1977

Take-all of cereals and Cereal seed dressings

G D. MacNish

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DEPARTMENT OF AGRICULTURE
Western Australia

EXPERIMENTAL SUMMARY 1977

A. TAKE-ALL OF CEREALS
B. CEREAL SEED DRESSINGS

G. D. Mac Nish
Plant Pathologist
Plant Research Division

(Preliminary reports of experiments conducted in cooperation with other officers of the Department of Agriculture)
A. TAKE-ALL OF CEREALS

Take-all surveys

Effect of nitrogen sources on take-all
- 76LQ25 Wheat (N = 50 kg/ha)
- 77MT19 " (N = 45 kg/ha)
- 77JE31 Barley (N = 45 kg/ha)
- 77MT17 " (N = 45 kg/ha)
- 77LQ20 Oats (N = 45 kg/ha)
- 77MT18 " (N = 45 kg/ha)
- 77JE5 Wheat (N = 33 kg/ha)
- 77LQ6 " (N = 25 kg/ha)
- 77E4 " (N = 25 kg/ha)
- 77ES6 " (N = 25 kg/ha)
- 77GE10 " (N = 25 kg/ha)

Effect of rates of (NH₄)₂SO₄ and NaNO₃ on take-all
- 77E6 Wheat (N = 0 to 75 kg/ha)
- 77ES " (N = 0 to 75 kg/ha)

Effect of rates of (NH₄)₂SO₄ on take-all
- 77LQ7 Wheat (N = 0 to 90 kg/ha)
- 77JE5 " (N = 0 to 90 kg/ha)

Soil pH and take-all
- 77LQ25

Cleaning crops and take-all control
- 76E6, 76N5, 76M47, 76A7, 76LQ27

Spray-fallow and time of planting
- 76GE35, 76LQ26, 76LQ26, 76LQ38

Effect of rates of sowing on take-all
- 77JE7

Long term rotations and take-all
- 77ES8, 73SG16

Continuous wheat and take-all
- 74SG16

Effect of sowing systems on take-all
- 76E33

Effect of grass control on take-all
- 77JE3, 77JE4

B. CEREAL SEED DRESSING

Control of barley covered smut
- 77A3

Control of bunt
- 77M3

Control of Oat loose smut
- 77A4
<table>
<thead>
<tr>
<th>Experiment</th>
<th>Description</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>76WH11</td>
<td>Cleaning crop and take-all</td>
<td>Treatments unsatisfactory</td>
</tr>
<tr>
<td>76SG11</td>
<td>Spray-fallow and take-all</td>
<td>Treatments unsatisfactory</td>
</tr>
<tr>
<td>77GE11</td>
<td>Depth of cultivation and take-all</td>
<td>Crossed plots</td>
</tr>
<tr>
<td>77LG4</td>
<td>Cereals following oats</td>
<td>Overgrown with weeds</td>
</tr>
<tr>
<td>77LG5</td>
<td>Cereals following grass</td>
<td>Overgrown with weeds</td>
</tr>
</tbody>
</table>
Aim: To determine over a number of seasons the incidence and distribution within Western Australia of take-all of cereals.

Methods: Surveys have been carried out since 1973. In the survey conducted in 1973, samples were collected in late spring in the vicinity of 25 wheat-belt towns. The 1974 survey was conducted on a state-wide basis in early spring along most of the major roads in the wheat-belt. In 1975 intensive surveys were made in the vicinity of four towns (Three Springs, Kellerberrin, Lake Grace and Fitzgerald).

