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Yields of the Field Experiments 1980

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80/W/RN/6 Arable Reference Plots

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80/W/RN/6

ARABLE REFERENCE PLOTS

Object: To study the long term effects of FYM and N, P and K fertilisers on the yield and mineral content of crops - Woburn Stackyard C.

Sponsor: F.V. Widdowson.

The 21st year, w. barley, w. oats, permanent grass.

For previous years see 60/B/3(t), 61-65/B/2, 66/B/2(t), 67/B/2(t), 68/B/3(t), 69/W/RN/6, 70/W/RN/6(t) and 71-79/W/RN/6.

Design: Blocks of 12 plots for each crop. Barley and oats one third replicate of 3 x 12 x 3 in 3 blocks of 12 plots. Permanent grass 1 block of 12 plots.

Whole plot dimensions: 2.74 x 2.13.

Treatments: All combinations of:-

Blocks

- | | |
|----------|--|
| 1. CROP | Crops in 1980 and previous crops: |
| BW(OW) | W. barley after w. oats in 1979 (arable since 1960) |
| BW(BS) | W. barley after s. barley in 1979 (arable since 1960) |
| BW(BS G) | W. barley after s. barley in 1979 (grass 1960-73, arable thereafter) |
| OW(P) | W. oats after potatoes in 1979 |
| OW(SB) | W. oats after sugar beet in 1979 |
| OW(L) | W. oats after one-year ley in 1979 |

Plots

- | | |
|---------------|---|
| 2. MANURE(79) | Fertilisers and farmyard manure (until 1979, none in 1980): |
| O | |
| N1 | |
| P | |
| N1P | |
| K | |
| NIK | |
| PK | |
| N1PK | |
| N2PK | |
| D | |
| N1PKD | |
| N2PKD | |

N1,2 (kg N): 31.5, 63 (ley): 63, 126 (s. barley and oats): 126, 252 (sugar beet and potatoes): 188, 376 (permanent grass) as ammonium nitrate.

P: P205 at 63 kg as triple superphosphate.

K: K20 at 252 kg as potassium bicarbonate.

D: Farmyard manure at 25 tonnes (permanent grass): 50 tonnes (sugar beet and potatoes): none to other crops.

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and some of the combinations of 1 & 2 with:

3. N 80	Nitrogen fertiliser (kg N):
90	25 kg N to seedbed, 30 kg N in February, 35 kg N in April
120	25 kg N to seedbed, 40 kg N in February, 55 kg N in April
150	25 kg N to seedbed, 50 kg N in February, 75 kg N in April

plus one extra block in permanent grass, sown autumn 1973 (PERMGRAS) testing MANURE as above except that treatments were also applied in 1980.

Standard applications:

W. barley and w. oats: Manures: Chalk at 3.7 t. Weedkillers: Ioxynil at 0.32 kg with mecoprop 0.94 kg in 280 l applied twice, with tridemorph on the first occasion, with benomyl on the second. Fungicides: Tridemorph at 0.53 kg. Benomyl at 0.28 kg. Carbendazim at 0.25 kg plus tridemorph at 0.53 kg in 280 l. Insecticide to w. oats only: Phorate at 2.2 kg.

Seed: W. barley: Sonja, sown at 210 kg.

W. oats: Pennal, sown at 210 kg.

Permanent Grass: S215 meadow fescue at 20 kg, S24 perennial ryegrass at 20 kg, crested dogstail at 7 kg, Chewings fescue at 7 kg, smooth stalk meadow fescue at 7 kg, alsike clover at 4 kg, wild white clover at 2 kg. Mixture sown at 67 kg.

Cultivations, etc.:-

W. barley: Rotary cultivated: 3 Sept, 1979. Seed sown, first N applied: 28 Sept. Weedkillers with tridemorph applied, chalk applied: 28 Nov. Second N applied: 18 Feb, 1980. Third N applied, weedkillers with benomyl applied: 1 Apr. Carbendazim plus tridemorph applied: 29 Apr. Harvested: 21 July.

