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Yields of the Field Experiments 1979

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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 radiculicola* 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