wheat. Grain, tonnes/hectare:	Whole plot: 0.454 or 9.4% (7 d.f.)
	Sub plot: 0.572 or 11.9% (56 d.f.)

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TABLES OF MEANS

SUGAR BEET

ROOTS (WASHED): TONNES/HECTARE

	N								
	0	40	80	120	160	200	240	280	Mean
MANURE									
FYM	12.8	21.1	27.3	29.0	30.9	29.9	31.8	28.1	26.4
Straw	11.2	19.9	23.9	27.3	26.4	29.3	25.7	28.3	24.0
Peat	7.0	20.6	23.6	27.6	26.5	27.7	26.9	27.5	23.4
Greenmanr	11.0	22.3	24.1	25.9	26.6	23.7	23.8	22.5	22.5
Fert-FYM	4.4	13.7	24.4	27.3	29.8	27.8	27.4	24.7	22.5
Fert-Str	6.5	19.1	24.0	25.3	28.2	29.3	27.1	23.0	22.8
Cloverley	10.7	25.2	25.9	25.6	27.5	29.5	27.0	29.6	25.1
Grassley	17.1	24.3	29.5	30.0	30.2	29.8	27.6	27.1	26.9
Mean	10.1	20.8	25.3	27.2	28.3	28.4	27.2	26.3	24.2

STANDARD ERRORS OF DIFFERENCES

MANURE	N	MANURE	N
1.19	0.71	2.22	
Except when comparing means			
with the same level of			
MANURE		2.01	

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SUGAR BEET									
SUGAR PERCENTAGE									
	N								
	0	40	80	120	160	200	240	280	Mean
MANURE									
FYM	16.2	16.3	16.2	15.7	15.7	15.4	14.6	14.7	15.6
Straw	15.7	16.2	16.2	15.7	15.4	15.4	15.3	14.6	15.6
Peat	16.0	16.2	16.2	16.3	15.7	15.4	15.0	15.0	15.7
Greenmanr	15.6	16.1	15.9	15.6	15.3	15.1	14.8	14.6	15.4
Fert-FYM	15.9	15.7	16.3	15.9	15.8	15.6	15.1	14.5	15.6
Fert-Str	15.4	16.1	16.0	15.9	15.5	15.0	14.8	14.7	15.4
Cloverley	16.1	15.9	16.0	16.1	15.2	15.0	14.8	14.6	15.5
Grassley	16.0	16.3	16.2	15.9	15.3	15.0	14.7	14.4	15.5
Mean	15.9	16.1	16.1	15.9	15.5	15.2	14.9	14.6	15.5

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SUGAR BEET

TOTAL SUGAR: TONNES/HECTARE

N

	0	40	80	120	160	200	240	280	Mean
MANURE									
FYM	2.08	3.44	4.43	4.57	4.85	4.62	4.66	4.12	4.10
Straw	1.76	3.24	3.87	4.30	4.07	4.51	3.92	4.13	3.72
Peat	1.12	3.32	3.82	4.48	4.17	4.25	4.05	4.13	3.67
Greenmanr	1.71	3.61	3.84	4.04	4.07	3.58	3.53	3.28	3.46
Fert-FYM	0.70	2.16	3.98	4.34	4.71	4.35	4.12	3.59	3.49
Fert-Str	1.02	3.06	3.84	4.03	4.37	4.40	4.01	3.39	3.52
Cloverley	1.72	3.99	4.13	4.13	4.19	4.43	4.00	4.33	3.87
Grassley	2.74	3.95	4.78	4.76	4.62	4.47	4.07	3.89	4.16
Mean	1.61	3.35	4.09	4.33	4.38	4.33	4.04	3.86	3.75

STANDARD ERRORS OF DIFFERENCES

MANURE	N	MANURE	N
0.178	0.112	0.346	
Except when comparing means with same level of			
MANURE		0.317	

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SUGAR BEET

TOPS: TONNES/HECTARE

	N								
	0	40	80	120	160	200	240	280	Mean
MANURE									
FYM	7.0	11.2	13.9	20.9	25.5	27.9	34.5	32.4	21.7
Straw	7.0	10.8	16.7	20.2	29.3	32.4	31.0	34.5	22.8
Peat	3.1	9.8	12.2	18.8	25.5	27.9	33.5	33.5	20.5
Greenmmr	8.4	13.3	17.8	22.3	32.1	28.9	30.3	33.1	23.3
Fert-FYM	2.4	4.5	11.5	18.1	24.4	27.2	30.3	26.5	18.1
Fert-Str	4.9	13.9	19.5	25.5	32.4	37.7	40.1	34.9	26.1
Cloverley	8.7	13.6	18.5	24.4	26.9	31.4	30.7	37.3	23.9
Grassley	10.1	10.8	18.8	26.5	26.2	31.7	30.7	30.0	23.1
Mean	6.5	11.0	16.1	22.1	27.8	30.6	32.7	32.8	22.4

STANDARD ERRORS OF DIFFERENCES

MANURE	N	MANURE
		N
1.78	1.09	3.40
Except when comparing means		
with same level of		
MANURE		3.09

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WINTER WHEAT

GRAIN: TONNES/HECTARE

N

	0	25	50	75	100	125	150	175	Mean
MANURE									
FYM	2.17	3.38	3.75	5.52	5.58	6.13	5.61	6.03	4.77
Straw	2.03	2.60	3.61	5.12	5.85	6.66	7.01	6.54	4.93
Peat	1.88	2.21	3.80	4.80	5.86	6.24	6.46	6.06	4.66
Greenmmr	1.70	3.12	3.28	4.21	5.57	5.69	5.42	6.03	4.38
Fert-FYM	1.71	2.25	3.20	4.46	5.73	4.88	4.78	4.55	3.95
Fert-Str	1.72	2.62	3.83	4.90	5.51	6.51	6.13	6.36	4.70
Cloverley	3.51	4.67	5.38	6.71	6.47	6.15	6.01	5.82	5.59
Grassley	3.64	5.12	5.47	6.41	6.51	6.21	5.52	4.90	5.47
Mean	2.29	3.25	4.04	5.27	5.89	6.06	5.87	5.79	4.81

STANDARD ERRORS OF DIFFERENCES

MANURE N MANURE
N

0.454 0.202 0.701
Except when comparing means
with same level of
MANURE 0.572

Mean D.M. % 82.4

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WINTER WHEAT

STRAW: TONNES/HECTARE

N

	0	25	50	75	100	125	150	175	Mean
MANURE									
FYM	1.58	2.45	3.47	4.00	4.34	4.09	3.57	4.01	3.44
Straw	1.03	2.22	2.83	3.87	4.68	4.72	3.97	4.22	3.44
Peat	0.93	1.92	3.20	4.20	3.68	4.32	3.85	4.17	3.28
Greenmanr	1.20	2.44	2.86	3.46	4.12	4.29	3.99	4.03	3.30
Fert-FYM	1.11	2.07	2.81	3.59	3.37	4.00	4.09	3.86	3.11
Fert-Str	0.92	1.97	3.12	3.61	4.24	3.88	3.98	3.93	3.21
Cloverley	1.91	2.87	4.08	4.42	3.88	4.22	4.18	3.83	3.67
Grassley	2.36	3.89	3.88	4.25	4.48	4.41	4.55	4.38	4.03
Mean	1.38	2.48	3.28	3.93	4.10	4.24	4.02	4.05	3.44

Mean D.M. % 84.9