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61/W/B/5 Market Garden Soil

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61/B/5.1

WOBURN MARKET GARDEN EXPERIMENT

Organic manures, N,P,K and Mg - Lansome Field 1961, the 20th year of the experiment, the 1st year with revised treatments.

Revised treatments commencing 1961:-

The following treatments are now discontinued:

No organics with none; 0.3; 0.6; 0.9 cwt N per acre.
N at 0.3 cwt per acre to plots receiving organics.

The following treatments are now superimposed on the existing design:-

To plots without organics: all combinations of:

Nitrogen: 0.9; 1.8 cwt N per acre as 'Nitro-Chalk'. (N_1 : N_2)
Phosphate and potash: 1.5 cwt P_2O_5 with 1.5 or 3.0 cwt K_2O per acre as compound fertiliser 20% P_2O_5 , 20% K_2O or 14% P_2O_5 , 28% K_2O . (P_1K_1 : P_1K_2)

There are 2 plots per series for each of the above factorial combinations and of these one has all its fertiliser applied for all crops in the seedbed; the other has half its PK (for potatoes) and half its NPK (for beet and leeks) ploughed in with the organics; the remainder of its dressing is reserved for seedbed application.

To plots receiving organics at 10 and 20 tons per acre: NPK at the lower rate shown above v no fertiliser (2 plots per series for each treatment).

In addition all plots are split for a test of 0 v 500 lb of magnesium sulphate per acre.

Area of each plot (acres):		Area harvested (acres):
Leeks (whole plot)	0.0125	0.0104
Early potatoes (sub plot)	0.0063	0.0023
Globe beet (sub plot)	0.0063	0.0011

Harvesting of globe beet: These are now harvested on 2 dates, about one month apart, 3 rows per sub-plot being harvested on each date.

Note: The results for the 1961-62 leeks will be included in the 1962 report.

Cultivations, etc.:

Leeks 1960-61. Organic manures applied (vegetable compost, at $\frac{1}{2}$ rate): July 20, 1960. Ploughed: July 21. 'Nitro-Chalk' and basal fertiliser applied, leeks planted: July 25. Second dressing of 'Nitro-Chalk' applied: Sept 9. Harvested: Feb 22-Apr 6, 1961. Variety: Musselburgh.

61/B/5.2

Early potatoes: Ploughed: Sept 21, 1960. Organic manures applied: Jan 18, 1961. PK applied, ploughed second time: Jan 20. N and second half of PK applied, potatoes machine planted: Mar 18. Earthed up: May 23. Lifted: July 20. Variety: Arran Pilot. Globe beet. Ground chalk applied at 20 cwt per acre, organic manures and NPK applied: Apr 11, 1961. Ploughed: Apr 12. Second half of NPK applied: May 2. Seed drilled at 14 lb per acre: May 8. Sprayed against flea-beetle with DDT emulsion (25% DDT) at 2 pints in 40 gallons per acre: May 20. Singled: June 16. Lifted: July 17 and Aug 9. Variety: Detroit.

Standard errors per plot.

Leeks 1960-61.	Saleable produce:	0.818 tons per acre or 14.6% (17 d.f.)
Early potatoes.	Total tubers:	
	whole plot:	0.702 tons per acre or 10.2% (15 d.f.)
	sub plot:	0.448 tons per acre or 6.5% (16 d.f.)
Globe beet.	1st harvest:	
Saleable bulbs	whole plot:	0.457 tons per acre or 10.7% (15 d.f.)
	sub plot:	0.615 tons per acre or 14.3% (16 d.f.)
	2nd harvest:	
	whole plot:	1.829 tons per acre or 15.8% (15 d.f.)
	sub plot:	0.990 tons per acre or 8.6% (16 d.f.)
	Mean of 2 harvests:	
	whole plot:	1.036 tons per acre or 13.0% (15 d.f.)
	sub plot:	0.612 tons per acre or 7.7% (16 d.f.)