In 1976 I decided to standardize the method of sampling. Road side collections are to be made along a few strategical roads at a time as close as possible to when most crops would be flowering. In 1976 the roads were as follows:

Northern Zone (NZ) – Dongara to Morawa (approx. every 5 km); NCZ – Dandaragan West to Mollerin (5 km); CZ – Northam to Burracoppin (5 km); SCZ – Arthur River to Newdegate (10 km); CZ – Cranbrook to just east of Jerramungup and Gibson to Salmon Gums (20 km). In 1977 the roads were:

NZ – Geraldton to Mullewa and Dongara to Morawa (10 km); NCZ – North of Badgingarra to Rabbit Proof Fence and Dandaragan West to Beacon (10 km); CZ – Clackline to Bodallin and Beverley to east Bruce Rock (10 km); SCZ – Williams to Hyden and Arthur River to Lake King (20 km); Cranbrook to Ravensthorpe and Gibson to Salmon Gums (20 km).

Results:

<table>
<thead>
<tr>
<th>Year</th>
<th>Zone</th>
<th>Percentage of survey samples in Take-all categories (Plants infected)*</th>
<th>Number of samples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>1-10%</td>
</tr>
<tr>
<td>1973</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ</td>
<td>60</td>
<td>33</td>
<td>7</td>
</tr>
<tr>
<td>NCZ</td>
<td>53</td>
<td>14</td>
<td>31</td>
</tr>
<tr>
<td>CZ</td>
<td>74</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>SCZ</td>
<td>30</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>SZ</td>
<td>15</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>1974</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>NZ</td>
<td>79</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>NCZ</td>
<td>85</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>CZ</td>
<td>71</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>SCZ</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>SZ</td>
<td>38</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>1975</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TS</td>
<td>42</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>K</td>
<td>48</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>LG</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>F</td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>1976</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ</td>
<td>75</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>NCZ</td>
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<td>18</td>
<td>7</td>
</tr>
<tr>
<td>CZ</td>
<td>50</td>
<td>31</td>
<td>11</td>
</tr>
<tr>
<td>SCZ</td>
<td>24</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>SZ</td>
<td>6</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>1977</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZ</td>
<td>50</td>
<td>20</td>
<td>38</td>
</tr>
<tr>
<td>NCZ</td>
<td>28</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>CZ</td>
<td>17</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>SCZ</td>
<td></td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

*1-10% = Between 1 to 10% of the plants within a sample were infected
EFFECT OF NITROGEN SOURCES ON TAKE-ALL (WHEAT)

**Experiment** : 76LG25

**Location** : Newdegate Research Station (Paddock S3A)

**Aim** : To study the effect of repeated use of different nitrogen sources on the incidence of take-all.

**Treatments** : This experiment, which was commenced in 1976, was re-sown with the same treatments on the same plots in 1977. Actual rates of application of fertilizers varied slightly between seasons.

1. Nil
2. \((NH_4)_2 SO_4\) drilled with seed 237 kg/ha
3. \((NH_4)_2 SO_4\) topdressed 237 "
4. \(NH_4 NO_3\) (Agran 34) topdressed 147 "
5. Na NO_3 topdressed 312 "
6. Agras No. 1 drilled 278 "
7. Agras No. 1 drilled 383 "

**Methods** : Experiment on white sand over gravel at depth. Area cropped to wheat in 1975, heavily infected with take-all. In 1977 the area sown to Gamenya (45 kg/ha) on June 2. Super equivalent to 227 kg/ha. Sampled for take-all October 6 (growth stage 36 on H. Fisher scale). Bulk soil pH determined on soil taken from between rows (5 samples per plot). The root soil pH was determined as follows. Most of the soil was shaken from the root system of each plant and discarded. The remaining small amount of soil from each plant was gently shaken off, bulked with similar soil from other plants and the pH determined. Results mean of 4 replications.

