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# Yields of the Field Experiments 1985

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## 85/R/CS/311 Effects of Shallow Straw Incorporation - W. Wheat

### Rothamsted Research

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85/R/CS/311

EFFECTS OF SHALLOW STRAW INCORPORATION

Object: To study the effects of shallow straw incorporation on straw decomposition, toxin production, pests and diseases and on the establishment, growth and yield of winter wheat - West Barnfield I.

Sponsors: R.D. Prew, D.G. Christian, B.M. Church, R.J. Gutteridge, S.H.T. Harper, J.F. Jenkyn, A.E. Johnston, B.R. Kerry, R. Moffitt, W. Powell, G.C. Scott, A.D. Todd.

The first year, w. wheat.

Design: Single replicate 3 x 2 split 2 x 2 x 2.

Whole plot dimensions: 9.0 x 51.0.

Treatments: All combinations of:-

Whole plots

- |             |  |
|-------------|--|
| 1. STRAW    | Treatments to straw of previous wheat:                               |
| BURNT       | Burnt on 21 Aug, 1984, ash disced in on 22 Aug                       |
| BALED       | Baled and removed on 15 Aug  |
| CHOPPED     | Chopped on 17 Aug  |
| 2. CULTTIME | Time of cultivation, to 10 cm depth:                                 |
| EARLY       | Heavy spring-tine cultivated twice on 24 Aug, disced twice on 27 Aug |
| LATER       | Heavy spring-tine cultivated twice and disced twice on 2 Oct         |

Sub plots

- |              |  |
|--------------|--|
| 3. AUT N     | Autumn N as 'Nitro-Chalk' (26% N) applied just before cultivation:   |
| 0            | None   |
| 50           | 50 kg N on 24 Aug (CULTTIME EARLY), 1 Oct (CULTTIME LATER)   |
| 4. FUNGCIDE  | Fungicides:  |
| 0            | None   |
| FULL         | Full programme:-<br>Prochloraz at 0.40 kg and carbendazim at 0.15 kg in 500 l on 17 Apr, 1985<br>Propiconazole at 0.25 kg in 500 l on 4 June<br>Propiconazole at 0.12 kg with carbendazim and maneb (as 'Septal' at 2.5 kg) in 200 l on 2 July |
| 5. INSECTIDE | Insecticide:   |
| 0            | None   |
| PIRIMICA     | Pirimicarb at 0.14 kg in 500 l on 8 July   |

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Basal applications: Manures: 'Nitro-Chalk' (27.5% N) at 140 kg followed by 730 kg. Weedkillers: Paraquat at 0.60 kg ion in 500 l. Isoproturon at 2.0 kg, with mecoprop at 1.6 kg, bromoxynil at 0.20 kg and ioxynil at 0.20 kg in 200 l.

Seed: Avalon, sown at 220 kg.

Cultivations, etc.:- Paraquat applied: 28 Aug, 1984. Rotary harrowed: 11 Oct. Seed sown: 12 Oct. Spring-tine cultivated: 13 Oct. First N applied: 28 Feb, 1985. Remaining weedkillers applied: 10 Apr. Second N applied: 12 Apr. Combine harvested: 30 Aug. Previous crops: Potatoes 1983, w. wheat 1984.

NOTE: Growth was measured and incidence of pests and diseases assessed at intervals during the season. Components of yield were measured.

GRAIN TONNES/HECTARE

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

| CULTTIME | EARLY | LATER | MEAN |
|----------|-------|-------|------|
| STRAW    |       |       |      |
| BURNT    | 7.95  | 8.61  | 8.28 |
| BALED    | 8.13  | 8.33  | 8.23 |
| CHOPPED  | 8.47  | 8.25  | 8.36 |
| MEAN     | 8.18  | 8.39  | 8.29 |
| AUT N    | 0     | 50    | MEAN |
| STRAW    |       |       |      |
| BURNT    | 8.19  | 8.37  | 8.28 |
| BALED    | 8.11  | 8.34  | 8.23 |
| CHOPPED  | 8.18  | 8.54  | 8.36 |
| MEAN     | 8.16  | 8.42  | 8.29 |
| AUT N    | 0     | 50    | MEAN |
| CULTTIME |       |       |      |
| EARLY    | 8.10  | 8.26  | 8.18 |
| LATER    | 8.22  | 8.57  | 8.39 |
| MEAN     | 8.16  | 8.42  | 8.29 |
| FUNGCIDE | 0     | FULL  | MEAN |
| STRAW    |       |       |      |
| BURNT    | 7.50  | 9.06  | 8.28 |
| BALED    | 7.40  | 9.05  | 8.23 |
| CHOPPED  | 7.66  | 9.06  | 8.36 |
| MEAN     | 7.52  | 9.06  | 8.29 |
| FUNGCIDE | 0     | FULL  | MEAN |
| CULTTIME |       |       |      |
| EARLY    | 7.44  | 8.93  | 8.18 |
| LATER    | 7.60  | 9.19  | 8.39 |
| MEAN     | 7.52  | 9.06  | 8.29 |