61/B/5.3

Summary of Results

Organic manures	Level of manuring:	N: cwt per acre				Mean
	tons per acre	None	0.3	0.6	0.9	
<u>Leeks 1960-61. Saleable produce: tons per acre</u>						
			(±0.578)			(±0.409)
None		1.72	3.94	4.44	5.23	2.83*
Dung	10	5.70	5.06			5.38
	20	6.68	7.14			6.91
Sludge compost	10	4.92	6.55			5.74
	20	6.46	6.75			6.60
Sludge	10	6.00	6.19			6.10
	20	6.15	6.90			6.53
Vegetable compost	10	4.92	5.94			5.43
	20	5.72	5.64			5.68
Mean (±0.204)		5.82 ⁺	6.27 ⁺			5.60**

Leeks 1960-61. Percentage saleable (by number)

None		81.1	91.8	95.2	99.5	86.4*
Dung	10	99.6	99.7			99.6
	20	98.2	99.2			98.7
Sludge compost	10	99.4	100.0			99.7
	20	99.6	99.0			99.3
Sludge	10	100.0	98.9			99.5
	20	97.8	100.0			98.9
Vegetable compost	10	96.5	98.7			97.6
	20	99.4	98.6			99.0
Mean		98.8 ⁺	99.3 ⁺			97.6**

*Mean over None and 0.3 cwt N per acre only. **General mean.

⁺Excluding 'no organics'.

61/E/5.4

Organic manures	tons per acre	Mag.sulph. lb p.a.				Fertiliser			
		Mean	None	500	Diff.	None	N ₁	P ₁	K ₁ Diff.
Early potatoes: Total tubers tons per acre									
		(±0.351)	(±0.385) ⁽¹⁾	(±0.317)		(±0.496)		(±0.702)	
Dung	10	6.84	7.11	6.58	-0.53	5.48	8.21	+2.73	
	20	8.03	8.19	7.88	-0.31	6.74	9.33	+2.59	
Sludge	10	6.25	6.24	6.26	+0.02	5.20	7.30	+2.10	
compost	20	7.13	7.21	7.06	-0.15	6.18	8.09	+1.91	
Sludge	10	6.11	6.06	6.17	+0.11	5.41	6.81	+1.40	
	20	6.75	6.66	6.84	+0.18	6.23	7.27	+1.04	
Vegetable	5	6.25	6.54	5.96	-0.58	4.88	7.62	+2.74	
compost	10	7.57	7.88	7.27	-0.61	6.53	8.61	+2.08	
Mean		6.87	6.98	6.75	-0.23 (±0.112)	5.83	7.91	+2.08 (±0.248)	
NPK									
111*		6.71	6.93	6.49	-0.44				
111		5.79	6.40	5.18	-1.22				
211*		6.30	5.72	6.88	+1.16				
211*		6.04	6.35	5.72	-0.63				
112*		6.61	6.15	7.07	+0.92				
112*		6.83	6.54	7.12	+0.58				
212*		8.26	7.27	9.25	+1.98				
212*		6.47	6.74	6.20	-0.54				
Mean		6.63	6.51	6.74	+0.23				

Globe beet, Saleable bulbs: tons per acre. 1st harvest									
		(±0.229)	(±0.316)	(±0.435)		(±0.323)			(±0.457)
Dung	10	5.05	5.20	4.90	-0.30	4.58	5.53		+0.95
	20	6.12	6.23	6.00	-0.23	5.60	6.63		+1.03
Sludge	10	3.69	3.79	3.59	-0.20	2.64	4.75		+2.11
compost	20	4.26	4.04	4.47	+0.43	3.67	4.85		+1.18
Sludge	10	3.17	2.99	3.34	+0.35	2.16	4.17		+2.01
	20	2.84	2.97	2.72	-0.25	1.81	3.87		+2.06
Vegetable	5	4.12	4.15	4.10	-0.05	3.04	5.20		+2.16
compost	10	5.11	4.98	5.25	+0.27	3.95	6.28		+2.33
Mean		4.29	4.29	4.30	+0.01 (±0.154)	3.43	5.16		+1.73 (±0.162)
NPK									
111*		2.16	2.41	1.91	-0.50				
111		2.31	2.21	2.41	+0.20				
211*		3.06	3.12	3.01	-0.11				
211		3.26	2.71	3.82	+1.11				
112*		2.61	2.81	2.41	-0.40				
112		3.92	3.42	4.42	+1.00				
212*		1.81	1.81	1.81	0.00				
212		2.51	2.31	2.71	+0.40				
Mean		2.71	2.60	2.81	+0.21				

* $\frac{1}{2}$ NPK or PK ploughed in
in seedbed.