**Results** : Tables 1 and 2.

**Comments** : The results for 1976 and 1977 were similar. The 1977 planting was the third successive wheat crop. The control of take-all with NH_4-N and maintenance of yields are very encouraging.
### TABLE 1

**EFFECT OF NITROGEN SOURCES ON TAKE-ALL OF WHEAT**

Results - for Experiment 76LG25

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Rate of N kg/ha</th>
<th>Plants per m</th>
<th>Av. plant fresh weight (g)</th>
<th>Yield kg/ha</th>
<th>Av. 100 Grain weight (g)</th>
<th>pH Oct 6, 1977</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Agras No. 1 (D†)</td>
<td>70</td>
<td>17.0</td>
<td>22.4</td>
<td>1999</td>
<td>2.98</td>
<td>4.76 4.54</td>
</tr>
<tr>
<td>2. (NH₄)₂SO₄ (D†)</td>
<td>50</td>
<td>18.7</td>
<td>19.0</td>
<td>1723</td>
<td>2.85</td>
<td>4.72 4.60</td>
</tr>
<tr>
<td>6. Agras No. 1 (D†)</td>
<td>50</td>
<td>18.9</td>
<td>17.3</td>
<td>1712</td>
<td>2.80</td>
<td>4.64 4.52</td>
</tr>
<tr>
<td>3. (NH₄)₂SO₄ (TD)</td>
<td>50</td>
<td>20.5</td>
<td>13.4</td>
<td>1376</td>
<td>2.60</td>
<td>4.79 4.57</td>
</tr>
<tr>
<td>4. Agran 34 (TD)</td>
<td>50</td>
<td>19.5</td>
<td>14.6</td>
<td>997</td>
<td>2.68</td>
<td>5.00 4.78</td>
</tr>
<tr>
<td>5. Na NO₃ (TD)</td>
<td>50</td>
<td>21.3</td>
<td>11.3</td>
<td>755</td>
<td>2.52</td>
<td>5.46 5.08</td>
</tr>
<tr>
<td>1. Nil</td>
<td>0</td>
<td>21.9</td>
<td>7.5</td>
<td>432</td>
<td>2.53</td>
<td>5.23 4.88</td>
</tr>
</tbody>
</table>

| LSD p = 0.05          | NS 3.4          | 2.4 1.8       | 182 154                   | 2.2         | 0.25 0.17                 |
|                       |                 | 3.4 2.5       | 249 na                    | 3.1         | 0.34 0.24                 |
|                       |                 | 4.6 3.4       | 340 na                    | 0.46 0.32   |

† D = drilled with seed; TD = topdressed
### TABLE 2

**EFFECT OF NITROGEN SOURCES ON TAKE-ALL OF WHEAT**

Results - for Experiment 76LG25

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Rate of N kg/ha</th>
<th>Take-all incidence %</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Agras No. 1 (D)</td>
<td>70</td>
<td>1</td>
</tr>
<tr>
<td>2. (NH₄)₂SO₄ (D)</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>6. Agras No. 1 (D)</td>
<td>50</td>
<td>3</td>
</tr>
<tr>
<td>3. (NH₄)₂SO₄ (TD)</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>4. Agran 34 (TD)</td>
<td>50</td>
<td>1</td>
</tr>
<tr>
<td>5. Na NO₃ (TD)</td>
<td>50</td>
<td>1</td>
</tr>
<tr>
<td>1. Nil</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

| LSD          | -               | -       | ****  | ***    | NS    | NS     | ***  | ***    | ***  | ***       | *** |

† L = Low, less than 25% root system discoloured;  
M = Moderate, 25 to 75% root system discoloured;  
S = Severe, more than 75% root system discoloured.
**Experiment** : 77MT19  
**Location** : Mt. Barker Research Station (N1B)  
**Aim** : To study the effect of various nitrogen sources on the incidence of take-all \( (N = 45 \text{ kg/ha}) \).

