

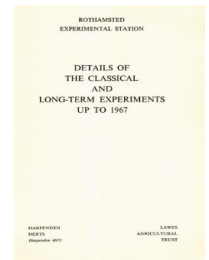
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Details of the Classical and Long-term Experiments Up to 1967

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Cultivation-weedkiller Rotation - Rothamsted and Woburn

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CULTIVATION—WEEDKILLER ROTATION EXPERIMENTS GREAT HARPENDEN I, 1961 ONWARDS, AND WOBURN, GREAT HILL, 1960–67

These experiments were designed to investigate the long-term effects of persistent weedkillers used on row crops and the feasibility of rotary cultivation or deep-tine cultivation instead of ploughing. The two experiments differed in some respects and they will be described separately below.

On each farm a start was made in 1960 with post-planting treatments only. At Rothamsted the site chosen (in Great Knott II) proved unsatisfactory and the experiment was started in its new form in Great Harpenden I in 1961. At Woburn the site was acceptable and the 1960 treatments are included in the summary below.

The Rothamsted Experiment, 1961 onwards

Crop rotation. Beans, wheat, potatoes, barley. Beans and wheat are sown in autumn if possible, otherwise in spring.

Design. Each phase of the rotation occupies a series comprising two blocks of 12 whole plots each split into two.

Treatments

Whole plots. All combinations of:

- (i) Primary cultivation for each crop by: mouldboard plough (P), rotary cultivator (R), deep-tine cultivator (T).
- (ii) Post-planting weed-control in beans and potatoes: mechanical (no weedkiller) (M); persistent weedkiller with little or no cultivation (SX); persistent weedkiller (SY), differing from SX in material, time of application or subsequent cultivation (details for each year given below).

Subplots

- (iii) Weed control in wheat and barley: no spray (O), post-emergence herbicide (H).

Notes

- (1) All treatments are cumulative.
- (2) In addition to the treatments listed three plots per block were designated 'reserve plots' and were managed similarly to treatment PM until required for new treatments (see below).
- (3) P plots are normally ploughed once for each crop, R plots are rotary cultivated once or twice and T plots are deep-tine cultivated two or three times in different directions. P and T plots receive surface cultivations as necessary to produce a seedbed. Depths of cultivation (approximate): P, 8 in.; R, 6 in.; T, 8 in.
- (4) Each whole plot is 50 ft long by 49 ft wide including 10½ ft discarded each side; this arrangement gives 21 ft for turning implements when working across the plots.

Weedkillers used. See Tables 41, 42 and 43 on page 92.

CULTIVATION-WEEDKILLER (ROTHAMSTED & WOBURN)

TABLE 41

Weedkillers (persistent) to beans and potatoes (rates a.i./acre)

Year	Beans		Potatoes	
	X	Y	X	Y
1961		Simazine 1 lb	Simazine 1 lb after planting	Simazine 1 lb after inter-row cultivation
1962		Simazine 1 lb		Prometryne 2½ lb
1963	Simazine 1 lb winter	Simazine ½ lb winter ½ lb spring	Prometryne 2 lb and paraquat ¾ lb	
1964		Simazine 1 lb	Prometryne 2 lb and paraquat ¾ lb	Linuron 2 lb and paraquat ¾ lb
1965	Simazine 1 lb winter	Simazine ½ lb winter ½ lb spring	Prometryne 2 lb and paraquat ¾ lb	Linuron 2 lb and paraquat ¾ lb
1966		Simazine 1 lb		Linuron 1 lb and paraquat ¾ lb
1967		Simazine 1 lb		Linuron 1 lb and paraquat ¾ lb

Notes

Beans. Drilled at 21 in. rows 1961–63 and 1966–67. In 1964 and 1965 sprayed plots were drilled at 10½ in. By error the reserve plots were also sown at 10½ in. in 1964 and were sprayed. In 1965 T plots were all sown at 21 in. because of difficulty in drilling close rows on these plots.

Potatoes. In 1961–63 the X plots were split for a test of final earthing up v. no final earthing up. M plots were split for high v. low ridges. In 1966–67 the Y plots received an additional cultivation by rotary ridger which was also applied to the M plots.

TABLE 42

Weedkillers (non-persistent) to wheat and barley (H sub-plots)

Year	Wheat	Barley
1961	Mecoprop (6 pints Compitox)	Mecoprop (6 pints Compitox)
1962	Dicamba/MCPA (4 pints Banlene)	Dicamba/MCPA (4 pints Banlene)
1963	Dicamba/MCPA (4 pints Banlene)	Dicamba/MCPA (4 pints Banlene)
1964	Mecoprop/2,4-D (7 pints Methoxone Extra)	Mecoprop/2,4-D (6 pints Methoxone Extra)
1965	Mecoprop/2,4-D (7 pints Methoxone Extra)	Mecoprop/2,4-D (6 pints Methoxone Extra)
1966	Mecoprop/2,4-D (6 pints Methoxone Extra)	Mecoprop/2,4-D (6 pints Methoxone Extra)
1967	Mecoprop/2,4-D* (6 pints Methoxone Extra)	Mecoprop/2,4-D* (6 pints Methoxone Extra)

* In 1967 basal hormone weedkiller was applied, the test of O v. H being omitted because of unusually large quantities of weeds.

TABLE 43

Basal weedkillers

In each year certain series have received basal weedkiller in autumn/winter to control couch (*Agropyron repens*)

Winter	
1961–62	Dalapon (12 lb a.e. split dressing) for wheat, beans and potatoes
1962–63	Dalapon (11 lb a.e. split dressing) for wheat
1963–64	Dalapon (11 lb a.e.) for beans and potatoes
	Sodium trichloroacetate (36 lb split dressing) for barley
1964–65	Aminotriazole (4 lb) and ammonium thiocyanate (3.7 lb) for wheat and potatoes
	Sodium trichloroacetate (36 lb split dressing) for barley
1965–66	Sodium trichloroacetate (36 lb split dressing) for barley
1966–67	Aminotriazole (4 lb) and ammonium thiocyanate (3.7 lb) for wheat
	Sodium trichloroacetate (36 lb split dressing) for barley.