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GRAIN TONNES/HECTARE

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

| FUNGCIDE | 0    | FULL | MEAN |
|----------|------|------|------|
| AUT N    |      |      |      |
| 0        | 7.46 | 8.86 | 8.16 |
| 50       | 7.58 | 9.25 | 8.42 |
| MEAN     | 7.52 | 9.06 | 8.29 |

| INSCTCDE | 0    | PIRIMICA | MEAN |
|----------|------|----------|------|
| STRAW    |      |          |      |
| BURNT    | 8.11 | 8.45     | 8.28 |
| BALED    | 8.14 | 8.31     | 8.23 |
| CHOPPED  | 8.19 | 8.53     | 8.36 |
| MEAN     | 8.15 | 8.43     | 8.29 |

| INSCTCDE | 0    | PIRIMICA | MEAN |
|----------|------|----------|------|
| CULTTIME |      |          |      |
| EARLY    | 7.94 | 8.42     | 8.18 |
| LATER    | 8.35 | 8.43     | 8.39 |
| MEAN     | 8.15 | 8.43     | 8.29 |

| INSCTCDE | 0    | PIRIMICA | MEAN |
|----------|------|----------|------|
| AUT N    |      |          |      |
| 0        | 7.97 | 8.35     | 8.16 |
| 50       | 8.33 | 8.50     | 8.42 |
| MEAN     | 8.15 | 8.43     | 8.29 |

| INSCTCDE | 0    | PIRIMICA | MEAN |
|----------|------|----------|------|
| FUNGCIDE |      |          |      |
| 0        | 7.47 | 7.57     | 7.52 |
| FULL     | 8.83 | 9.29     | 9.06 |
| MEAN     | 8.15 | 8.43     | 8.29 |

| CULTTIME | EARLY |      | LATER |      |
|----------|-------|------|-------|------|
| AUT N    | 0     | 50   | 0     | 50   |
| STRAW    |       |      |       |      |
| BURNT    | 7.90  | 8.01 | 8.48  | 8.73 |
| BALED    | 8.04  | 8.21 | 8.19  | 8.46 |
| CHOPPED  | 8.37  | 8.56 | 7.98  | 8.51 |

| CULTTIME | EARLY |      | LATER |      |
|----------|-------|------|-------|------|
| FUNGCIDE | 0     | FULL | 0     | FULL |
| STRAW    |       |      |       |      |
| BURNT    | 7.29  | 8.62 | 7.72  | 9.50 |
| BALED    | 7.25  | 9.00 | 7.55  | 9.11 |
| CHOPPED  | 7.78  | 9.16 | 7.54  | 8.96 |