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Method</th>
<th>Topdress/Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nil</td>
<td>Site loamy gravel over clay. Grass dominant pasture in 1976. Grass burnt. Sown to Egret (52 kg/ha) on June 8. Super (200 kg/ha) drilled with seed for 1, 2, 3, 4 and 5. Super (197 kg/ha) mixed with ((\text{NH}_4\text{)}_2\text{SO}_4) for T.6. Sampled for take-all and root soil pH on October 17 (GS36). Results mean of 4 replications.</td>
<td></td>
</tr>
<tr>
<td>2. Na NO(_3) topdressed</td>
<td>286 kg/ha</td>
<td></td>
</tr>
<tr>
<td>3. Agran 34 topdressed</td>
<td>123 &quot;</td>
<td></td>
</tr>
<tr>
<td>4. Urea topdressed</td>
<td>101 &quot;</td>
<td></td>
</tr>
<tr>
<td>5. ((\text{NH}_4\text{)}_2\text{SO}_4) topdressed</td>
<td>212 &quot;</td>
<td></td>
</tr>
<tr>
<td>6. &quot; drilled with seed</td>
<td>205 &quot;</td>
<td></td>
</tr>
<tr>
<td>7. Agras No. 1 drilled with seed</td>
<td>262 &quot;</td>
<td></td>
</tr>
</tbody>
</table>

**Results** : Table 1.  
**Comments** : The take-all incidence followed the pattern established in experiments in the 1975 and 1976 seasons.
TABLE 1
EFFECT OF NITROGEN SOURCES ON TAKE-ALL OF WHEAT

Results - for Experiment 77MT19

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate of N kg/ha</th>
<th>Plants per m</th>
<th>Take-all incidence %</th>
<th>Root soil pH (Oct. 17)</th>
<th>Yield kg/ha</th>
<th>Av. 100 grain weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. (NH₄)₂SO₄ (D)</td>
<td>43</td>
<td>21.6</td>
<td>6</td>
<td>43A</td>
<td>51A</td>
<td>4.98</td>
</tr>
<tr>
<td>7. Agras No. 1  (D)</td>
<td>47</td>
<td>20.6</td>
<td>6</td>
<td>39AB</td>
<td>55AB</td>
<td>4.99</td>
</tr>
<tr>
<td>5. (NH₄)₂SO₄ (TD)</td>
<td>45</td>
<td>23.2</td>
<td>5</td>
<td>28BC</td>
<td>67BC</td>
<td>4.97</td>
</tr>
<tr>
<td>3. Agran 34     (TD)</td>
<td>42</td>
<td>23.6</td>
<td>2</td>
<td>21C</td>
<td>77C</td>
<td>5.06</td>
</tr>
<tr>
<td>4. Urea         (TD)</td>
<td>46</td>
<td>24.6</td>
<td>1</td>
<td>18C</td>
<td>81C</td>
<td>5.05</td>
</tr>
<tr>
<td>2. Na NO₃       (TD)</td>
<td>46</td>
<td>23.6</td>
<td>1</td>
<td>18C</td>
<td>81C</td>
<td>5.03</td>
</tr>
<tr>
<td>1. Nil</td>
<td>0</td>
<td>27.2</td>
<td>1</td>
<td>21C</td>
<td>78C</td>
<td>5.10</td>
</tr>
</tbody>
</table>

LSD p = 0.05
0.01
0.001
NA
**EFFECT OF NITROGEN SOURCES ON TAKE-ALL (BARLEY)**

| Experiment | 77JE31 |
| Location   | D. Reimers, Gairdner River |
| Aim        | As 77ML9 (N = 45 kg/ha) |
| Treatments | 1. Nil |
|            | 2. Na NO₃ topdressed 260 kg/ha |
|            | 3. Agran 34 topdressed 140 '' |
|            | 4. Urea topdressed 100 '' |
|            | 5. (NH₄)₂ SO₄ topdressed 200 '' |
|            | 6. '' '' drilled with seed 220 '' |
|            | 7. Agras No. 1 drilled with seed 250 '' |

**Methods**
Site grey sand over clay. Cropped 1973. Pasture high grass content. Sown to Clipper (50 kg/ha) on June 3. Super (200 kg/ha) drilled with seed for T.1, 2, 3, 4 and 5. Super (210 kg/ha) mixed with (NH₄)₂ SO₄ for T.6. Sampled for take-all on October 27. Results mean of 4 replications.

