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83/W/CS/99 Effects of Breaks on Take-all - S. Barley, S. Wheat

Rothamsted Research

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83/W/CS/99

EFFECTS OF BREAKS ON TAKE-ALL

Object: To study factors affecting the incidence of take-all (*Gaeumannomyces graminis*) and their effects on yields of s. cereals - Woburn, Butt Furlong.

Sponsor: D. Hornby.

The 12th year, s. barley, s. wheat.

For previous years see 72/W/CS/99(t) and 73-82/W/CS/99.

Design: 2 randomised blocks of 9 plots, 6 of which are split into 2.

Whole plot dimensions: 5.34 x 15.2.

Treatments: All combinations of:-

Whole plots

1. TREATMNT(1) Crop sequences; soil sterilant and inoculum in 1979:

	72	73	74	75	76	77	78	79	80	81	82	83
B 10(S)	F	BE	B	B	B	B	B	B(S)	B	B	B	B
B 8	B	B	F	BE	B	B	B	B	B	B	B	B
B 7(SI)	B	B	B	F	BE	B	B	B(SI)	B	B	B	B
B 6(I)	B	B	B	B	F	BE	B	B(I)	B	B	B	B
W 9	B	F	BE	B	B	B	B	B	B	W	W	W

All sequences were in s. barley 1968-71

Sub plots

2. INOCULUM Take-all inoculum:

0	None
I	Inoculated (in 1980 and 1983 to s. barley, in 1981 to s. wheat)

plus an extra combination of:

Whole plots

1. TREATMNT(2) Crop sequences (s. barley 1968-71):

	72	73	74	75	76	77	78	79	80	81	82	83
B 16	B	B	B	B	B	B	B	B	B	B	B	B

Sub plots

2. AUT CROP Crop in autumn 1982 before sowing in spring 1983:

NONE	None
BARLEY	Barley sown 26 Oct, destroyed 8 Mar.

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plus three extra plots testing crop sequences alone (all s. barley 1968-71):

EXTRA

	72	73	74	75	76	77	78	79	80	81	82	83
B 2	F	B	B	B	B	B	B	F	BE	O	B	B
B 4	B	B	B	B	B	F	BE	O	B	B	B	B
B 3	B	B	B	B	B	B	F	BE	O	B	B	B

B = S. barley, W = S. wheat, BE = S. beans, O = S. oats, F = Fallow
 S = Soil sterilant (1979), formalin.
 (I) & I = Inoculum of take-all applied on colonised autoclaved oats, in the ratio of three oats to one s. barley or s. wheat seed, broadcast at 310 kg on the surface and rotary harrowed in 1983, 1981 and 1980, combine drilled in 1979.

NOTE: Spring barley was sown in error before applying the inoculum. It was therefore applied as soon as plants emerged and then all s. barley plots were rotary cultivated and resown.

Standard applications:

- S. wheat and s. barley: Manures: (20:10:10) at 590 kg. N at 60 kg as 'Nitro-Chalk'.
- S. barley: Weedkiller: Paraquat at 0.56 kg ion in 280 l. Dicamba with mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 250 l.

Seed: S. barley: Triumph, dressed with ethirimol, sown at 160 kg.
 S. wheat: Sicco, sown at 190 kg.

Cultivations, etc.:-

- S. barley: Ploughed: 5 Oct, 1982. Early-sown plots spring-tine cultivated, seed sown: 26 Oct. Paraquat applied, NPK applied: 8 Mar, 1983. Spring-tine cultivated with crumbler attached, seed sown: 9 Mar. Inoculum treatment applied, rotary cultivated, seed resown: 7 Apr. 'Herrisol' applied: 26 May. N applied: 3 June. Combine harvested: 9 Aug.
- S. wheat: Ploughed: 5 Oct, 1982. NPK applied: 8 Mar, 1983. Spring-tine cultivated with crumbler attached, seed sown: 9 Mar. N applied: 3 June. Combine harvested: 16 Aug.

NOTE: Plant samples were taken in July for incidence of take-all.

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GRAIN TONNES/HECTARE

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

TREATMNT(1)	B10(S)	B8	B7(SI)	B6(I)	W9	MEAN
INOCULUM						
0	1.61	2.70	1.50	2.37	2.03	2.04
I	0.75	2.33	0.85	1.63	2.77	1.67
MEAN	1.18	2.51	1.18	2.00	2.40	1.85
AUT CROP	NONE	BARLEY	MEAN			
TREATMNT(2)						
B16	1.75	2.64	2.19			
EXTRA	B2	B4	B3	MEAN		
	3.30	4.04	3.07	3.47		

GRAND MEAN 2.43

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	AUT CROP	EXTRA	INOCULUM	TREATMNT(1)	INOCULUM TREATMNT(1)

SED	0.407	0.563	0.182	0.563	0.632

EXCEPT WHEN COMPARING MEANS WITHIN THE SAME LEVEL(S) OF:
TREATMNT(1) 0.407

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	8	0.563	23.2
BLOCK.WP.SP	12	0.407	16.8

MEAN DM% 85.4

PLOT AREA HARVESTED 0.00193