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Yields of the Field Experiments 1983

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83/W/RN/4 Market Garden - Red Beet, Carrots, S. Barley

Rothamsted Research

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83/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 42nd year, red beet, carrots, s. barley.

For previous years see 'Details' 1967 & 1973 and 74-80/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, s. barley, 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

83/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: In 1981 and 1982 (25:0:16) was applied to the grass in spring and after each cut except the last. Two cuts were made in each year.
Weedkillers: Mecoprop (as 'Herrifex' at 3.5 l) with MCPA (as 'Agroxone' at 1.4 l) in 250 l was applied in 1982 only.

Basal applications:

To both series: Weedkiller: Glyphosate at 2.0 kg in 250 l.
Series A: Red beet: Manures: (0:20:20) at 750 kg, N at 170 kg as 'Nitro-Chalk'. Weedkillers: Paraquat at 0.84 kg ion in 280 l, phenmedipham at 1.3 kg in 280 l. Insecticide: Demeton-s-methyl at 0.24 kg in 280 l.
Carrots: Manures: (0:20:20) at 750 kg, N at 60 kg as 'Nitro-Chalk'.
Weedkiller: Linuron at 0.47 kg in 280 l. Insecticide: Carbofuran (as 'Yaltox' granules at 34 kg).
Series B: S. barley: Manures: (0:20:20) at 380 kg, N at 120 kg as 'Nitro-Chalk'. Weedkillers: Dicamba with mecoprop and MCPA (as 'Herrisol' at 5 l) in 250 l. Fungicide: Tridemorph at 0.52 kg in 250 l.

Seed: Red beet: Detroit Crimson Globe, sown by precision drill.
Carrots: Chantenay Red-cored Supreme, sown by precision drill.
S. barley: Triumph, dressed with triadimenol and fuberidazole, sown at 160 kg.

Cultivations, etc.:-

Series A: Red beet: Glyphosate applied: 10 Aug, 1982. Ploughed: 13 Sept. Spring-tine cultivated: 11 Mar, 1983. Paraquat applied: 16 Apr. PK and N applied, spring-tine cultivated: 26 Apr. Rotary cultivated, seed sown: 30 Apr. Phenmedipham applied: 7 June. Insecticide applied: 29 June. Singled: 30 June, 1 July. Hand harvested: 9 Aug.
Carrots: Glyphosate applied: 10 Aug, 1982. Ploughed: 13 Sept. Spring-tine cultivated: 11 Mar, 1983. PK and N applied, spring-tine cultivated: 26 Apr. Rotary cultivated, seed sown: 30 Apr. Insecticide applied: 8 June. Rotary cultivated because of crop failure, seed resown: 8 June. Weedkiller applied: 16 June.
Series B: S. barley: Glyphosate applied: 10 Aug, 1982. Ploughed: 13 Sept. Spring-tine cultivated: 11 Mar, 1983. PK and N applied, spring-tine cultivated with crumbler attached, seed sown: 15 Mar. Weedkillers applied: 27 May. Fungicide applied: 16 June. Combine harvested: 9 Aug.

NOTES: (1) Despite resowing, the carrot crop failed to establish.
(2) Crop samples were taken at maturity and soil samples after harvest for chemical analyses.

83/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 | 21.7 | 15.9 | 16.6 | 20.4 | 18.6 |
| 50 | 22.1 | 14.7 | 18.1 | 23.8 | 19.6 |
| MEAN | 21.9 | 15.3 | 17.4 | 22.1 | 19.1 |

NONE 16.7 GRAND MEAN 18.7

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

| TABLE | OM RESID | OM RATE | OM RESID OM RATE |
|-------|----------|---------|---------------------|
| SED | 1.66 | 1.17 | 2.34 |

SED FOR COMPARING EXTRA NONE WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 2.03

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

| STRATUM | DF | SE | CV% |
|----------|----|------|------|
| BLOCK.WP | 28 | 3.31 | 17.8 |

TOPS FRESH WEIGHT TONNES/HECTARE

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

| OM RESID OM RATE | FYM | SEWAGE | SEW COM | VEG COM | MEAN |
|---------------------|------|--------|---------|---------|------|
| 25 | 10.6 | 9.4 | 8.8 | 10.2 | 9.7 |
| 50 | 11.5 | 7.5 | 9.9 | 11.8 | 10.2 |
| MEAN | 11.1 | 8.4 | 9.3 | 11.0 | 10.0 |

NONE 9.7 GRAND MEAN 9.9

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

| TABLE | OM RESID | OM RATE | OM RESID OM RATE |
|-------|----------|---------|---------------------|
| SED | 0.65 | 0.46 | 0.92 |

SED FOR COMPARING EXTRA NONE WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 0.79

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

| STRATUM | DF | SE | CV% |
|----------|----|------|------|
| BLOCK.WP | 28 | 1.30 | 13.1 |

PLOT AREA HARVESTED 0.00045

83/W/RN/4

SPRING BARLEY

GRAIN TONNES/HECTARE

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

| OM RESID OM RATE | FYM | SEWAGE | SEW COM | VEG COM | MEAN |
|---------------------|------|--------|---------|---------|------|
| 25 | 6.00 | 5.88 | 6.02 | 6.70 | 6.15 |
| 50 | 6.27 | 5.51 | 5.82 | 5.80 | 5.85 |
| MEAN | 6.14 | 5.70 | 5.92 | 6.25 | 6.00 |

NONE 6.54

GRAND MEAN 6.11

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

| TABLE | OM RESID | OM RATE | OM RESID OM RATE |
|-------|----------|---------|---------------------|
| SED | 0.256 | 0.181 | 0.362 |

SED FOR COMPARING EXTRA NONE WITH ANY ITEM IN OM RESID.OM RATE TABLE IS 0.313

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

| STRATUM | DF | SE | CV% |
|----------|----|-------|-----|
| BLOCK.WP | 28 | 0.511 | 8.4 |

GRAIN MEAN DM% 86.5

STRAW TONNES/HECTARE

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

| OM RESID OM RATE | FYM | SEWAGE | SEW COM | VEG COM | MEAN |
|---------------------|------|--------|---------|---------|------|
| 25 | 4.34 | 4.01 | 4.02 | 4.80 | 4.29 |
| 50 | 4.54 | 3.90 | 4.13 | 3.88 | 4.11 |
| MEAN | 4.44 | 3.95 | 4.07 | 4.34 | 4.20 |

NONE 3.92

GRAND MEAN 4.15

STRAW MEAN DM% 88.4

PLOT AREA HARVESTED 0.00249