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RESEARCH

## Yields of the Field Experiments 1978

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### 78/W/CS/184 Cereal Cyst Nematode Study - Oats

#### Rothamsted Research

Rothamsted Research (1979) *78/W/CS/184 Cereal Cyst Nematode Study - Oats* ; Yields Of The Field Experiments 1978, pp 233 - 238 - DOI: <https://doi.org/10.23637/ERADOC-1-30>

78/W/CS/184

CEREAL CYST NEMATODE STUDY

Object: To study the residual effects of varieties, aldicarb and formalin on cereal cyst nematode (*Heterodera avenae*), nematode-parasitic fungi and on the yield of oats - Woburn Butt Close.

Sponsor: T.D. Williams.

The third year, oats.

For previous years see 76-77/W/CS/184.

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

Whole plot dimensions: 2.13 x 21.0.

Treatments: All combinations of:-

Whole plots

1. VARIETY(77) Varieties and resistance to cereal cyst nematode (all Manod (susceptible) in 1978):

NELSON/R Nelson (resistant)  
TABARD/S Maris Tabard (susceptible)

2. ALDICARB(77) Aldicarb to seedbed (kg):

0  
10

Sub plots

3. FORMALIN(76) Formalin applied in 1976 (1):

0  
3000

4. FORMALIN(77) Formalin applied in 1977 (1):

0  
3000

Basal applications: Manures: (20:14:14) at 400 kg, combine drilled. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 2.5 l in 340 l).

Seed: Manod, sown at 200 kg.

Cultivations, etc.: - Ploughed: 28 Sept, 1977. Spring-tine cultivated with crumbler attached, seed sown: 31 Mar, 1978. Harrowed: 6 Apr. Weedkiller applied: 15 May. Combine harvested: 4 Sept.

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- NOTES: (1) Plant samples were taken in May for measurements of fresh tops and root weights and counts were made of *Heterodera avenae* invasion.  
 (2) Soil samples were taken in June to estimate populations of *Heterodera avenae* remaining from the unhatched residues of the 1977 populations.  
 (3) Plant samples were taken in June for measurements of fresh top and root weights, and counts were made of total numbers of white females of *Heterodera avenae* females and proportion infected with fungi.  
 (4) Soil samples were taken in September for egg counts of *Heterodera avenae*.

GRAIN TONNES/HECTARE

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

|              |      |      |      |
|--------------|------|------|------|
| ALDICARB(77) | 0    | 10   | MEAN |
| VARIETY(77)  |      |      |      |
| NELSON/R     | 2.71 | 2.66 | 2.68 |
| TABARD/S     | 1.08 | 2.45 | 1.77 |
| MEAN         | 1.90 | 2.55 | 2.23 |
| FORMALIN(76) | 0    | 3000 | MEAN |
| VARIETY(77)  |      |      |      |
| NELSON/R     | 2.68 | 2.69 | 2.68 |
| TABARD/S     | 1.65 | 1.88 | 1.77 |
| MEAN         | 2.16 | 2.29 | 2.23 |
| FORMALIN(76) | 0    | 3000 | MEAN |
| ALDICARB(77) |      |      |      |
| 0            | 1.83 | 1.96 | 1.90 |
| 10           | 2.49 | 2.61 | 2.55 |
| MEAN         | 2.16 | 2.29 | 2.23 |
| FORMALIN(77) | 0    | 3000 | MEAN |
| VARIETY(77)  |      |      |      |
| NELSON/R     | 2.68 | 2.69 | 2.68 |
| TABARD/S     | 1.72 | 1.81 | 1.77 |
| MEAN         | 2.20 | 2.25 | 2.23 |
| FORMALIN(77) | 0    | 3000 | MEAN |
| ALDICARB(77) |      |      |      |
| 0            | 1.80 | 1.99 | 1.90 |
| 10           | 2.60 | 2.51 | 2.55 |
| MEAN         | 2.20 | 2.25 | 2.23 |
| FORMALIN(77) | 0    | 3000 | MEAN |
| FORMALIN(76) |      |      |      |
| 0            | 2.20 | 2.13 | 2.16 |
| 3000         | 2.20 | 2.38 | 2.29 |
| MEAN         | 2.20 | 2.25 | 2.23 |

