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72/R/RN/8 Cultivation/WEEDKILLER - Beans, Wheat, Potatoes, Barley

Rothamsted Research

Rothamsted Research (1973) *72/R/RN/8 Cultivation/WEEDKILLER - Beans, Wheat, Potatoes, Barley* ;
Yields Of The Field Experiments 1972, pp 92 - 98 - DOI: <https://doi.org/10.23637/ERADOC-1-62>

72/R/RN/8

CULTIVATION/WEEDKILLER

Object: To determine the long-term effects of weedkillers and different methods of primary cultivation on a rotation of crops - Great Harpenden I.

Sponsors: J.R. Moffatt, G.V. Dyke, J.A. Currie.

The 12th year, beans, wheat, potatoes, barley.

For previous years see 'Details' 1967, 68/B/6(t), 69/R/RN/8(t), 70/R/RN/8 and 71/R/RN/8(t).

Whole plot dimensions: 12.8 x 15.2. Area harvested: Beans: 0.00488, winter wheat and barley: 0.00434, potatoes: 0.00217.

Seed: Beans: Maris Bead sown at 220 kg.

Wheat: Cappelle sown at 200 kg.

Potatoes: Pentland Crown, Rothamsted once grown.

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

Cultivations, etc.:-

Spring beans: Barley straw burnt on B plots: 25 Aug, 1971. Paraquat applied at 0.56 kg ion in 220 l to G sub plots: 10 Sept. B plots deep-tine cultivated once, T plots twice: 4 Nov. R plots rotary cultivated, P and C plots ploughed: 8 Nov. P, R, T, B and C plots power-harrowed, A plots rotary cultivated: 20 Mar, 1972. All plots placement drilled: 21 Mar. Simazine applied at 1.1 kg in 220 to SX, A, B and C plots: 2 May. M plots tractor hoed: 4 May. M plots mechanically weeded: 9 May. Dinoseb acetate ('Ivosit' at 6.7 kg) applied in 440 l to SY plots: 19 May. M plots tractor hoed: 25 May, 7 June. Phorate applied at 1.1 kg: 16 June. Ends of all plots sprayed with demeton-s-methyl at 0.25 kg in 440 l: 5 Aug. Combine harvested: 26 Sept.

Wheat: Bean straw raked off B plots (insufficient to burn): 6 Sept, 1971. Paraquat applied at 0.56 kg ion in 220 l to G sub plots: 10 Sept. B plots deep-tine cultivated once, T plots twice: 8 Oct. P, A and C plots ploughed: 11 Oct. P, T, A, B and C plots spring-tine cultivated, R plots rotary cultivated, seed combine drilled: 15 Oct. All plots harrowed: 22 Mar, 1972. All plots rolled: 25 Mar. N applied: 19 Apr. H sub plots sprayed 0.63 kg ioxynil and 1.9 kg mecoprop in 220 l: 28 Apr. Combine harvested: 31 Aug.

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Potatoes: Wheat straw burnt on B plots: 7 Sept, 1971. Paraquat applied to G sub plots: 10 Sept. T plots deep-tine cultivated twice: 4 Nov. P and C plots ploughed, R plots rotary cultivated: 8 Nov. Basal NPK applied, P and T plots spring-tine cultivated: 18 Apr, 1972. P and T plots spring-tine cultivated: 19 Apr. R, A, B and C plots rotary cultivated, potatoes machine planted: 19 - 20 Apr. All ridges rolled: 2 May. M plots chain harrowed and grubbed: 9 May. S plots sprayed linuron at 0.84 kg and paraquat at 0.42 kg ion in 440 l: 17 May. M and Y plots grubbed: 14 June. M and Y plots rotary ridged: 15 June. Sprayed three times with mancozeb at 1.34 kg in 440 l: 11 July, 21 July, 10 Aug. Demeton-s-methyl at 0.25 kg was included with the second spray. Sprayed with undiluted BOV at 200 l: 20 Sept. Lifted: 7 - 9 Nov.

Barley: Spring-tine cultivated: 12 Oct, 1971. Sodium trichloroacetate applied at 20 kg in 220 l: 21 Oct. Spring-tine cultivated twice: 28 Oct, 17 Nov. Sodium trichloroacetate applied at 20 kg in 220 l: 2 Dec. Spring-tine cultivated: 10 Dec. T and C plots deep-tine cultivated twice, R plots rotary cultivated, P plots ploughed: 13 Dec. A plots rotary cultivated, P, R, T, B and C plots power-harrowed: 20 Mar, 1972. Seed combine drilled: 21 Mar. Rolled: 22 Mar. H sub-plots sprayed 0.53 kg ioxynil and 1.6 kg mecoprop in 220 l: 17 May. Combine harvested: 18 Aug.

- NOTES: (1) Docks were hand pulled in potatoes and thistles in all crops. Weed counts were taken.
- (2) Two rows of potatoes per sub-plot were lifted for yield by elevator digger (not 4 as in previous years), then the 2 adjacent rows were lifted by harvester. Yields are presented for the elevator digger only.

