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73/W/RN/13 - Intensive Cereals - Ley, Potatoes, Wheat, Barley

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73/W/RN/13

INTENSIVE CEREALS

Object: To study the effects of intensive cereal cropping on yield, incidence of soil-borne diseases and organic matter in the soil - Woburn Stackyard I.

Sponsors: G.W. Cooke, D.B. Slope.

The eighth year, ley, potatoes, winter wheat, barley.

For previous years see 66/B/9(t), 67/B/9, 68/B/7(t), 69/W/RN/13(t), 70/W/RN/13(t), 71/W/RN/13(t) and 72/W/RN/13.

Design: For each experiment: 2 randomised blocks of 6 plots, split into 4.

Whole plot dimensions: 8.53 x 20.4. Sub plot area harvested:
Potatoes - 0.00139. Wheat - 0.00277. Barley - 0.00273.
Ley - 0.00089.

Treatments:-

One experiment on winter wheat on part of the site of the classical wheat experiment 1877-1954 WHEATSTE

One experiment on barley on part of the site of the classical barley experiment 1877-1954 BARLYSTE

Factors tested on both experiments are the same but crop and nitrogen rates differ. All combinations of:-

Whole plots: 1. Previous crops:							PREVCROP
1966	1967	1968	1969	1970	0971	1972	
L	P	C	C	C	L	P	C/C/L/P
P	C	C	C	L	P	C	C/L/P/C
C	C	C	L	P	C	C	L/P/C/C
C	C	L	P	C	C	C	P/C/C/C
C	L	P	C	C	C	L	C/C/C/L
C	C	C	C	C	C	C	C/C/C/C

Ley = 1 year ley P = Potatoes C = Cereal: wheat or barley.

Sub plots: 2. Nitrogen fertiliser (kg N):				N	
To wheat	To barley		Wheat	Barley	
63	50		63	50	
126	100		126	100	
189	150		189	150	
252	200		252	200	

Ley and potatoes received basal N only, residues of dressings to cereals are tested (NRESID).

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Basal applications: All crops: Manures: (0:14:28) at 130 kg P2O₅, 260 kg K₂O, half ploughed in, half applied to the plough furrow. Weedkiller to all crops except potatoes: Paraquat at 0.56 kg ion in 280 l.

Ley: 'Nitro-Chalk' at 60 kg N in seedbed, 60 kg N after sowing, and 60 kg N after the first cut. Two cuts were taken.

Potatoes: 'Nitro-Chalk' at 150 kg N. Weedkiller: Linuron at 1.2 kg plus paraquat at 0.42 kg ion in 280 l. Fungicide with insecticide: Mancozeb at 1.3 kg plus demeton-s-methyl at 0.25 kg in 390 l. Fungicide: Mancozeb at 1.3 kg in 390 l on the first occasion and in 370 l on the second occasion.

Wheat: Weedkiller: Ioxynil at 0.63 kg with mecoprop at 1.9 kg in 280 l.

Barley: Weedkiller: Ioxynil at 0.53 kg with mecoprop at 1.6 kg in 280 l.

Seed: Ley: Italian ryegrass S22, sown at 40 kg.

Potatoes: Majestic.

Wheat: Cappelle, sown at 200 kg.

Barley: Julia, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.: All plots: Half PK applied: 4 Oct, 1972.

Ploughed: 10 Oct. Remaining PK applied: 17 Oct.

Ley: Paraquat applied: 6 Sept, 1972. Power harrowed, wheat site only: 18 Oct. N applied: 16 Mar, 1973. Seeds sown: 20 Mar. N applied: 18 May, 3 July. Cut twice: 2 July, 28 Aug.

Potatoes: Power harrowed, wheat site only: 18 Oct, 1972. N applied: 23 Mar, 1973. Rotary cultivated: 6 Apr. Potatoes planted: 7 Apr. Linuron with paraquat applied: 14 May. Grubbed: 1 June. Rotary ridged: 16 June. Fungicide with insecticide applied: 5 July. Fungicide applied: 26 July, 13 Aug. Haulm mechanically destroyed: 19 Sept. Sprayed with undiluted BOV at 220 l: 24 Sept. Lifted: 4 Oct.

Wheat: Paraquat applied: 6 Sept, 1972. Power harrowed: 18 Oct. Seed sown: 20 Oct. N applied: 12 Apr, 1973. Ioxynil with mecoprop applied: 26 Apr. Combine harvested: 22 Aug.