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GRAIN TONNES/HECTARE

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

|              |              |      |      |      |      |
|--------------|--------------|------|------|------|------|
| ALDICARB(77) | 0            |      | 10   |      |      |
| FORMALIN(76) | 0            | 3000 | 0    | 3000 |      |
| VARIETY(77)  |              |      |      |      |      |
| NELSON/R     | 2.67         | 2.75 | 2.68 | 2.63 |      |
| TABARD/S     | 1.00         | 1.17 | 2.31 | 2.59 |      |
| ALDICARB(77) | 0            |      | 10   |      |      |
| FORMALIN(77) | 0            | 3000 | 0    | 3000 |      |
| VARIETY(77)  |              |      |      |      |      |
| NELSON/R     | 2.58         | 2.84 | 2.77 | 2.54 |      |
| TABARD/S     | 1.02         | 1.14 | 2.42 | 2.47 |      |
| FORMALIN(76) | 0            |      | 3000 |      |      |
| FORMALIN(77) | 0            | 3000 | 0    | 3000 |      |
| VARIETY(77)  |              |      |      |      |      |
| NELSON/R     | 2.64         | 2.72 | 2.71 | 2.67 |      |
| TABARD/S     | 1.77         | 1.54 | 1.68 | 2.08 |      |
| FORMALIN(76) | 0            |      | 3000 |      |      |
| FORMALIN(77) | 0            | 3000 | 0    | 3000 |      |
| ALDICARB(77) |              |      |      |      |      |
| 0            | 1.79         | 1.88 | 1.81 | 2.11 |      |
| 10           | 2.62         | 2.37 | 2.58 | 2.64 |      |
|              | FORMALIN(76) | 0    |      | 3000 |      |
|              | FORMALIN(77) | 0    | 3000 | 0    | 3000 |
| VARIETY(77)  | ALDICARB(77) |      |      |      |      |
| NELSON/R     | 0            | 2.47 | 2.87 | 2.68 | 2.82 |
|              | 10           | 2.80 | 2.56 | 2.74 | 2.52 |
| TABARD/S     | 0            | 1.10 | 0.89 | 0.94 | 1.40 |
|              | 10           | 2.43 | 2.18 | 2.42 | 2.77 |

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GRAIN TONNES/HECTARE

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

| TABLE | VARIETY(77) | ALDICARB(77) | FORMALIN(76) | FORMALIN(77) |
|-------|-------------|--------------|--------------|--------------|
| SED   | 0.173       | 0.173        | 0.123        | 0.123        |

| TABLE                                              | VARIETY(77)<br>ALDICARB(77) | VARIETY(77)<br>FORMALIN(76) | ALDICARB(77)<br>FORMALIN(76) | VARIETY(77)<br>FORMALIN(77) |
|----------------------------------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|
| SED                                                | 0.245                       | 0.212                       | 0.212                        | 0.212                       |
| EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: |                             |                             |                              |                             |
|                                                    | VARIETY(77)                 | 0.174                       |                              | 0.174                       |
|                                                    | ALDICARB(77)                |                             | 0.174                        |                             |

| TABLE                                              | ALDICARB(77)<br>FORMALIN(77) | FORMALIN(76)<br>FORMALIN(77) | VARIETY(77)<br>ALDICARB(77)<br>FORMALIN(76) | VARIETY(77)<br>ALDICARB(77)<br>FORMALIN(77) |
|----------------------------------------------------|------------------------------|------------------------------|---------------------------------------------|---------------------------------------------|
| SED                                                | 0.212                        | 0.174                        | 0.300                                       | 0.300                                       |
| EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: |                              |                              |                                             |                                             |
|                                                    | ALDICARB(77)                 | 0.174                        |                                             |                                             |
|                                                    | VARIETY(77).ALDICARB(77)     |                              | 0.246                                       | 0.246                                       |

| TABLE                                              | VARIETY(77)<br>FORMALIN(76)<br>FORMALIN(77) | ALDICARB(77)<br>FORMALIN(76)<br>FORMALIN(77) | VARIETY(77)<br>ALDICARB(77)<br>FORMALIN(76)<br>FORMALIN(77) |
|----------------------------------------------------|---------------------------------------------|----------------------------------------------|-------------------------------------------------------------|
| SED                                                | 0.275                                       | 0.275                                        | 0.388                                                       |
| EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: |                                             |                                              |                                                             |
|                                                    | VARIETY(77)                                 | 0.246                                        |                                                             |
|                                                    | ALDICARB(77)                                | 0.246                                        |                                                             |
|                                                    | VARIETY(77).ALDICARB(77)                    |                                              | 0.348                                                       |