**Results**
Table 1.

**Comments**
Low level of take-all. Some evidence that NH₄-N may be causing a slight reduction in take-all.
<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate of N kg/ha</th>
<th>Plants per m</th>
<th>Take-all incidence</th>
<th>Yield kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nil</td>
<td>L</td>
</tr>
<tr>
<td>6. (NH₄)₂SO₄ (D)</td>
<td>46</td>
<td>10.4</td>
<td>29²</td>
<td>71</td>
</tr>
<tr>
<td>7. Agras No. 1</td>
<td>45</td>
<td>11.3</td>
<td>62₁</td>
<td>38</td>
</tr>
<tr>
<td>5. (NH₄)₂SO₄ (TD)</td>
<td>42</td>
<td>12.4</td>
<td>26²</td>
<td>66</td>
</tr>
<tr>
<td>3. Agran 34</td>
<td>48</td>
<td>13.5</td>
<td>7²</td>
<td>82</td>
</tr>
<tr>
<td>4. Urea (TD)</td>
<td>46</td>
<td>15.5</td>
<td>9²</td>
<td>73</td>
</tr>
<tr>
<td>2. NaNO₃ (TD)</td>
<td>42</td>
<td>15.1</td>
<td>14²</td>
<td>66</td>
</tr>
<tr>
<td>1. Nil</td>
<td>0</td>
<td>16.3</td>
<td>14²</td>
<td>71</td>
</tr>
<tr>
<td>LSD p = 0.05</td>
<td></td>
<td></td>
<td>3.9</td>
<td>*</td>
</tr>
<tr>
<td>0.01</td>
<td></td>
<td></td>
<td></td>
<td>NS</td>
</tr>
<tr>
<td>0.001</td>
<td></td>
<td></td>
<td></td>
<td>na</td>
</tr>
</tbody>
</table>
EFFECT OF NITROGEN SOURCES ON TAKE-ALL (BARLEY)

Experiments : 77MT17

Location : Mt. Barker Research Station (N1B)

Aim : As 77MT19 (N = 45 kg/ha)

Treatments :
1. Nil
2. Na NO₃ topdressed 286 kg/ha
3. Agran 34 topdressed 123 "
4. Urea topdressed 101 "
5. (NH₄)₂ SO₄ topdressed 212 "
6. " " drilled with seed 205 "
7. Agran No. 1 drilled with seed 262 "

Methods : Site loamy gravel over clay. Grass dominant pasture in 1976. Grass burnt. Sown to Clipper (49 kg/ha) on June 8. Super (200 kg/ha) drilled with seed for T.1, 2, 3, 4 and 5. Super (197 kg/ha) mixed with (NH₄)₂ SO₄ for T.6. Sampled for take-all on October 27. Results mean of 4 replications.

Results : Table 1.

Comments : Significant effects of the different sources of N on take-all were not detected. This experiment was sown directly north of 77MT19 (wheat). The severity of take-all in the barley was considerably less than that in the wheat.
### TABLE 1

