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Yields of the Field Experiments 1984

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84/W/RN/4 Market Garden - Red Beet, Carrots, Clover

Rothamsted Research

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84/W/RN/4

MARKET GARDEN

Object: The experiment compared the effects of fertilizers and organic manures applied annually in the period 1942 to 1967. Residual effects of the organic manures were studied in arable crops from 1968 to 1973. From 1974 until 1982 the site was maintained in grass without yields. A new sequence of arable cropping started in 1983 to study further the residual effects of the organic manures, particularly the availability of metals from sewage sludge - Woburn Lansome I.

Sponsor: S.P. McGrath.

The 43rd year, red beet, carrots, clover.

For previous years see 'Details' 1967 & 1973, 74-80/W/RN/4 and 83/W/RN/4.

Design: 2 series each of 4 blocks of 10 plots. On one series the plots are split, systematically, for red beet and carrots.

Whole plot dimensions: 8.15 x 5.18.

Treatments:

To Series A, red beet and carrots, all combinations of:-

1. OM RESID Residues of organic manures:
 - FYM Farmyard manure until 1967
 - SEWAGE Sewage sludge until 1962
 - SEW COM Sewage sludge, composted with straw, until 1962
 - VEG COM Vegetable compost until 1962, then farmyard manure until 1967
2. OM RATE Rates of organic manures (t per crop):
 - 25
 - 50
 - EXTRA plus one extra treatment (duplicated):
 - NONE No organic manures

To Series B, white clover, all combinations of:-

1. OM RESID Residues of organic manures:
 - FYM Farmyard manure to whole plot until 1964, to half plots until 1967. Untreated half plots received a balancing dressing in 1974
 - SEWAGE Sewage sludge until 1962
 - SEW COM Sewage sludge, composted with straw, until 1962
 - VEG COM Vegetable compost until 1962, then farmyard manure until 1965

84/W/RN/4

2. OM RATE Rates of organic manures (t per crop):

25
50

EXTRA plus one extra treatment (duplicated):

PEAT Peat at 31 t per crop to half plots 1965 to 1967.
Untreated half plots received a balancing dressing in 1974.

NOTE: On series A red beet in 1984 followed carrots in 1983 and vice versa.

Basal applications:

Series A: Red beet: Manures: (0:20:20) at 750 kg, N at 200 kg as 'Nitro-Chalk'. Insecticide: Demeton-S-methyl at 0.24 kg in 250 l.

Carrots: Manures: (0:20:20) at 750 kg, N at 70 kg as 'Nitro-Chalk'.
Insecticides: Carbofuran (as 'Yaltox' granules at 94 kg). Demeton-S-methyl at 0.24 kg in 250 l.

Series B: Clover: Manures: (0:18:36) at 380 kg. Weedkiller: Paraquat at 0.4 kg ion in 250 l.

Seed: Red beet: Detroit Crimson Globe, sown by precision drill.
Carrots: Chantenay Red-cored Supreme, sown by precision drill.
Clover: Blanca white clover, sown at 8 kg and resown at 17 kg.

Cultivations, etc.:-

Series A: Red beet: Ploughed: 15 Feb, 1984. Spring-tine cultivated with crumbler attached, PK and N applied, power harrowed twice: 16 Apr. Seed sown: 18 Apr. Seed resown: 25 May. Hand hoed: 18-19 June. Insecticide applied: 27 June. Singled: 3-6 July. Hand hoed: 6 July. Hand harvested: 20 Aug.

Carrots: Ploughed: 15 Feb, 1984. Spring-tine cultivated with crumbler attached, PK and N applied: 16 Apr. Carbofuran applied, power harrowed twice, seed sown: 18 Apr. Seed resown: 25 May. Hand hoed: 21-22 June, 6-9 July. Demeton-S-methyl applied: 27 June. Hand harvested: 21 Aug.

Series B: Clover: PK applied: 19 Sept, 1983. Ploughed: 20 Sept. Spring-tine cultivated with crumbler attached, seed sown: 11 Oct. Weedkiller applied: 17 Apr, 1984. Power harrowed: 18 Apr. Seed resown: 19 Apr. Cut: 24 July, 1 Nov.

- NOTES: (1) All crops failed at the first sowing and had to be resown.
(2) Crop samples were taken at maturity and soil samples after harvest for chemical analyses.
(3) One plot of Series B clover was contaminated with soil from adjacent plots with high metal content and it has been treated as missing, it had treatment combination VEG COM, 50. An estimated value was used in the analyses.