(1) For use in vertical and diagonal comparisons

61/B/5.5

Organic manures	tons per acre	Mean	Mag. sulph. lb p.a.			Fertiliser		
			None	500	Diff.	None	N ₁ P ₁ K ₁	Diff.
Globe beet, Saleable bulbs: tons per acre. 2nd harvest								
		(±0.914)	(±0.979)	(1)	(±0.700)	(±1.293)	(±1.829)	
Dung	10	12.22	11.83	12.61	+0.78	11.43	13.01	+1.58
	20	15.09	14.89	15.30	+0.41	13.15	17.04	+3.89
Sludge	10	11.01	10.86	11.17	+0.31	9.04	12.99	+3.95
compost	20	10.69	10.64	10.74	+0.10	9.14	12.24	+3.10
Sludge	10	10.70	10.50	10.90	+0.40	9.55	11.85	+2.30
	20	10.34	10.60	10.07	-0.53	7.86	12.82	+4.96
Vegetable	5	10.01	10.04	9.98	-0.06	7.57	12.44	+4.87
compost	10	12.53	12.25	12.82	+0.57	9.74	15.33	+5.59
Mean		11.57	11.45	11.70	+0.25	9.68	13.46	+3.78
NPK					(±0.248)			(±0.647)
111*		5.42	3.90	6.93	+3.03			
111*		5.80	5.73	5.88	+0.15			
211*		8.80	7.36	10.25	+2.89			
211*		9.74	9.32	10.17	+0.85			
112*		10.09	9.95	10.23	+0.28			
112*		12.08	12.14	12.01	-0.13			
212*		7.18	5.93	8.44	+2.51			
212*		10.84	10.71	10.98	+0.27			
Mean		8.75	8.13	9.36	+1.23			
Globe beet, Saleable bulbs: tons per acre. Mean of 2 harvests								
		(±0.518)	(±0.561)		(±0.432)	(±0.732)	(±1.036)	
Dung	10	8.64	8.52	8.76	+0.24	8.01	9.27	+1.26
	20	10.61	10.56	10.65	+0.09	9.38	11.84	+2.46
Sludge	10	7.36	7.33	7.38	+0.05	5.84	8.87	+3.03
compost	20	7.48	7.34	7.61	+0.27	6.41	8.55	+2.14
Sludge	10	6.93	6.74	7.12	+0.38	5.86	8.01	+2.15
	20	6.59	6.79	6.40	-0.39	4.84	8.35	+3.51
Vegetable	5	7.07	7.10	7.04	-0.06	5.31	8.83	+3.52
compost	10	8.83	8.62	9.04	+0.42	6.85	10.81	+3.96
Mean		7.94	7.87	8.00	+0.13	6.56	9.31	+2.75
NPK					(±0.153)			(±0.366)
111*		3.79	3.16	4.42	+1.26			
111*		4.06	3.97	4.14	+0.17			
211*		5.94	5.24	6.63	+1.39			
211*		6.51	6.02	7.00	+0.98			
112*		6.35	6.38	6.32	-0.06			
112*		8.00	7.78	8.22	+0.44			
212*		4.50	3.87	5.12	+1.25			
212*		6.68	6.51	6.84	+0.33			
Mean		5.73	5.37	6.09	+0.72			
(1)								

* $\frac{1}{2}$ NPK ploughed in
 $\frac{1}{2}$ in seedbed.

For use in vertical and diagonal comparisons.

* $\frac{1}{2}$ NPK ploughed in
in seedbed.

61/B/5.6

Organic manures	tons per acre	Mean	Mag. sulph. lb p.a.			Fertiliser			
			None	500	Diff.	None	N ₁	P ₁	K ₁ Diff.