**EFFECT OF NITROGEN SOURCES ON TAKE-ALL OF BARLEY**

Results - for Experiment 77MT17

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate of N kg/ha</th>
<th>Plants per m</th>
<th>Take-all incidence (%)</th>
<th>Yield kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nil</td>
<td>L</td>
</tr>
<tr>
<td>6. (NH₄)₂SO₄ (D)</td>
<td>43</td>
<td>20.8</td>
<td>20</td>
<td>63</td>
</tr>
<tr>
<td>7. Agras No. 1 (D)</td>
<td>47</td>
<td>20.0</td>
<td>5</td>
<td>63</td>
</tr>
<tr>
<td>5. (NH₄)₂SO₄ (TD)</td>
<td>45</td>
<td>18.9</td>
<td>15</td>
<td>66</td>
</tr>
<tr>
<td>3. Agran 34 (TD)</td>
<td>42</td>
<td>16.1</td>
<td>10</td>
<td>65</td>
</tr>
<tr>
<td>4. Urea (TD)</td>
<td>46</td>
<td>19.6</td>
<td>6</td>
<td>51</td>
</tr>
<tr>
<td>2. Na NO₃ (TD)</td>
<td>46</td>
<td>19.2</td>
<td>3</td>
<td>65</td>
</tr>
<tr>
<td>1. Nil</td>
<td>0</td>
<td>17.7</td>
<td>3</td>
<td>65</td>
</tr>
</tbody>
</table>

LSD p = 0.05

NS | NS | NS | NS | NS | NS | NS | 174 |
EFFECT OF NITROGEN SOURCES ON TAKE-ALL (OATS)

Experiment : 77LG20
Location : Newdegate Research Station (S3A)
Aim : As 77MT19 (N = 45 kg/ha)
Treatments :
1. Nil
2. Na NO₃ top dressed 280 kg/ha
3. Agran 34 top dressed 128 "
4. Urea top dressed 96 "
5. (NH₄)₂ SO₄ top dressed 212 "
6. " drilled with seed 212 "
7. Agras No. 1 drilled with seed 258 "
Methods : Sandy loam over gravel. Cropped to oats 1976. The oats showed evidence of take-all. Stubble burnt. Sown to West (45 kg/ha) on June 2. Super (205 kg/ha) drilled with seed for T.1, 2, 3, 4 and 5. Super (205 kg/ha) mixed with (NH₄)₂ SO₄ for T. 6. Sampled for take-all October 26. Results mean of 4 replications.

Results :

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Rate of N kg/ha</th>
<th>Take-all incidence %</th>
<th>Yield kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Nil      L     M     S</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>46</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LSD p = 0.05 189
0.01 na
0.001 na

Comments :

11.
EFFECT OF NITROGEN SOURCES ON TAKE-ALL (OATS)

Experiment : 77MT18
Location : Mt. Barker Research Station (E9)
Aim : As 77MT19 (N = 45 kg/ha)
Treatments : 1. Nil
2. Na NO₃ topdressed 286 kg/ha
3. Agran 34 topdressed 123 "
4. Urea topdressed 101 "
5. (NH₄)₂ SO₄ topdressed 212 "
6. " drilled with seed 205 "
7. Agras No. 1 drilled with seed 262 "

Methods : Loamy gravel over clay. Cropped to oats 1976. Stubble burnt. Sown to West (52 kg/ha) on June 17. Super (200 kg/ha) drilled with seed for T.1, 2, 3, 4 and 5, Super (197 kg/ha) mixed with (NH₄)₂ SO₄ for T.6. Sampled for take-all on October 28. Results mean of 4 replications.

Results :

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate of N kg/ha</th>
<th>Take-all incidence %</th>
<th>Yield kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nil L M S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td></td>
<td>5046</td>
</tr>
<tr>
<td>2</td>
<td>46</td>
<td></td>
<td>5092</td>
</tr>
<tr>
<td>3</td>
<td>42</td>
<td></td>
<td>5252</td>
</tr>
<tr>
<td>4</td>
<td>46</td>
<td></td>
<td>5467</td>
</tr>
<tr>
<td>5</td>
<td>45</td>
<td></td>
<td>5205</td>
</tr>
<tr>
<td>6</td>
<td>43</td>
<td></td>
<td>5165</td>
</tr>
<tr>
<td>7</td>
<td>47</td>
<td></td>
<td>5069</td>
</tr>
</tbody>
</table>

LSD p = 0.05 NS

Comments :
EFFECT OF NITROGEN SOURCES ON TAKE-ALL (WHEAT)