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GRAIN TONNES/HECTARE

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

|          |            |      |            |      |
|----------|------------|------|------------|------|
| AUT N    | 0          |      | 50         |      |
| FUNGCIDE | 0          | FULL | 0          | FULL |
| STRAW    |            |      |            |      |
| BURNT    | 7.38       | 9.00 | 7.63       | 9.12 |
| BALED    | 7.50       | 8.73 | 7.30       | 9.37 |
| CHOPPED  | 7.51       | 8.85 | 7.81       | 9.27 |
| AUT N    | 0          |      | 50         |      |
| FUNGCIDE | 0          | FULL | 0          | FULL |
| CULTTIME |            |      |            |      |
| EARLY    | 7.44       | 8.77 | 7.44       | 9.08 |
| LATER    | 7.49       | 8.95 | 7.71       | 9.43 |
| CULTTIME | EARLY      |      | LATER      |      |
| INSCTCDE | 0 PIRIMICA |      | 0 PIRIMICA |      |
| STRAW    |            |      |            |      |
| BURNT    | 7.71       | 8.20 | 8.51       | 8.70 |
| BALED    | 7.86       | 8.39 | 8.42       | 8.23 |
| CHOPPED  | 8.25       | 8.69 | 8.13       | 8.37 |
| AUT N    | 0          |      | 50         |      |
| INSCTCDE | 0 PIRIMICA |      | 0 PIRIMICA |      |
| STRAW    |            |      |            |      |
| BURNT    | 8.00       | 8.37 | 8.22       | 8.53 |
| BALED    | 7.91       | 8.32 | 8.37       | 8.30 |
| CHOPPED  | 7.99       | 8.37 | 8.39       | 8.68 |
| AUT N    | 0          |      | 50         |      |
| INSCTCDE | 0 PIRIMICA |      | 0 PIRIMICA |      |
| CULTTIME |            |      |            |      |
| EARLY    | 7.81       | 8.40 | 8.07       | 8.45 |
| LATER    | 8.12       | 8.31 | 8.58       | 8.56 |
| FUNGCIDE | 0          |      | FULL       |      |
| INSCTCDE | 0 PIRIMICA |      | 0 PIRIMICA |      |
| STRAW    |            |      |            |      |
| BURNT    | 7.49       | 7.51 | 8.73       | 9.39 |
| BALED    | 7.38       | 7.41 | 8.90       | 9.20 |
| CHOPPED  | 7.53       | 7.79 | 8.85       | 9.26 |
| FUNGCIDE | 0          |      | FULL       |      |
| INSCTCDE | 0 PIRIMICA |      | 0 PIRIMICA |      |
| CULTTIME |            |      |            |      |
| EARLY    | 7.41       | 7.47 | 8.47       | 9.38 |
| LATER    | 7.52       | 7.68 | 9.18       | 9.19 |
| FUNGCIDE | 0          |      | FULL       |      |
| INSCTCDE | 0 PIRIMICA |      | 0 PIRIMICA |      |
| AUT N    |            |      |            |      |
| 0        | 7.39       | 7.54 | 8.55       | 9.17 |
| 50       | 7.55       | 7.61 | 9.11       | 9.40 |

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GRAIN TONNES/HECTARE

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

| TABLE | AUT N                             | FUNGCIDE                       | INSCTCDE                       | STRAW*<br>AUT N                |
|-------|-----------------------------------|--------------------------------|--------------------------------|--------------------------------|
| SED   | 0.112                             | 0.112                          | 0.112                          | 0.194                          |
| TABLE | CULTTIME*<br>AUT N                | STRAW*<br>FUNGCIDE             | CULTTIME*<br>FUNGCIDE          | AUT N<br>FUNGCIDE              |
| SED   | 0.159                             | 0.194                          | 0.159                          | 0.159                          |
| TABLE | STRAW*<br>INSCTCDE                | CULTTIME*<br>INSCTCDE          | AUT N<br>INSCTCDE              | FUNGCIDE<br>INSCTCDE           |
| SED   | 0.194                             | 0.159                          | 0.159                          | 0.159                          |
| TABLE | STRAW*<br>CULTTIME<br>AUT N       | STRAW*<br>CULTTIME<br>FUNGCIDE | STRAW*<br>AUT N<br>FUNGCIDE    | CULTTIME*<br>AUT N<br>FUNGCIDE |
| SED   | 0.275                             | 0.275                          | 0.275                          | 0.224                          |
| TABLE | STRAW*<br>CULTTIME<br>INSCTCDE    | STRAW*<br>AUT N<br>INSCTCDE    | CULTTIME*<br>AUT N<br>INSCTCDE | STRAW*<br>FUNGCIDE<br>INSCTCDE |
| SED   | 0.275                             | 0.275                          | 0.224                          | 0.275                          |
| TABLE | CULTTIME*<br>FUNGCIDE<br>INSCTCDE | AUT N<br>FUNGCIDE<br>INSCTCDE  |                                |                                |
| SED   | 0.224                             | 0.224                          |                                |                                |

\* WITHIN THE SAME LEVEL OF STRAW, CULTTIME OR STRAW.CULTTIME ONLY

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

| STRATUM | DF | SE    | CV% |
|---------|----|-------|-----|
| WP.SP   | 11 | 0.388 | 4.7 |

GRAIN MEAN DM% 86.0

SUB PLOT AREA HARVESTED 0.00280