Globe beet, Total produce: tons per acre. 1st harvest

Dung	10	10.48	10.78	10.18	-0.60	8.90	12.06	+3.16
	20	12.42	12.66	12.19	-0.47	11.58	13.27	+1.69
Sludge	10	8.15	8.42	7.89	-0.53	6.71	9.60	+2.89
compost	20	9.17	8.97	9.37	+0.40	7.76	10.58	+2.82
Sludge	10	7.55	7.31	7.79	+0.48	6.38	8.72	+2.34
	20	7.12	7.19	7.06	-0.13	4.98	9.27	+4.29
Vegetable	5	8.57	8.57	8.57	0.00	6.63	10.50	+3.87
compost	10	10.55	10.33	10.78	+0.45	8.74	12.36	+3.62
Mean		9.25	9.28	9.23	-0.05	7.71	10.79	+3.08

NPK

111*	4.68	5.23	4.12	-1.11
111*	5.98	5.43	6.53	+1.10
211*	7.34	7.14	7.54	+0.40
211*	7.28	6.93	7.64	+0.71
112*	5.68	5.93	5.43	-0.50
112*	7.84	7.14	8.54	+1.40
212*	4.22	4.12	4.32	+0.20
212*	5.58	5.33	5.83	+0.50
Mean	6.08	5.91	6.24	+0.33

Globe beet, Total produce: tons per acre. 2nd harvest

Dung	10	16.98	16.48	17.48	+1.00	14.92	19.03	+4.11
	20	21.40	21.47	21.34	-0.13	17.81	24.99	+7.18
Sludge	10	15.60	15.41	15.79	+0.38	12.90	18.30	+5.40
compost	20	15.50	15.42	15.59	+0.17	13.07	17.94	+4.87
Sludge	10	15.44	15.22	15.66	+0.44	14.06	16.82	+2.76
	20	15.25	15.60	14.89	-0.71	11.80	18.69	+6.89
Vegetable	5	14.25	14.40	14.11	-0.29	10.50	18.00	+7.50
compost	10	17.32	16.99	17.65	+0.66	13.25	21.39	+8.14
Mean		16.47	16.37	16.56	+0.19	13.54	19.40	+5.86

NPK

111*	8.44	6.56	10.31	+3.75
111*	8.62	8.49	8.74	+0.25
211*	12.71	10.90	14.52	+3.62
211*	13.47	12.99	13.95	+0.96
112*	15.08	15.05	15.10	+0.05
112*	17.01	17.26	16.76	-0.50
212*	11.76	9.82	13.69	+3.87
212*	15.82	15.35	16.30	+0.95
Mean	12.86	12.05	13.67	+1.62

* $\frac{1}{2}$ NPK ploughed in $\frac{1}{2}$ in seedbed.

61/B/5.7

Organic manures	tons per acre	Mean	Mag. sulph. lb		p.a. Diff.	Fertiliser		
			None	500		None	N ₁ P ₁ K ₁	Diff.
Globe beet, Total produce: tons per acre. Mean of two harvests								
Dung	10	13.73	13.63	13.83	+0.20	11.91	15.55	+3.64
	20	16.92	17.07	16.77	-0.30	14.70	19.03	+4.43
Sludge	10	11.88	11.91	11.84	-0.07	9.80	13.95	+4.15
compost	20	12.34	12.20	12.48	+0.28	10.42	14.26	+3.84
Sludge	10	11.50	11.27	11.73	+0.46	10.22	12.77	+2.55
	20	11.19	11.40	10.98	-0.42	8.39	13.98	+5.59
Vegetable	5	11.41	11.48	11.34	-0.14	8.57	14.26	+5.69
compost	10	13.94	13.66	14.22	+0.56	11.00	16.88	+5.88
Mean		12.86	12.83	12.90	+0.07	10.63	15.10	+4.47

NPK

111*	6.56	5.90	7.22	+1.32
111	7.30	6.96	7.64	+0.68
211*	10.02	9.02	11.03	+2.01
211	10.38	9.96	10.80	+0.84
112*	10.38	10.49	10.26	-0.23
112	12.42	12.20	12.65	+0.45
212*	7.98	6.97	9.00	+2.03
212	10.70	10.34	11.06	+0.72
Mean	9.47	8.98	9.96	+0.98