W. oats: Balancing Mg applied and plots dug by hand after potatoes: 2 Oct, 1979. Plots dug by hand after ley: 3 Oct. Balancing Mg applied and plots dug by hand after sugar beet: 17 Oct. Phorate applied, raked in, seed sown, first N applied: 18 Oct. Weedkillers and tridemorph applied, chalk applied: 28 Nov. Second N applied: 18 Feb, 1980. Third N applied, weedkillers with benomyl applied: 1 Apr. Carbendazim plus tridemorph applied: 29 Apr. Harvested: 31 July.

Permanent Grass: P and K applied: 28 Nov, 1979. FYM applied: 11 Mar, 1980. N applied: 11 Mar, 21 May, 8 July. Cut: 21 May, 8 July, 6 Oct.

NOTE: N, P and K contents of grain were measured.

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WINTER BARLEY

GRAIN TONNES/HECTARE

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

CROP	BW(OW)	BW(BS)	BW(BS G)	MEAN
MANURE (79)				
O	5.21	3.90	4.50	4.54
N1	3.99	4.08	3.08	3.71
P	5.56	4.49	2.99	4.34
N1P	3.66	3.02	2.56	3.08
K	5.80	4.96	6.83	5.86
N1K	5.97	5.56	5.41	5.65
PK	5.71	5.46	6.63	5.93
N1PK	5.78	5.90	5.27	5.65
N2PK	5.87	5.70	5.89	5.82
D	5.84	6.91	6.58	6.44
N1PKD	6.06	5.80	6.80	6.22
N2PKD	6.35	7.08	6.37	6.60
MEAN	5.48	5.24	5.24	5.32
N 80	90	120	150	MEAN
MANURE (79)				
O	3.90	5.21	4.50	4.54
N1	3.08	4.08	3.99	3.71
P	4.49	5.56	2.99	4.34
N1P	2.56	3.02	3.66	3.08
K	4.96	5.80	6.83	5.86
N1K	5.41	5.56	5.97	5.65
PK	5.46	5.71	6.63	5.93
N1PK	5.27	5.90	5.78	5.65
N2PK	5.87	5.89	5.70	5.82
D	5.84	6.58	6.91	6.44
N1PKD	6.06	6.80	5.80	6.22
N2PKD	6.35	6.37	7.08	6.60
MEAN	4.94	5.54	5.49	5.32

GRAIN MEAN DM% 81.1

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WINTER BARLEY

STRAW TONNES/HECTARE

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

CROP MANURE (79)	BW(OW)	BW(BS)	BW(BS G)	MEAN
O	4.77	3.89	4.83	4.50
N1	4.30	3.42	2.95	3.56
P	5.48	4.26	3.43	4.39
N1P	4.30	3.38	3.07	3.59
K	5.32	4.78	6.17	5.42
N1K	5.54	4.88	4.79	5.07
PK	5.52	5.82	6.97	6.11
N1PK	6.21	5.81	5.09	5.70
N2PK	5.81	5.48	7.29	6.19
D	6.00	7.46	8.05	7.17
N1PKD	5.95	6.43	6.58	6.32
N2PKD	6.71	7.01	7.27	7.00

MEAN 5.49 5.22 5.54 5.42

N 80 MANURE (79)	90	120	150	MEAN
O	3.89	4.77	4.83	4.50
N1	2.95	3.42	4.30	3.56
P	4.26	5.48	3.43	4.39
N1P	3.07	3.38	4.30	3.59
K	4.78	5.32	6.17	5.42
N1K	4.79	4.88	5.54	5.07
PK	5.82	5.52	6.97	6.11
N1PK	5.09	5.81	6.21	5.70
N2PK	5.81	7.29	5.48	6.19
D	6.00	8.05	7.46	7.17
N1PKD	5.95	6.58	6.43	6.32
N2PKD	6.71	7.27	7.01	7.00

