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77/W/CS/181 Green Manure - Barley, Potatoes

Rothamsted Research

Rothamsted Research (1978) *77/W/CS/181 Green Manure - Barley, Potatoes* ; Yields Of The Field Experiments 1977, pp 229 - 232 - DOI: <https://doi.org/10.23637/ERADOC-1-29>

77/W/CS/181

GREEN MANURE

Object: To study the effects of a green manure sown at different dates and interactions with fertiliser nitrogen on the following crop - Woburn Great Hill III, Lansome III.

Sponsors: G.V. Dyke, G.E.G. Mattingly.

The second year, barley, potatoes.

For previous year see 76/W/CS/181.

Design: 4 series, each a single replicate of 24 plots.

Whole plot dimensions: 4.26 x 6.10.

Treatments:

Series I (barley), Series II (potatoes): All combinations of:-

1. TREFOIL(76) Trefoil to barley in 1976:
- | | |
|----------|--|
| NONE | None |
| MAY | Undersown in May |
| MAY/AUG | Undersown in May, sown into stubble after harvest in August |
| JULY/AUG | Oversown in July before harvest, sown into stubble after harvest in August |

2. N 77 Amounts of nitrogen fertiliser in 1977 (kg N):

Barley	Potatoes	Barley	Potatoes
0	0	0	0
50	100	50 to seedbed	100 to seedbed
100	200	100 to seedbed	200 to seedbed
150	300	150 to seedbed	300 to seedbed
50+50	100+100	50 to seedbed + 50 in May	100 to seedbed + 100 in June
100+50	200+100	100 to seedbed + 50 in May	200 to seedbed + 100 in June

Series III (barley): All combinations of:-

1. TREFOIL(76) Trefoil to barley in 1976:
- | | |
|------|--|
| NONE | None (duplicated) |
| AUG | Sown into stubble after harvest in August (duplicated) |

2. N 77 Amounts of nitrogen fertiliser in 1977 (kg N):

0	0
50	50 to seedbed
100	100 to seedbed
150	150 to seedbed
50+50	50 to seedbed + 50 in May
100+50	100 to seedbed + 50 in May

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Series IV (barley): All combinations of:-

1. TREFOIL(767) Trefoil to barley in 1976 and 1977:

0	None
(MAY)APR	Undersown May 1976, April 1977
(J/AU)A	Oversown in July 1976, sown into stubble in August 1976, oversown in August 1977
(AU)AU	Sown into stubble in August 1976 and 1977

2. N 77 Amounts of nitrogen fertiliser (kg N):

	1977	1976
0	0	(0)
50	50 to seedbed	(30)
100	100 to seedbed	(60)
150	150 to seedbed	(90)
50+50	50 to seedbed + 50 in May	(120)
100+50	100 to seedbed + 50 in May	(150)

NOTE: N to Series IV in 1976 was all applied to the seedbed.

Standard applications:

Barley, Great Hill III, Series I & III: Manures: (0:20:20) at 300 kg combine drilled. Weedkiller: Ioxynil at 0.53 kg plus mecoprop at 1.6 kg in 220 l.
 Lansome III, Series IV: Manures: (0:20:20) at 300 kg combine drilled.
 Potatoes, Great Hill III, Series II: Manures: (0:14:28) at 1260 kg. Weedkiller: Linuron at 1.3 kg plus paraquat at 0.28 kg ion in 420 l. Fungicide: Mancozeb at 1.3 kg on four occasions, the last three with insecticide in 420 l, 390 l and twice in 370 l successively. Insecticide: Pirimicarb at 0.14 kg on three occasions with fungicide.

Seed: Julia, dressed with ethirimol, sown at 160 kg.
 Potatoes: Maris Piper.
 English trefoil 3498, inoculated with Rhizobium, sown at 27 kg.

Cultivations, etc.:-

Barley, Great Hill III, Series I & III: Ploughed: 28 Feb, 1977. Spring-tine cultivated: 8 Mar. Power harrowed: 9 Mar. Seed sown: 10 Mar. Spring N applied: 11 Mar. Weedkiller applied: 11 May. Late N applied: 23 May. Combine harvested: 30 Aug.
 Barley, Lansome III, Series IV: Ploughed: 28 Feb, 1977. Spring-tine cultivated: 8 Mar. Seed sown: 10 Mar. Spring N applied, trefoil undersown and raked in: 18 Mar. Late N applied: 23 May. Trefoil oversown: 5 Aug. Combine harvested: 15 Aug.
 Potatoes, Great Hill III, Series II: Ploughed: 28 Feb, 1977. Spring-tine cultivated: 8 Mar. PK applied: 6 Apr. Spring N applied, rotary cultivated, potatoes planted: 14 Apr. Grubbed and earthed up: 25 May. Weedkiller applied: 26 May. Late N applied: 20 June. Fungicide applied: 24 June. Fungicide with insecticide applied: 8 July, 21 July, 11 Aug. Haulm mechanically destroyed: 20 Sept. Lifted: 4 Oct.

