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Yields of the Field Experiments 1976

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76/R/CS/24 P K and Take-all - Continuous - Wheat

Rothamsted Research

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76/R/CS/24

PK AND TAKE-ALL

Object: To study the effects of different amounts of phosphate and potassium fertiliser on the yields and incidence of take-all (*Gaeumannomyces graminis*) in continuous wheat - West Barnfield II.

Sponsors: G.E.G. Mattingly, D.B. Slope.

The ninth year, continuous winter wheat (after continuous barley 1968-1973).

For previous years see 68/C/16(t), 69/R/CS/24, 70/R/CS/24(t) and 71-75/R/CS/24.

Design: 4 randomised blocks of 10 plots, split into 2.

Whole plot dimensions: 5.33 x 20.1.

Treatments: All combinations of:-

Whole plots

1. P Phosphate (kg P) as superphosphate:

| | |
|-------|--|
| 0 | None |
| 15 A | 15 annually |
| 60 A | 60 annually |
| 90 S | 90 six-yearly, last applied autumn 1973 |
| 360 S | 360 six-yearly, last applied autumn 1973 |

2. K Potassium (kg K) annually as muriate of potash:

| | |
|-----|-----|
| 30 | 30 |
| 120 | 120 |

Sub plots

3. N RESID Residues of nitrogen fertiliser, applied annually 1970-1973 (kg N):

| | |
|------|------|
| 37.5 | 37.5 |
| 75.0 | 75.0 |
| 113 | 113 |
| 150 | 150 |

Basal applications: Manures: 'Nitro-Chalk' at 500 kg. Weedkillers: Glyphosate at 1.7 kg in 220 l. Ioxynil at 0.53 with mecoprop at 1.6 kg in 220 l in spring.

Seed: Cappelle, sown at 200 kg.

Cultivations, etc.: - Glyphosate applied: 26 Sept, 1975. Ploughed: 14 Oct. Heavy spring-tine cultivated: 16 Oct. P and K applied: 3 Nov. Power harrowed and sown: 4 Nov. N applied: 5 Apr, 1976. Spring weedkiller applied: 22 Apr. Combine harvested: 30 July.

NOTE: Incidence of take-all was measured in July.

76/R/CS/24

GRAIN TONNES/HECTARE

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

| N RESID | 37.5 | 75.0 | 113 | 150 | MEAN | |
|---------|---------|------|------|------|-------|-------|
| K20 | | | | | | |
| 30 | 2.33 | 2.43 | 2.47 | 2.43 | 2.41 | |
| 120 | 3.31 | 2.94 | 3.33 | 3.02 | 3.15 | |
| MEAN | 2.82 | 2.68 | 2.90 | 2.73 | 2.78 | |
| P205 | 0 | 15 A | 60 A | 90 S | 360 S | MEAN |
| K20 | | | | | | |
| 30 | 2.17 | 2.30 | 2.60 | 2.50 | 2.50 | 2.41 |
| 120 | 2.57 | 3.19 | 3.39 | 3.24 | 3.36 | 3.15 |
| MEAN | 2.37 | 2.75 | 3.00 | 2.87 | 2.93 | 2.78 |
| P205 | 0 | 15 A | 60 A | 90 S | 360 S | MEAN |
| N RESID | | | | | | |
| 37.5 | 2.54 | 2.79 | 2.98 | 2.94 | 2.85 | 2.82 |
| 75.0 | 2.03 | 2.75 | 3.00 | 2.82 | 2.81 | 2.68 |
| 113 | 2.69 | 2.85 | 2.89 | 2.94 | 3.13 | 2.90 |
| 150 | 2.21 | 2.60 | 3.11 | 2.77 | 2.93 | 2.73 |
| MEAN | 2.37 | 2.75 | 3.00 | 2.87 | 2.93 | 2.78 |
| | P205 | 0 | 15 A | 60 A | 90 S | 360 S |
| K20 | N RESID | | | | | |
| 30 | 37.5 | 2.17 | 2.17 | 2.64 | 2.41 | 2.25 |
| | 75.0 | 2.15 | 2.33 | 2.42 | 2.66 | 2.57 |
| | 113 | 2.25 | 2.39 | 2.50 | 2.49 | 2.73 |
| | 150 | 2.11 | 2.32 | 2.82 | 2.43 | 2.46 |
| 120 | 37.5 | 2.90 | 3.41 | 3.33 | 3.46 | 3.45 |
| | 75.0 | 1.92 | 3.17 | 3.57 | 2.99 | 3.06 |
| | 113 | 3.13 | 3.30 | 3.29 | 3.39 | 3.53 |
| | 150 | 2.32 | 2.88 | 3.40 | 3.11 | 3.40 |