CULTIVATION-WEEDKILLER (ROTHAMSTED & WOBURN)

Basal manuring

TABLE 44

Basal manuring (cwt)

Year	Beans	Wheat	Potatoes	Barley
1961	(0:14:28) 3½	(16:9:9) 3½	(10:10:18) 12	(16:9:9) 3
1962	(0:14:28) 3½	(16:9:9) 3	(10:10:18) 12	(16:9:9) 3
1963	(0:14:28) 3½	(20:10:10) 2½	(10:10:18) 12	(20:10:10) 2½
1964	(0:14:28) 3½	(6:15:15) 2½ + 'Nitro-Chalk' (0.6 N)	(10:10:18) 12	(20:10:10) 2½
1965	(0:14:28) 3½	(6:15:15) 2½ + 'Nitro-Chalk' (0.6 N)	(10:10:18) 12	(20:10:10) 2½
1966	(0:14:28) 3½	(20:10:10) 2½	(10:10:18) 12	(20:10:10) 2½
1967	(0:14:28) 3½	(25:10:10) 3	(13:13:20) 10	(25:10:10) 3

Varieties

Year	Beans	Wheat	Potatoes	Barley
1961	Tick	Jufy I	Majestic	Proctor
1962	Tick 30B	Jufy I	Majestic	Proctor
1963	Pedigree*	Jufy I	Majestic	Proctor
1964	Tick	Cappelle*	Majestic	Maris Badger
1965	Pedigree*	Cappelle*	Majestic	Maris Badger
1966	Pedigree Tick	Kloka	Pentland Dell	Maris Badger
1967	Tarvin†	Kloka	Pentland Dell	Maris Badger

* Autumn sown.

† Formerly called Pedigree Tick.

Reserve plots. The first set of 'reserve plots' (A) were allocated to a new treatment in 1964: for spring-sown crops: no cultivation in autumn or winter, rotary cultivated before sowing; for autumn-sown crops: as treatment P. These plots are sprayed as X.

The second set of 'reserve plots' (B) were allocated to a new treatment in 1966—all crops grown on these plots receive the minimum cultivations necessary to produce a seedbed. Details vary according to condition of the soil, etc. Paraquat may be used at any stage in the rotation. These plots are sprayed as X.

The Woburn Experiment, 1960–67

In 1960 there were no primary cultivation treatments and the experiment tested simazine at different rates and times to potatoes and hormone spray to barley.

In 1961 the experiment was redesigned to include primary cultivations (P, R, T) spray treatments (SX and SY) and mechanical control (M) as at Rothamsted. The site was considered too weedy for the 0 v. hormone spray for barley and basal sprays were applied. From 1965 a nitrogen test to the barley was included.

Because of a shortage of land a two-course rotation was adopted (two blocks of nine plots for each crop): potatoes and barley 1960–63, sugar beet and barley 1964–65, potatoes and barley 1966–67.

CULTIVATION-WEEDKILLER (ROTHAMSTED & WOBURN)

Weedkillers used

Year	X	Potatoes Y	Barley
1960		Simazine 1 v. 2 lb*	MCPA/TBA (4 pints 18/15)
1961	Simazine 1 lb after planting	Simazine 1 lb after early cultivation	MCPA/TBA (4 pints 18/15)
1962	Prometryne 2½ lb after planting	Prometryne 2½ lb after early cultivation	Dicamba/MCPA (4 pints Banlene)
1963	Prometryne 2 lb and paraquat ¾ lb after planting		Mecoprop/2,4-D (6 pints Methoxone Extra)
1964	None (sugar beet)		Mecoprop/2,4-D (6 pints Methoxone Extra)
1965	None (sugar beet)		Mecoprop/2,4-D (6 pints Methoxone Extra)
1966	Linuron 1 lb and paraquat ¾ lb†		Mecoprop/2,4-D (6 pints Methoxone Extra)
1967	Linuron ½ lb and paraquat ¾ lb Dalapon 9 lb (autumn 1966, basal application)		Ioxynil/mecoprop (5 pints Actril C)

* Also tested 2 lb before and after grubbing and earthing up.

† Y plots received an additional cultivation by rotary ridger which was also applied to M plots.

Basal manuring

Year	Potatoes cwt	Barley cwt
1960	(10:10:18) 12 FYM 14 tons	(16:9:9) 4
1961	(17:11:22) 10	(16:9:9) 4
1962	(17:11:22) 10	(16:9:9) 3½
1963	(17:11:22) 10	(16:9:9) 3½
1964	Agricultural salt 5 (20:10:10) 6 (sugar beet)	(16:9:9) 3½
1965	Agricultural salt 5 (20:10:10) 6 (sugar beet)	(20:10:10) 3*
1966	(17:11:22) 10	(20:10:10) 3*
1967	(17:11:22) 10	(20:10:10) 3*

* 1965-67 test of 0 v. 0.25 v. 0.5 cwt N as 'Nitro-Chalk 21' in addition.

Varieties

Year	Potatoes	Barley
1960	Ulster Supreme	Proctor
1961-63	Majestic	Proctor
1964-65	Klein E (sugar beet)	Maris Badger
1966-67	Maris Piper	Maris Badger

Reference

For an account of both experiments 1960-65 see *Rep. Rothamsted exp. Stn for 1965*, 221-32.