Barley: Paraquat applied: 6 Sept, 1972. Seed sown: 12 Mar, 1973. N applied: 16 Mar. Ioxynil with mecoprop applied: 11 May. Combine harvested: 13 Aug.

NOTE: Estimates of eyespot (*Cercospora herpotrichoides*) and take-all (*Gaeumannomyces graminis*) were made on both cereal crops in July.

Standard errors per sub plot.

Wheat, grain, tonnes/hectare: 0.141 or 3.8% (12 d.f.)

Barley, grain, tonnes/hectare: 0.256 or 5.6% (12 d.f.)

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TABLE OF MEANS

LEY

DRY MATTER: TONNES/HECTARE

PERMANENT WHEAT BLOCKS

NRESID

63	126	189	252	Mean
1ST CUT				
3.79	3.77	3.74	4.35	3.91
2ND CUT				
3.68	4.07	3.98	4.19	3.98
TOTAL OF 2 CUTS				
7.47	7.84	7.72	8.54	7.89
Mean D.M. %	1st Cut:	17.6		
	2nd Cut:	21.1		
	Total of 2 cuts:	19.4		

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LEY

DRY MATTER: TONNES/HECTARE

PERMANENT BARLEY PLOTS

NRESID

50	100	150	200	Mean
1ST CUT				
5.30	5.10	5.25	4.81	5.11
2ND CUT				
4.60	4.47	4.47	4.41	4.49
TOTAL OF 2 CUTS				
9.90	9.57	9.71	9.22	9.60
Mean D.M. \$	1st Cut:	16.5		
	2nd Cut:	20.4		
	Total of 2 cuts:	18.5		

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POTATOES

PERMANENT WHEAT BLOCKS

NRESID

63	126	189	252	Mean
TOTAL TUBERS: TONNES/HECTARE				
49.3	46.5	49.7	46.4	48.0
PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE				
90.9	91.7	93.2	92.2	92.0

PERMANENT BARLEY BLOCKS

NRESID

50	100	150	200	Mean
TOTAL TUBERS: TONNES/HECTARE				
47.1	47.8	51.4	47.6	48.5
PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE				
92.2	92.1	91.7	91.5	91.9

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WINTER WHEAT

	N				Mean
	63	126	189	252	
PREVCROP	GRAIN: TONNES/HECTARE				
C/C/L/P	4.48	5.13	4.54	4.11	4.57
C/L/P/C	3.12	4.36	4.01	4.05	3.88
L/P/C/C	2.32	3.67	3.38	3.21	3.15
C/C/C/C	2.90	3.37	3.41	3.15	3.21
Mean	3.21	4.13	3.84	3.63	3.70

STANDARD ERRORS OF DIFFERENCES

N	PREVCROP* N
0.071	0.141

* Within the same level of PREVCROP only

PREVCROP	STRAW: TONNES/HECTARE				
C/C/L/P	4.50	5.04	5.05	4.83	4.85
C/L/P/C	3.47	4.85	3.21	4.62	4.04
L/P/C/C	2.72	4.09	4.45	4.53	3.95
C/C/C/C	3.57	3.59	3.86	3.93	3.74
Mean	3.56	4.39	4.14	4.48	4.14

Mean D.M. % Grain 84.4
Straw 91.2

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BARLEY

N

	50	100	150	200	Mean
PREVCROP	GRAIN: TONNES/HECTARE				
C/C/L/P	4.83	4.98	4.98	4.57	4.84
C/L/P/C	3.86	5.03	4.60	4.73	4.56
L/P/C/C	3.89	4.91	4.52	4.56	4.47
C/C/C/C	3.62	4.77	4.69	4.66	4.44
Mean	4.05	4.92	4.70	4.63	4.58

STANDARD ERRORS OF DIFFERENCES

N	PREVCROP* N
0.128	0.253

* Within the same level of PREVCROP only

PREVCROP	STRAW: TONNES/HECTARE				
C/C/L/P	3.23	4.02	4.09	4.32	3.92
C/L/P/C	2.12	3.97	3.74	4.49	3.58
L/P/C/C	2.10	4.13	3.58	4.03	3.46
C/C/C/C	2.07	3.35	3.58	3.86	3.21
Mean	2.38	3.87	3.75	4.18	3.54

Mean D.M. % Grain 84.4
Straw 90.3