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

| TABLE | K20 | N RESID | P205 | K20 N RESID |
|-------|-------------|-----------------|------------------------|----------------|
| SED | 0.057 | 0.081 | 0.091 | 0.116 |
| TABLE | K20 P205 | N RESID P205 | K20 N RESID P205 | |
| SED | 0.129 | 0.182 | 0.270 | |

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

| STRATUM | DF | SE | CV% |
|----------------------|------|-------|-----|
| BLOCK.WP+BLOCK.WP.SP | 37 | 0.257 | 9.2 |
| GRAIN MEAN DM% | 88.2 | | |

76/R/CS/24

STRAW TONNES/HECTARE

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

| | | | | | | |
|---------|------|------|------|------|-------|------|
| N RESID | 37.5 | 75.0 | 113 | 150 | MEAN | |
| K20 | | | | | | |
| 30 | 2.42 | 2.32 | 2.49 | 2.45 | 2.42 | |
| 120 | 3.51 | 3.08 | 3.51 | 3.15 | 3.31 | |
| MEAN | 2.96 | 2.70 | 3.00 | 2.80 | 2.86 | |
| P205 | 0 | 15 A | 60 A | 90 S | 360 S | MEAN |
| K20 | | | | | | |
| 30 | 2.06 | 2.27 | 2.73 | 2.61 | 2.42 | 2.42 |
| 120 | 2.33 | 3.22 | 3.83 | 3.40 | 3.76 | 3.31 |
| MEAN | 2.20 | 2.74 | 3.28 | 3.01 | 3.09 | 2.86 |
| P205 | 0 | 15 A | 60 A | 90 S | 360 S | MEAN |
| N RESID | | | | | | |
| 37.5 | 2.60 | 2.78 | 3.31 | 3.15 | 2.98 | 2.96 |
| 75.0 | 1.88 | 2.76 | 3.17 | 2.79 | 2.88 | 2.70 |
| 113 | 2.39 | 2.93 | 3.11 | 3.21 | 3.34 | 3.00 |
| 150 | 1.93 | 2.50 | 3.53 | 2.87 | 3.16 | 2.80 |
| MEAN | 2.20 | 2.74 | 3.28 | 3.01 | 3.09 | 2.86 |
| P205 | 0 | 15 A | 60 A | 90 S | 360 S | |
| K20 | | | | | | |
| 30 | 37.5 | 2.21 | 2.17 | 2.88 | 2.61 | 2.22 |
| | 75.0 | 2.08 | 2.20 | 2.30 | 2.59 | 2.41 |
| | 113 | 1.99 | 2.51 | 2.59 | 2.70 | 2.64 |
| | 150 | 1.97 | 2.19 | 3.14 | 2.53 | 2.39 |
| 120 | 37.5 | 2.99 | 3.39 | 3.73 | 3.69 | 3.74 |
| | 75.0 | 1.68 | 3.32 | 4.04 | 2.99 | 3.35 |
| | 113 | 2.79 | 3.35 | 3.63 | 3.72 | 4.03 |
| | 150 | 1.88 | 2.81 | 3.92 | 3.21 | 3.92 |

STRAW MEAN DM% 93.5

SUB PLOT AREA HARVESTED 0.00270