MEAN 4.93 5.65 5.68 5.42

STRAW MEAN DM% 57.4

PLOT AREA HARVESTED 0.00050

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WINTER OATS

GRAIN TONNES/HECTARE

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

CROP	OW(P)	OW(SB)	OW(L)	MEAN
MANURE (79)				
O	4.20	4.11	4.96	4.42
N1	3.76	4.12	4.19	4.02
P	4.72	3.77	4.03	4.18
N1P	3.73	3.80	4.20	3.91
K	5.28	4.30	5.91	5.16
N1K	6.22	5.38	4.96	5.52
PK	5.67	5.07	6.12	5.62
N1PK	6.86	6.27	6.20	6.44
N2PK	4.60	6.39	6.09	5.70
D	6.49	6.93	6.98	6.80
N1PKD	6.79	6.26	6.95	6.67
N2PKD	6.57	7.27	6.55	6.79
MEAN	5.41	5.31	5.59	5.44
N 80	90	120	150	MEAN
MANURE (79)				
O	4.11	4.20	4.96	4.42
N1	4.19	4.12	3.76	4.02
P	3.77	4.72	4.03	4.18
N1P	4.20	3.80	3.73	3.91
K	4.30	5.28	5.91	5.16
N1K	4.96	5.38	6.22	5.52
PK	5.07	5.67	6.12	5.62
N1PK	6.20	6.27	6.86	6.44
N2PK	4.60	6.09	6.39	5.70
D	6.49	6.98	6.93	6.80
N1PKD	6.79	6.95	6.26	6.67
N2PKD	6.57	6.55	7.27	6.79
MEAN	5.10	5.50	5.70	5.44

GRAIN MEAN DM% 72.3

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WINTER OATS

STRAW TONNES/HECTARE

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

CROP	OW(P)	OW(SB)	OW(L)	MEAN
MANURE (79)				
O	3.87	3.91	5.13	4.30
N1	3.89	3.88	3.81	3.86
P	4.85	3.83	4.40	4.36
N1P	3.92	4.00	3.59	3.84
K	5.51	4.69	6.56	5.59
N1K	6.29	5.59	5.12	5.67
PK	7.91	6.90	6.86	7.22
N1PK	7.86	7.24	6.81	7.30
N2PK	5.56	6.55	6.78	6.30
D	7.36	7.87	7.26	7.50
N1PKD	9.02	8.24	8.31	8.52
N2PKD	8.74	8.43	8.18	8.45

MEAN 6.23 5.93 6.07 6.08

N 80	90	120	150	MEAN
MANURE (79)				
O	3.91	3.87	5.13	4.30
N1	3.81	3.88	3.89	3.86
P	3.83	4.85	4.40	4.36
N1P	3.59	4.00	3.92	3.84
K	4.69	5.51	6.56	5.59
N1K	5.12	5.59	6.29	5.67
PK	6.90	7.91	6.86	7.22
N1PK	6.81	7.24	7.86	7.30
N2PK	5.56	6.78	6.55	6.30
D	7.36	7.26	7.87	7.50
N1PKD	9.02	8.31	8.24	8.52
N2PKD	8.74	8.18	8.43	8.45

MEAN 5.78 6.12 6.33 6.08

STRAW MEAN DM% 44.0

PLOT AREA HARVESTED 0.00050

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PERMANENT GRASS

TONNES/HECTARE

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

	PERMGRAS : DRY MATTER			
	1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE (79)				
0	1.65	1.68	1.79	5.12
N1	2.42	2.30	3.24	7.96
P	1.39	1.31	1.39	4.09
N1P	2.66	2.06	2.91	7.62
K	1.73	1.90	2.01	5.64
N1K	2.87	2.94	3.64	9.46
PK	2.05	2.10	2.17	6.33
N1PK	2.78	3.08	3.64	9.50
N2PK	3.83	3.42	4.29	11.54
D	2.93	2.26	2.93	8.13
N1PKD	3.64	3.24	4.32	11.20
N2PKD	4.33	3.89	4.90	13.11
MEAN DM%	22.4	21.2	30.6	24.7