Experiment : 77JE5
Location : C. Parsons, Fitzgerald
Aim : As 77MT19 (N = 33 kg/ha)
Treatments : 1. Nil
2. Na NO$_3$ topdressed 208 kg/ha
3. Agran $3^4$ topdressed 98 "
4. Urea topdressed 72 "
5. (NH$_4$)$_2$ SO$_4$ drilled with seed 158 "
6. A gras No. 1 drilled with seed 185 "
7. A gras No. 2 drilled with seed 275 "
8. D.A.P. 18:46 drilled with seed 185 "

Methods : Grey sand. Area last cropped in 1974 and became a grassy pasture (Sub. 30%, barley grass 20%). Grass burnt. Sown to Madden (50 kg/ha) on June 7. For T.1, 2, 3 and 4 super drilled with seed (386 kg/ha); T.5, 6 and 7 as mixture (387, 236 and 88 respectively). Sampled for take-all and root soil pH on October 19 (GS39). Results mean of 4 replications.

Results : Table 1.

Comments : Although there were small but significant effects of different N sources on take-all with the trend towards NH$_4$-N giving control, the results were not encouraging. This experiment coupled with others reported below, suggests that 33 kg/ha of N is getting near the lower limits for NH$_4$-N effectiveness against take-all.
TABLE 1

EFFECT OF NITROGEN SOURCES ON TAKE-ALL OF WHEAT

Results — for Experiment 77JE5

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate of N kg/ha</th>
<th>Plants per m</th>
<th>Take-all incidence</th>
<th>Root soil pH (Oct 19)</th>
<th>Yield kg/ha</th>
<th>Av. 100 grain weight g</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Agras No. 2 (D)</td>
<td>32</td>
<td>12.1</td>
<td>3 81^AB 15 1^A 16^A</td>
<td>5.20</td>
<td>1045</td>
<td></td>
</tr>
<tr>
<td>3. Agran 3 (TD)</td>
<td>33</td>
<td>14.5</td>
<td>6 84^A 8 2^AB 10^A</td>
<td>5.28</td>
<td>1127</td>
<td></td>
</tr>
<tr>
<td>6. Agras No. 1 (D)</td>
<td>33</td>
<td>12.3</td>
<td>3 76^AB 18 3^AB 21^AB</td>
<td>5.24</td>
<td>1008</td>
<td></td>
</tr>
<tr>
<td>4. Urea (TD)</td>
<td>33</td>
<td>15.0</td>
<td>0 80^AB 14 6^ABC 20^AB</td>
<td>5.35</td>
<td>1116</td>
<td></td>
</tr>
<tr>
<td>5. (NH₄)₂ SO₄ (D)</td>
<td>33</td>
<td>12.5</td>
<td>5 74^AB 14 7^ABC 21^AB</td>
<td>5.21</td>
<td>959</td>
<td></td>
</tr>
<tr>
<td>8. D.A.P. (D)</td>
<td>33</td>
<td>15.2</td>
<td>2 75^AB 15 8^BC 25^ABC</td>
<td>5.30</td>
<td>846</td>
<td></td>
</tr>
<tr>
<td>2. NaNO₃ (TD)</td>
<td>33</td>
<td>16.3</td>
<td>1 70^BC 21 8^BC 29^BC</td>
<td>5.46</td>
<td>771</td>
<td></td>
</tr>
<tr>
<td>1. Nil</td>
<td>0</td>
<td>17.2</td>
<td>4 60^C 22 14^C 36^C</td>
<td>5.25</td>
<td>937</td>
<td></td>
</tr>
</tbody>
</table>