NOTE: Samples of trefoil and weeds were dug just before ploughing for the determination of dry matter and N.

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BARLEY SERIES I

GRAIN TONNES/HECTARE

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

N 77	0	50	100	150	50+50	100+50	MEAN
TREFOIL(76)							
NONE	1.41	3.06	3.14	3.07	3.28	3.28	2.87
MAY	0.89	3.34	3.35	4.43	3.34	3.60	3.16
MAY/AUG	1.47	2.04	2.77	3.74	2.26	3.87	2.69
JULY/AUG	0.38	3.23	2.96	3.58	3.02	3.28	2.74
MEAN	1.04	2.92	3.05	3.71	2.97	3.51	2.87

GRAIN MEAN DM% 83.2

STRAW TONNES/HECTARE

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

N 77	0	50	100	150	50+50	100+50	MEAN
TREFOIL(76)							
NONE	0.60	1.66	1.90	1.80	1.33	1.70	1.50
MAY	0.56	1.54	1.82	2.21	1.37	1.59	1.51
MAY/AUG	0.53	1.01	1.53	2.13	1.18	1.78	1.36
JULY/AUG	0.27	1.24	1.50	2.08	1.53	1.81	1.41
MEAN	0.49	1.36	1.69	2.05	1.35	1.72	1.44

STRAW MEAN DM% 66.6

PLOT AREA HARVESTED 0.00173

BARLEY SERIES III

GRAIN TONNES/HECTARE

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

N 77	0	50	100	150	50+50	100+50	MEAN
TREFOIL(76)							
NONE	0.50	2.04	4.25	3.20	3.14	3.22	2.72
AUG	0.59	2.57	2.96	4.43	3.08	4.44	3.01
MEAN	0.55	2.30	3.60	3.81	3.11	3.83	2.87

GRAIN MEAN DM% 75.2

STRAW TONNES/HECTARE

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

N 77	0	50	100	150	50+50	100+50	MEAN
TREFOIL(76)							
NONE	0.48	1.24	2.26	1.65	1.18	1.47	1.38
AUG	0.27	1.21	1.33	2.38	1.47	2.09	1.46
MEAN	0.38	1.23	1.80	2.02	1.32	1.78	1.42

STRAW MEAN DM% 62.5

PLOT AREA HARVESTED 0.00173

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BARLEY SERIES IV

GRAIN TONNES/HECTARE

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

N 77	0	50	100	150	50+50	100+50	MEAN
TREFOIL(767)							
NONE	0.96	3.47	3.86	4.63	3.64	3.86	3.40
(MAY)APR	0.71	3.22	5.13	3.79	3.97	4.97	3.63
(J/AU)A	1.39	3.61	4.33	4.36	4.34	4.05	3.68
(AU)AU	1.09	4.25	4.04	4.31	3.61	4.53	3.64
MEAN	1.04	3.64	4.34	4.27	3.89	4.35	3.59

GRAIN MEAN DM% 79.7

STRAW TONNES/HECTARE

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

N 77	0	50	100	150	50+50	100+50	MEAN
TREFOIL(767)							
NONE	0.38	1.90	2.40	2.39	2.32	2.52	1.98
(MAY)APR	0.68	1.59	2.67	2.26	2.30	2.55	2.01
(J/AU)A	0.53	1.26	2.28	2.30	2.26	2.48	1.85
(AU)AU	0.50	2.24	2.02	2.63	2.50	2.86	2.13
MEAN	0.52	1.75	2.34	2.40	2.35	2.60	1.99

STRAW MEAN DM% 74.4 PLOT AREA HARVESTED 0.00173

POTATOES SERIES II

TOTAL TUBERS TONNES/HECTARE

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

N 77	0	100	200	300	100+100	200+100	MEAN
TREFOIL(76)							
NONE	19.4	37.7	31.6	36.9	28.6	28.9	30.5
MAY	22.0	39.8	30.1	34.8	32.7	36.7	32.7
MAY/AUG	19.7	28.4	37.3	33.9	36.1	35.0	31.7
JULY/AUG	15.3	30.9	35.2	33.9	32.4	32.4	30.0
MEAN	19.1	34.2	33.6	34.9	32.5	33.3	31.2

PERCENTAGE WARE 3.81CM (1.5 INCH) MIDDLE

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

N 77	0	100	200	300	100+100	200+100	MEAN
TREFOIL(76)							
NONE	83.8	93.1	92.1	92.2	93.2	89.6	90.7
MAY	85.1	93.7	94.3	94.0	91.2	91.5	91.6
MAY/AUG	84.8	88.9	96.1	94.6	92.8	91.0	91.4
JULY/AUG	83.8	91.9	94.1	93.1	91.9	94.4	91.5
MEAN	84.4	91.9	94.2	93.5	92.3	91.6	91.3

PLOT AREA HARVESTED 0.00087