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

Rothamsted Research

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82/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. barley - Woburn, Butt Furlong.

Sponsor: D. Hornby.

The eleventh year, s. barley, s. wheat.

For previous years see 72/W/CS/99(t) and 73-81/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:

	1968-71	72	73	74	75	76	77	78	79	80	81	82
B 9(S)	B	F	BE	B	B	B	B	B	B(S)	B	B	B
B 7	B	B	B	F	BE	B	B	B	B	B	B	B
B 6(SI)	B	B	B	B	F	BE	B	B	B(SI)	B	B	B
B 5(I)	B	B	B	B	B	F	BE	B	B(I)	B	B	B
W 8	B	B	F	BE	B	B	B	B	B	B	W	W

Sub plots

2. INOCULUM Take-all inoculum:

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

plus an extra combination of:

Whole plots

1. TREATMNT(2) Crop sequences:

	1968-71	72	73	74	75	76	77	78	79	80	81	82
B 15	B	B	B	B	B	B	B	B	B	B	B	B

Sub plots

2. AUT CROP Crop in autumn 1981 before sowing in spring 1982:

NONE	None
BARLEY	Barley sown 14 Oct, destroyed 3 Apr.

82/W/CS/99

plus three extra plots testing crop sequences alone:

EXTRA

	1968-71	72	73	74	75	76	77	78	79	80	81	82
B 1	B	F	B	B	B	B	B	B	F	BE	O	B
B 3	B	B	B	B	B	B	F	BE	O	B	B	B
B 2	B	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 1981 and 1980, combine drilled in 1979.

Standard applications:-

S. barley and s. wheat: (20:10:10) at 620 kg. Weedkillers: Glyphosate at 1.5 kg in 280 l, paraquat at 0.56 kg ion in 280 l.

S. barley only: Dicamba, with mecoprop and MCPA (as 'Poly-Farmon' at 4.9 l) in 280 l.

Seed: S. barley: Triumph, dressed with ethirimol, sown at 170 kg in the autumn and 160 kg in the spring.

S. wheat: Timmo, sown at 190 kg.

Cultivations, etc.:-

S. barley and s. wheat: Glyphosate applied: 1 Oct, 1981. Ploughed: 9 Oct. Spring-tine cultivated with crumbler attached, autumn-sown spring barley seed sown: 14 Oct. NPK applied: 26 Mar, 1982. Paraquat applied: 3 Apr. Rotary cultivated, seed sown: 13 Apr. 'Poly-Farmon' applied to barley plots: 17 May. Combine harvested s. barley: 11 Aug, s. wheat: 17 Aug.

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

82/W/CS/99

GRAIN TONNES/HECTARE

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

TREATMNT INOCULUM	B 9(S)	B 7	B 6(SI)	B 5(I)	W 8	MEAN
0	5.73	6.55	5.35	5.83	3.49	5.39
I	5.81	6.68	5.79	6.23	3.71	5.65
MEAN	5.77	6.62	5.57	6.03	3.60	5.52

AUT CROP	NONE	BARLEY	MEAN
	5.65	5.26	5.45

EXTRA	B 1	B 3	B 2	MEAN
	6.40	6.48	6.67	6.52

GRAND MEAN 5.84

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

TABLE	AUT CROP	EXTRA	INOCULUM	TREATMNT	INOCULUM TREATMNT
SED	0.421	0.549	0.188	0.549	0.625

EXCEPT WHEN COMPARING MEANS WITHIN THE SAME LEVEL(S) OF:
TREATMNT 0.421

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

STRATUM	DF	SE	CV%
BLOCK.WP	8	0.549	9.4
BLOCK.WP.SP	12	0.421	7.2

MEAN DM% 87.6

PLOT AREA HARVESTED 0.00193