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79/R/CS/203 Species Mixtures and Phialophora - Wheat

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79/R/CS/203

SPECIES MIXTURES AND PHIALOPHORA

Object: To study the effects of lucerne, grass and clover, singly and in mixtures, and of soil inoculation on populations of *Phialophora radicicola* graminicola (Prg) and on take-all (*Gaeumannomyces graminis*) and yield of following wheat crops - Stubbings.

Sponsors: E. Lester, D.B. Slope, R.J. Gutteridge.

The third year, wheat; the first year of yields.

Design: 4 randomised blocks of 9 plots, split into 4.

Whole plot dimensions: 4.27 x 27.1.

Treatments: All combinations of:-

1. Whole plots

CRP INOC	Crops in 1977 and 1978 (all wheat 1979) and inoculation:-	
	1977	1978
C C	White clover	White clover
G G	Ryegrass	Ryegrass
GC GC	Ryegrass/white clover mixture	Ryegrass/white clover
LU LU	Lucerne	Lucerne
LU LU I	Lucerne	Lucerne + Prg inoculum to 1979 wheat
GLU GLU	Ryegrass/lucerne in alternate rows	Ryegrass/lucerne
W G	Spring wheat	Ryegrass, sown into spring wheat stubble
WG G	Spring wheat undersown with ryegrass	Ryegrass
WGI G	Spring wheat, inoculated Prg, undersown with ryegrass	Ryegrass

2. Sub plots

N	Nitrogen fertiliser (kg N) in 1979 only:
0	
50	
100	
150	

NOTES: (1) The inoculum used for the I treatments was an agar culture of Prg mixed with sand. It was broadcast and power harrowed into the soil before sowing.

(2) All lucerne was inoculated with 'Nodulaid'.

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Standard applications: 1977 & 1978:

Nitrogen (kg N):	1977	1978
C C and LU LU	0	0
G G	75 per cut	75 per cut
GC GC	30 per cut	30 per cut
GLU GLU	0	30 per cut
W G and WG G	75 to seedbed	75 per cut

NOTE: The first N per cut was applied to herbage crops in the seedbed in the year of sowing, in spring thereafter. Subsequent dressings were applied after each cut except the last.

PK: (0:14:28) at 690 kg to all plots for 1977. None in 1978. Weedkillers: Glyphosate at 1.8 kg in 220 l to all plots for 1977. MCPB (as 'Tropotox' at 7.0 kg in 340 l) to C, GC, and G treatments for 1977. 2,4-DB at 2.5 kg in 340 l to LU and GLU treatments for 1977. None in 1978.

Varieties and seed rates (kg) 1977:

	Grass RvP	Clover Blanca	Lucerne Vertus	S. wheat Sappo
C	-	11	-	-
G	22	-	-	-
GC	22	2.2	-	-
LU	-	-	13	-
GLU	11	-	13	-
W	-	-	-	190
WG	22	-	-	190

NOTE: GC: Grass and clover seeds were mixed. GLU: Grass and lucerne seeds were sown in alternate rows.

Varieties and seed rate 1978: Only grass was sown in 1978; W G: RvP sown at 22 kg.

Cultivations, etc. for 1977:- Glyphosate applied: 20 Sept, 1976. Ploughed: 29 Oct. Spring-tine cultivated: 5 Apr, 1977. PK applied: 6 Apr. Spring-tine cultivated, power harrowed for W and WG only: 7 Apr. Power harrowed for G, rolled G, W and WG: 8 Apr. Seed sown for G, W and WG: 9 Apr. First standard N applied: 19 May. LU, C, GC and GLU power harrowed, G and GC sown: 27 May. LU and GLU sown: 1 June. G and GC cut: 21 July. N applied to G only: 27 July. 'Tropotox' applied: 28 July. 2,4-DB applied: 4 Aug. All wheat cut green: 5 Aug. All plots cut: 8 Nov. Previous cropping: Potatoes 1975, wheat 1976.

Cultivations, etc. for 1978:- W G heavy spring-tine cultivated: 16 Sept, 1977. W G disc harrowed twice: 28 Sept. Seed sown for W G treatments: 3 Oct. N applied: 20 Mar, 1978. Grass cut, N applied (as 'Nitra-Shell 34'): 9 June. Grass cut: 24 July.

Basal applications for 1979: Manures: (0:20:20) at 250 kg, combine drilled. Weedkillers: Paraquat at 0.84 kg ion in 220 l. Mecoprop at 2.5 kg and isoproturon at 2.2 kg in 220 l.

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Seed for 1979: Flanders, sown at 200 kg.

Cultivations for 1979: Paraquat applied: 3 Aug, 1978. Heavy spring-tine cultivated: 10 Aug (twice), 25 Aug, 8 Sept, 15 Sept. Power harrowed: 10 Oct. Seed sown: 11 Oct. N applied to half of site: 12 Apr, 1979. N applied to remaining plots: 17 Apr. Isoproturon and mecoprop applied: 9 May. Combine harvested: 30 Aug.

NOTE: Estimates of take-all and Phialophora were made on crop in April and early July. Bio-assays of soils for take-all and Phialophora were made after harvest, before ploughing.

GRAIN TONNES/HECTARE

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

	N	0	50	100	150	MEAN
CRP INOC						
C C		4.46	6.46	7.88	8.28	6.77
G G		3.99	5.49	6.50	6.62	5.65
GC GC		3.64	5.82	6.76	6.86	5.77
LU LU		4.33	6.25	7.43	7.49	6.38
LU LU I		4.13	6.40	7.72	7.78	6.51
GLU GLU		3.47	5.69	6.56	7.70	5.86
W G		3.63	5.41	6.12	6.98	5.54
WG G		3.23	5.29	5.75	6.46	5.18
WGI G		3.55	5.61	6.31	6.61	5.52
MEAN		3.83	5.83	6.78	7.20	5.91

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

TABLE	CRP INOC	N	CRP INOC N
SED	0.264	0.144	0.458
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
CRP INOC			0.432

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

STRATUM	DF	SE	CV%
BLOCK.WP	24	0.374	6.3
BLOCK.WP.SP	81	0.611	10.3

GRAIN MEAN DM% 86.1

SUB PLOT AREA HARVESTED 0.00127