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Details of the Classical and Long-term Experiments 1968-73

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R/CS/6 Wheat After Intensive Barley - Wheat, Barley, Beans

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INTENSIVE BARLEY FOLLOWED BY WHEAT AFTER INTENSIVE BARLEY

ROTHAMSTED LITTLE KNOTT I

(R/C5/6)

This experiment, started in 1961, was designed to provide a comparison each year between barley immediately following a two-year break from cereals and barley 2, 3 . . . years after the break. Barley in a four-course rotation (one phase only), continuous barley, continuous winter wheat and continuous spring wheat were also included.

From 1969 winter wheat was the only cereal grown and the experiment was used to study the effects of different sequences of pre-cropping with barley on yields and incidence of take-all (*Gaeumannomyces graminis*) in wheat; break-crops (fallow and beans) were introduced in certain sequences.

Since 1973 only one quarter of the experiment has been continued, primarily for studies on the phenomenon of take-all decline.

Design

Two replicates of 40 treatments in four blocks of 20 (with certain interactions confounded). Later the experiment was analysed as two blocks of 40.

In 1971 each strip of 40 plots was divided across the plots for a test of lime.

In 1973 only two replicates of 10 plots were retained.

Treatments

(1) Crop sequences

Treatment	1961	62	63	64	65	66	67	68	69	70	71	72	73
1	0	BE	B	B	B	B	B	B	WW	F	WW	WW	WW
2	WS	0	BE	B	B	B	B	B	WW	WW	WW	F	WW
3	0	WS	0	BE	B	B	B	B	WW	WW	WW	F	BE
4	BE	0	WS	0	BE	B	B	B	WW	WW	WW	WW	F
5	WS	BE	0	WS	0	BE	B	B	WW	WW	WW	WW	WW
6	WS	WS	BE	0	WS	0	BE	B	WW	WW	WW	WW	WW
7	B	B	B	B	B	B	B	B	WW	WW	WW	WW	WW
8	WS	WS	WS	WS	WS	WS	WS	WS	WW	WW	WW	WW	WW
9	WS	WW	WW	WW	WW	WW	WW	F	WW	WW	WW	WW	WW
10	BE	WW	P	B	BE	WW	P	B	F	WW	WW	WW	WW

0 = Oats, BE = Spring beans, B = Barley, WW = Winter wheat, WS = Spring wheat, F = Fallow

(2) Nitrogen (kg N as 'Nitro-Chalk')

1961-68	1969 & 70
None (N0)	75 (N3) to former N0 plots
38 (N1)	126 (N5) to former N1 plots
76 (N2)	176 (N7) to former N2 plots
114 (N3)	226 (N9) to former N3 plots

Applied to continuous cereals and to winter wheat and barley in treatment sequence 10.

Nitrogen treatments were discontinued in 1971.

- (3) *Lime*
 1971 Each strip of 40 plots was split across all plots for a test of none (U) v. ground chalk at 12.6 t (L).

Standard applications

Cereals and beans 37.5 kg P₂O₅, 75 kg K₂O as (0-14-28) cereals combine drilled, beans placement drilled. Oats and non-continuous spring wheat: 56 kg N as 'Nitro-Chalk'.

Potatoes

1963 125 kg N, 125 kg P₂O₅, 225 kg K₂O as (10-10-18).

1967 145 kg N, 145 kg P₂O₅, 225 kg K₂O as (13-13-20).

Winter wheat

1969 140 kg P₂O₅, 280 kg K₂O as (0-14-28) ploughed in.
 40 kg P₂O₅, 40 kg K₂O as (0-20-20) combine drilled.

1970 120 kg P₂O₅, 240 kg K₂O as (0-14-28) ploughed in.

35 kg P₂O₅, 70 kg K₂O as (0-14-28) combine drilled

1971-73 35 kg P₂O₅, 70 kg K₂O as (0-14-28) combine drilled

125 kg N as 'Nitro-Chalk' top dressed.

Spring beans

1973 55 kg P₂O₅, 110 kg K₂O as (0-14-28)

Liming

1961 3.0 t ground chalk

1966 3.1 t ground chalk

1971 See treatment above

1973 10.0 t on half plots not limed in 1971 and 2.5 t overall.

Weedkillers

Oats, barley, winter and spring wheat:	1961-63	MCPA with TBA
Oats, barley, spring wheat:	1964	MCPA with dichloroprop
Winter wheat:	1964 &	
	1965	Mecoprop with 2,4-D
Oats:	1965	MCPA with dicamba
Barley:	1965	Mecoprop with 2,4-D
Barley, winter and spring wheat &	1966-68	Ioxynil with mecoprop
Oats:	1966	
All plots:	1968	Aminotriazole with ammonium thiocyanate in autumn 1967.
Winter wheat:	1969-73	Paraquat in preceding autumn
	1969	Ioxynil, bromoxynil with dichloroprop
	1970-73	Terbutryne and related triazines
	1970	Dichloroprop
	1972 &	
	1973	Dicamba, / mecoprop with MCPA

Other chemicals applied

Beans:	1961, 1963, 1966, 1967 1965 1973	Demeton-S-methyl Menazon Phorate
Potatoes:	1963 1967	Tops burnt off with B.O.V. Mancozeb

Varieties

Barley:	1961-68	Proctor
Winter wheat:	1962-67, 1969, 1973. 1970-72	Cappelle Joss Cambier
Spring wheat:	1961-68	Jufy I
Spring beans:	1961-66 1967 1973	Tick Tarvin Minor
Oats:	1961-66	Condor
Potatoes:	1963 & 1967	Majestic

Areas harvested

Yields were taken for barley, winter and spring wheat only

1961-70 & 1973		0.00563 – 0.005 (1968 S. wheat: 0.00761)
1971 & 1972	Sub-plot area harvested	0.00266 – 0.00269

Soil series Batcombe and Hook series.