Standard errors per plot.

Spring beans: Grain, tonnes/hectare:	Whole plot: 0.298 or 9.3% (8 d.f.)
	Sub plot: 0.344 or 10.8% (9 d.f.)
Spring wheat: Grain, tonnes/hectare:	Whole plot: 0.362 or 5.4% (8 d.f.)
	Sub plot: 0.291 or 4.4% (8 d.f.)
Potatoes, Total tubers, tonnes/hectare:	Whole plot: 3.48 or 9.4% (8 d.f.)
	Sub plot: 2.74 or 7.4% (9 d.f.)
Barley: Grain, tonnes/hectare:	Whole plot: 0.164 or 2.4% (8 d.f.)
	Sub plot: 0.275 or 4.0% (9 d.f.)

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TABLES OF MEANS

SPRING BEANS

GRAIN: TONNES/HECTARE

CULTIVATION (C)

	P	R	T	Mean
Mean	3.47	2.99	3.12	3.19
WEEDKILLER (W)				
M	3.64	2.97	3.37	3.33
SX	3.10	2.95	2.64	2.90
SY	3.68	3.05	3.34	3.35
PARAQUAT SPRAY (P)				
O	3.52	2.89	3.01	3.14
G	3.42	3.09	3.22	3.24

STANDARD ERRORS OF DIFFERENCES

	C	W	P	C W	C P
Unless same level of	0.172	0.172	0.115	0.298	0.222
C					0.199

A	AG	BG	C	CG
2.95	2.93	2.94	3.17	3.41

Grand mean: 3.16
Mean D.M. %: 83.2

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WINTER WHEAT

GRAIN: TONNES/HECTARE

CULTIVATION (C)

	P	R	T	Mean
Mean	7.07	6.56	6.40	6.68
WEEDKILLER 1971 (W)				
M	6.98	6.50	6.58	6.68
SX	7.07	7.06	6.53	6.88
SY	7.17	6.11	6.09	6.46
PARAQUAT SPRAY 1972 (P)				
O	6.94	6.38	6.18	6.50
G	7.21	6.73	6.62	6.85
HORMONE SPRAY 1972 (H)				
O	6.49	6.65	6.41	6.52
H	6.88	7.12	6.51	6.83

STANDARD ERRORS OF DIFFERENCES

	C	W	P	H	C W	C P	C H
Unless same level of C	0.209	0.209	0.097	0.097	0.362	0.241	0.241
						0.168	0.168

A	AG	AH	AGH	BGH	CH	CGH
7.35	6.93	6.56	7.57	7.12	7.52	6.67

Grand mean: 6.78
Mean D.M. %: 84.5

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POTATOES

TOTAL TUBERS: TONNES/HECTARE

CULTIVATION (C)

	P	R	T	Mean
Mean	39.5	34.7	37.1	37.1
WEEDKILLER (W)				
M	42.3	34.0	34.5	37.0
S	36.4	35.7	34.4	35.5
SY	39.8	34.6	42.3	38.9
PARAQUAT SPRAY (P)				
O	37.3	35.3	35.7	36.1
G	41.7	34.2	38.5	38.1

STANDARD ERRORS OF DIFFERENCES

	C	W	P	C W	C P
Unless same level of C	2.01	2.01	0.91	3.48	2.30
					1.58

A	AG	BG	C	CG
32.1	32.4	33.7	43.6	40.7

Grand mean: 36.8

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POTATOES

PERCENTAGE WARE: 3.81 CM (1.5 INCH) RIDDLE

CULTIVATION (C)

	P	R	T	Mean
Mean	95.0	96.2	95.8	95.7
WEEDKILLER (W)				
M	96.8	97.3	95.5	96.6
S	93.2	95.2	95.3	94.6
SY	95.1	96.0	96.5	95.9
PARAQUAT SPRAY (P)				
O	94.6	96.1	95.5	95.4
G	95.5	96.3	96.1	96.0

A	AG	BG	C	CG
97.3	96.2	94.0	95.6	95.1

Grand mean: 95.6

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BARLEY

GRAIN: TONNES/HECTARE

CULTIVATION (C)

	P	R	T	Mean
Mean	6.88	6.82	6.80	6.83
WEEDKILLER 1971 (W)				
M	6.87	6.95	6.85	6.89
S	6.81	6.70	6.56	6.69
SY	6.95	6.82	7.00	6.92
HORMONE SPRAY 1972 (H)				
O	6.89	6.81	6.67	6.79
H	6.87	6.84	6.93	6.88

STANDARD ERRORS OF DIFFERENCES

	C	W	H	C W	C H
Unless same level of C	0.095	0.095	0.092	0.164	0.147
					0.158
	A	AH	BH	CH	
	6.31	6.64	6.78	6.93	

Grand mean: 6.81
Mean D.M. %: 82.7