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

| STRATUM     | DF | SE    | CV%  |
|-------------|----|-------|------|
| BLOCK.WP    | 9  | 0.347 | 15.6 |
| BLOCK.WP.SP | 36 | 0.492 | 22.1 |

GRAIN MEAN DM% 79.5

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STRAW TONNES/HECTARE

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

|              |      |      |      |
|--------------|------|------|------|
| ALDICARB(77) | 0    | 10   | MEAN |
| VARIETY(77)  |      |      |      |
| NELSON/R     | 1.90 | 1.89 | 1.90 |
| TABARD/S     | 1.07 | 1.91 | 1.49 |
| MEAN         | 1.48 | 1.90 | 1.69 |
| FORMALIN(76) | 0    | 3000 | MEAN |
| VARIETY(77)  |      |      |      |
| NELSON/R     | 1.94 | 1.85 | 1.90 |
| TABARD/S     | 1.46 | 1.51 | 1.49 |
| MEAN         | 1.70 | 1.68 | 1.69 |
| FORMALIN(76) | 0    | 3000 | MEAN |
| ALDICARB(77) |      |      |      |
| 0            | 1.54 | 1.43 | 1.48 |
| 10           | 1.87 | 1.93 | 1.90 |
| MEAN         | 1.70 | 1.68 | 1.69 |
| FORMALIN(77) | 0    | 3000 | MEAN |
| VARIETY(77)  |      |      |      |
| NELSON/R     | 1.91 | 1.88 | 1.90 |
| TABARD/S     | 1.40 | 1.57 | 1.49 |
| MEAN         | 1.66 | 1.73 | 1.69 |
| FORMALIN(77) | 0    | 3000 | MEAN |
| ALDICARB(77) |      |      |      |
| 0            | 1.41 | 1.56 | 1.48 |
| 10           | 1.90 | 1.90 | 1.90 |
| MEAN         | 1.66 | 1.73 | 1.69 |
| FORMALIN(77) | 0    | 3000 | MEAN |
| FORMALIN(76) |      |      |      |
| 0            | 1.70 | 1.70 | 1.70 |
| 3000         | 1.61 | 1.75 | 1.68 |
| MEAN         | 1.66 | 1.73 | 1.69 |

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STRAW TONNES/HECTARE

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

|                          |      |      |      |      |      |
|--------------------------|------|------|------|------|------|
| ALDICARB(77)             | 0    |      | 10   |      |      |
| FORMALIN(76)             | 0    | 3000 | 0    | 3000 |      |
| VARIETY(77)              |      |      |      |      |      |
| NELSON/R                 | 1.99 | 1.82 | 1.90 | 1.89 |      |
| TABARD/S                 | 1.08 | 1.05 | 1.84 | 1.98 |      |
| ALDICARB(77)             | 0    |      | 10   |      |      |
| FORMALIN(77)             | 0    | 3000 | 0    | 3000 |      |
| VARIETY(77)              |      |      |      |      |      |
| NELSON/R                 | 1.86 | 1.95 | 1.96 | 1.82 |      |
| TABARD/S                 | 0.96 | 1.17 | 1.83 | 1.98 |      |
| FORMALIN(76)             | 0    |      | 3000 |      |      |
| FORMALIN(77)             | 0    | 3000 | 0    | 3000 |      |
| VARIETY(77)              |      |      |      |      |      |
| NELSON/R                 | 1.89 | 1.99 | 1.93 | 1.77 |      |
| TABARD/S                 | 1.51 | 1.41 | 1.29 | 1.73 |      |
| FORMALIN(76)             | 0    |      | 3000 |      |      |
| FORMALIN(77)             | 0    | 3000 | 0    | 3000 |      |
| ALDICARB(77)             |      |      |      |      |      |
| 0                        | 1.51 | 1.57 | 1.31 | 1.55 |      |
| 10                       | 1.89 | 1.84 | 1.90 | 1.96 |      |
| FORMALIN(76)             |      | 0    |      | 3000 |      |
| FORMALIN(77)             |      | 0    | 3000 | 0    | 3000 |
| VARIETY(77) ALDICARB(77) |      |      |      |      |      |
| NELSON/R                 | 0    | 1.93 | 2.05 | 1.79 | 1.84 |
| 10                       | 1.86 | 1.94 | 2.07 | 1.70 |      |
| TABARD/S                 | 0    | 1.09 | 1.08 | 0.84 | 1.26 |
| 10                       | 1.93 | 1.74 | 1.74 | 2.21 |      |

STRAW MEAN DM% 56.2

PLOT AREA HARVESTED 0.00098