Globe beet, Plant number: thousands per acre. 1st harvest

Dung	10	77.7	80.3	75.2	-5.1	81.5	74.0	-7.5
	20	86.1	89.1	83.1	-6.0	95.7	76.5	-19.2
Sludge	10	80.9	86.5	75.4	-11.1	89.2	72.7	-16.5
compost	20	69.2	71.8	66.6	-5.2	59.9	78.5	+18.6
Sludge	10	73.5	71.1	75.8	+4.7	76.7	70.2	-6.5
	20	68.2	66.6	69.8	+3.2	59.6	76.7	+17.1
Vegetable	5	71.2	67.1	75.4	+8.3	76.7	65.7	-11.0
compost	10	85.2	88.0	82.4	-5.6	88.5	82.0	-6.5
Mean		76.5	77.6	75.4	-2.2	78.5	74.5	-4.0
NPK								
111		48.6	54.0	43.2	-10.8			
111*		76.0	74.7	77.4	+2.7			
211		85.5	85.5	85.5	0.0			
211*		89.2	80.1	98.2	+18.1			
112		47.2	54.0	40.5	-13.5			
112*		74.7	81.9	67.5	-14.4			
212		39.6	36.9	42.3	+5.4			
212*		41.0	36.0	45.9	+9.9			
Mean		62.7	62.9	62.6	-0.3			

* $\frac{1}{2}$ NPK ploughed in $\frac{1}{2}$ in seedbed.

61/B/5.8

Organic manures	tons per acre	Mean	Mag. sulph. lb. p.a.			Fertiliser		
			None	500	Diff.	None	N ₁ P ₁ K ₁	Diff.
<u>Globe beet, Plant number: thousands per acre. 2nd harvest</u>								
Dung	10	84.2	85.1	83.3	-1.8	91.8	76.5	-15.3
	20	87.6	89.6	85.7	-3.9	86.0	89.3	+3.3
Sludge	10	78.7	74.7	82.6	+7.9	78.1	79.2	+1.1
compost	20	67.3	66.2	68.4	+2.2	61.9	72.7	+10.8
Sludge	10	83.4	83.3	83.5	+0.2	86.9	79.9	-7.0
	20	74.7	73.6	75.8	+2.2	74.0	75.4	+1.4
Vegetable	5	80.9	77.6	84.2	+6.6	85.5	76.3	-9.2
compost	10	83.4	84.4	82.4	-2.0	83.3	83.5	+0.2
Mean		80.0	79.3	80.7	+1.4	80.9	79.1	-1.8

NPK

111*	62.6	57.6	67.5	+9.9	
111*	47.2	47.7	46.8	-0.9	
211*	69.8	69.3	70.2	+0.9	
211*	90.4	91.8	89.1	-2.7	
112*	82.4	94.5	70.2	-24.3	
112*	78.8	84.6	72.9	-11.7	
212*	58.5	53.1	63.9	+10.8	
212*	72.0	60.3	83.7	+23.4	
Mean	70.2	69.9	70.5	+0.6	

Globe beet, Plant number: thousands per acre. Mean of two harvests

Dung	10	81.0	82.7	79.3	-3.4	86.7	75.3	-11.4	
	20	86.9	89.4	84.4	-5.0	90.9	82.9	-8.0	
Sludge	10	79.8	80.6	79.0	-1.6	83.7	76.0	-7.7	
compost	20	68.3	69.0	67.5	-1.5	60.9	75.6	+14.7	
Sludge	10	78.5	77.2	79.7	+2.5	81.8	75.1	-6.7	
	20	71.5	70.1	72.8	+2.7	66.8	76.1	+9.3	
Vegetable	5	76.1	72.4	79.8	+7.4	81.1	71.0	-10.1	
compost	10	84.3	86.3	82.4	-3.9	85.9	82.8	-3.1	
Mean		78.3	78.5	78.1	-0.4	79.7	76.8	-2.9	

NPK

111*	55.6	55.8	55.4	-0.4	
111*	61.6	61.2	62.1	+0.9	
211*	77.6	77.4	77.8	+0.4	
211*	89.8	86.0	93.6	+7.6	
112*	64.8	74.2	55.4	-18.8	
112*	76.7	83.2	70.2	-13.0	
212*	49.0	45.0	53.1	+8.1	
212*	56.5	48.2	64.8	+16.6	
Mean	66.5	66.4	66.6	+0.2	

* $\frac{1}{2}$ NPK ploughed in $\frac{1}{2}$ in seedbed.