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

Rothamsted Research

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84/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 13th year, s. barley, s. wheat.

For previous years see 72/W/CS/99(t) and 73-83/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	81-84
B 11(S)A	F	BE	B	B	B	B	B	B(S)	B	B
B 9 A	B	B	F	BE	B	B	B	B	B	B
B 8(SI)A	B	B	B	F	BE	B	B	B(SI)	B	B
B 7(I)A	B	B	B	B	F	BE	B	B(I)	B	B
W 10	B	F	BE	B	B	B	B	B	B	W

All sequences were in s. barley 1968-71

Sub plots

2. INOC RES Residues of take-all inoculum:

0	None
I	Inoculated (in 1980 and 1983 to s. barley, in 1981 and 1982 to s. wheat)

plus an extra combination of:

Whole plots

1. TREATMNT(2) Crop sequence:

B 17	S. barley 1968-84
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Sub plots

2. AUT CROP Crop in autumn 1983 before sowing in spring 1984:

NONE	None
BARLEY	Barley sown 12 Oct, destroyed 15 Mar, resown 16 Mar.

84/W/CS/99

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

EXTRA

	72	73	74	75	76	77	78	79	80	81	82-84
B 3	F	B	B	B	B	B	B	F	BE	O	B
B 5	B	B	B	B	B	F	BE	O	B	B	B
B 4	B	B	B	B	B	B	F	BE	O	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 1980, 1981 and 1983, combine drilled in 1979.
 A = Barley sown in autumn, destroyed and resown in spring.

Standard applications:

S. Wheat and s. barley: Manures: Magnesian limestone at 7.5 t. (20:10:10) at 420 kg, none to autumn-sown barley. Weedkillers: Glyphosate at 1.4 kg in 250 l. Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 250 l.

Seeds: S. barley: Triumph, dressed with ethirimol, sown at 170 kg in autumn and 160 kg in spring.
 S. Wheat: Sicco, sown at 190 kg.

Cultivations, etc.:-

S. barley: Glyphosate applied: 7 Sept, 1983. Magnesian limestone applied: 30 Sept. Ploughed: 10 Oct. Autumn-sown plots spring-tine cultivated with crumbler attached, seed sown: 12 Oct. NPK applied: 14 Mar, 1984. Spike rotary cultivated: 15 Mar. Spring-tine cultivated with crumbler attached, seed sown: 16 Mar. 'Brittox' applied: 15 May. Combine harvested: 14 Aug.

S. wheat: Glyphosate applied: 7 Sept, 1983. Magnesian limestone applied: 30 Sept. Ploughed: 10 Oct. NPK applied, spike rotary cultivated: 14 Mar, 1984. Spring-tine cultivated with crumbler attached, seed sown: 16 Mar. 'Brittox' applied: 15 May. Combine harvested: 28 Aug.

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

GRAIN TONNES/HECTARE

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

TREATMNT(1) INOC RES	B 11(S)A	B 9 A	B 8(SI)A	B 7(I)A	W 10	MEAN
0	5.26	5.43	4.81	5.19	3.75	4.89
I	5.16	5.77	5.33	5.61	4.09	5.19
MEAN	5.21	5.60	5.07	5.40	3.92	5.04

84/W/CS/99

GRAIN TONNES/HECTARE

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

AUT CROP TREATMNT(2)	NONE	BARLEY	MEAN	
B 17	5.20	6.21	5.70	
EXTRA	B 3 5.95	B 5 6.38	B 4 6.30	MEAN 6.21

GRAND MEAN 5.50

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

TABLE	AUT CROP	EXTRA	INOC RES	TREATMNT(1)	INOC RES TREATMNT(1)
SED	0.497	0.560	0.222	0.560	0.661

EXCEPT WHEN COMPARING MEANS WITHIN THE SAME LEVEL(S) OF:
TREATMNT(1) 0.497

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

STRATUM	DF	SE	CV%
BLOCK.WP	8	0.560	10.2
BLOCK.WP.SP	12	0.497	9.0

MEAN DM% 86.7

PLOT AREA HARVESTED 0.00193