84/W/RN/4 RED BEET

ROOTS FRESH WEIGHT TONNES/HECTARE

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

OM RESID OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25	23.2	23.7	25.8	20.4	23.3
50	28.0	19.4	21.8	25.7	23.7
MEAN	25.6	21.5	23.8	23.1	23.5

NONE 21.9

GRAND MEAN 23.2

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

TABLE	OM RESID	OM RATE	OM RESID OM RATE
SED	2.24	1.59	3.17

SED FOR COMPARING NONE WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 2.75

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

STRATUM	DF	SE	CV%
BLOCK.WP	28	4.48	19.4

84/W/RN/4 RED BEET

TOPS FRESH WEIGHT TONNES/HECTARE

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

OM RESID OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25	12.7	11.1	11.6	11.1	11.6
50	12.5	10.2	9.2	12.4	11.1
MEAN	12.6	10.7	10.4	11.7	11.3

NONE 11.4

GRAND MEAN 11.4

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

TABLE	OM RESID	OM RATE	OM RESID OM RATE
-----	-----	-----	-----
SED	0.77	0.54	1.09

SED FOR COMPARING NONE WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 0.94

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

STRATUM	DF	SE	CV%
BLOCK.WP	28	1.54	13.6

PLOT AREA HARVESTED 0.00022

84/W/RN/4 CARROTS

ROOTS FRESH WEIGHT TONNES/HECTARE

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

OM RESID OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25	28.5	26.2	26.0	29.8	27.6
50	33.7	23.5	31.6	36.0	31.2
MEAN	31.1	24.8	28.8	32.9	29.4

NONE 34.2

GRAND MEAN 30.4

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

TABLE	OM RESID	OM RATE	OM RESID OM RATE
-----	-----	-----	-----
SED	2.47	1.75	3.50

SED FOR COMPARING NONE WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 3.03

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

STRATUM	DF	SE	CV%
BLOCK.WP	28	4.95	16.3

84/W/RN/4 CARROTS

TOPS FRESH WEIGHT TONNES/HECTARE

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

OM RESID OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25	11.6	10.6	10.8	11.6	11.2
50	12.1	8.6	11.8	12.9	11.3
MEAN	11.8	9.6	11.3	12.2	11.2

NONE 13.0

GRAND MEAN 11.6

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

TABLE	OM RESID	OM RATE	OM RESID OM RATE
SED	1.05	0.74	1.49

SED FOR COMPARING NONE WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 1.29

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

STRATUM	DF	SE	CV%
BLOCK.WP	28	2.10	18.1

PLOT AREA HARVESTED 0.00022

84/W/RN/4 WHITE CLOVER

1ST CUT (24/7/84) DRY MATTER TONNES/HECTARE

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

OM RESID OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25	0.69	0.43	0.35	0.88	0.59
50	1.19	0.21	0.38	0.71	0.62
MEAN	0.94	0.32	0.37	0.80	0.61

PEAT 0.50

GRAND MEAN 0.58

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

TABLE	OM RESID	OM RATE	OM RESID OM RATE
-----	-----	-----	-----
SED	0.113	0.080	0.160

SED FOR COMPARING PEAT WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 0.139

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

STRATUM	DF	SE	CV%
BLOCK.WP	27	0.227	38.8
1ST CUT MEAN DM%	27.4		

84/W/RN/4 WHITE CLOVER

2ND CUT (1/11/84) DRY MATTER TONNES/HECTARE

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

OM RESID OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25	1.60	1.28	1.29	1.46	1.41
50	1.52	1.36	1.42	1.56	1.47
MEAN	1.56	1.32	1.35	1.51	1.44

PEAT 1.44

GRAND MEAN 1.44

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

TABLE	OM RESID	OM RATE	OM RESID OM RATE
SED	0.063	0.045	0.089

SED FOR COMPARING PEAT WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 0.077

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

STRATUM	DF	SE	CV%
BLOCK.WP	27	0.126	8.8
2ND CUT MEAN DM%	13.0		

84/W/RN/4 WHITE CLOVER

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

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

OM RESID OM RATE	FYM	SEWAGE	SEW COM	VEG COM	MEAN
25	2.28	1.71	1.64	2.34	2.00
50	2.71	1.58	1.80	2.28	2.09
MEAN	2.50	1.65	1.72	2.31	2.04

PEAT 1.94

GRAND MEAN 2.02

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

TABLE	OM RESID	OM RATE	OM RESID OM RATE
-----	-----	-----	-----
SED	0.126	0.089	0.178

SED FOR COMPARING PEAT WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 0.155

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

STRATUM	DF	SE	CV%
BLOCK.WP	27	0.252	12.5

TOTAL OF 2 CUTS MEAN DM% 20.3

PLOT AREA HARVESTED 0.00075