LSD p = 0.05
0.01
0.001

3.6 NS * NS * *

0.14 NS
EFFECT OF NITROGEN SOURCES ON TAKE-ALL (WHEAT)

| Experiment | 77LG6 |
| Location | C. Fisher, Lake Grace |
| Aim | As 77MT19 (N = 25 kg/ha) |
| Treatments |
| 1. Nil |
| 2. Na NO₃ | topdressed | 156 kg/ha |
| 3. Agran 34 | topdressed | 80 " |
| 4. Urea | topdressed | 56 " |
| 5. (NH₄)₂ SO₄ | drilled with seed | 116 " |
| 6. Agras No. 1 | drilled with seed | 139 " |
| 7. Agras No. 2 | drilled with seed | 214 " |
| 8. D.A.P. 18:46 | drilled with seed | 140 " |
| Methods | Shallow sand over gravel. Wheat 1976 with high incidence of take all. Topdressed 1977 with copper sand mixture (7 kg/ha of Cu SO₄). Sown to Gaminya (45 kg/ha) on May 31. For T.1, 2, 3 and 4 super drilled with seed (285 kg/ha); T.5, 6 and 7 as mixture (284, 177, 66 respectively). Bulk soil pH between drill row and on drill row determined July 7. Sampled for take-all, plant dry weight and root soil pH on October 20 (GS38). The crop grew so poorly, it was impossible to harvest. Results mean of 3 replications. |
| Results | Table 1 |
| Comments | No effect of N sources on take-all could be detected. The level of take-all was very high. Shallow soil lead to drought problems for most of the growing period. These factors may have complicated the results. However it appears that 25 kg/ha of N is too low for the NH₄-N effect on take all to be operative. |

15.
### TABLE 1

**EFFECT OF NITROGEN SOURCES ON TAKE-ALL OF WHEAT**

Results - for Experiment 77IG6

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate of N kg/ha</th>
<th>Plants per m</th>
<th>Take-all incidence %</th>
<th>Bulk soil pH On rows (July 7)</th>
<th>Root soil pH Between rows (July 7)</th>
<th>Av. plant dry weight (mg)</th>
<th>Yield kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nil</td>
<td>0</td>
<td>15.3</td>
<td>0 0 1 99 100</td>
<td>5.20</td>
<td>5.17</td>
<td>5.61</td>
<td>492</td>
</tr>
<tr>
<td>2. Na NO₃ (TD)</td>
<td>25</td>
<td>15.9</td>
<td>0 0 5 95 100</td>
<td>5.10</td>
<td>5.07</td>
<td>5.76</td>
<td>723</td>
</tr>
<tr>
<td>3. Agran 34 (TD)</td>
<td>27</td>
<td>17.5</td>
<td>0 0 3 97 100</td>
<td>5.17</td>
<td>5.10</td>
<td>5.66</td>
<td>833</td>
</tr>
<tr>
<td>4. Urea (TD)</td>
<td>26</td>
<td>17.4</td>
<td>0 0 5 95 100</td>
<td>5.20</td>
<td>5.20</td>
<td>5.78</td>
<td>858</td>
</tr>
<tr>
<td>5. (NH₄)₂ SO₄ (D)</td>
<td>24</td>
<td>18.2</td>
<td>0 1 16 83 99</td>
<td>5.07</td>
<td>5.14</td>
<td>5.35</td>
<td>1198</td>
</tr>
<tr>
<td>6. Agras No. 1 (D)</td>
<td>25</td>
<td>19.9</td>
<td>0 0 13 87 100</td>
<td>5.14</td>
<td>5.07</td>
<td>5.39</td>
<td>915</td>
</tr>
<tr>
<td>7. Agras No. 2 (D)</td>
<td>26</td>
<td>16.6</td>
<td>0 1 14 86 100</td>
<td>5.04</td>
<td>5.17</td>
<td>5.37</td>
<td>1083</td>
</tr>
<tr>
<td>8. D.A.P. (D)</td>
<td>25</td>
<td>16.9</td>
<td>0 0 8 92 100</td>
<td>5.24</td>
<td>5.17</td>
<td>5.47</td>
<td>1472</td>
</tr>
</tbody>
</table>

**LSD p = 0.05**
- **NS**

**p = 0.01**
- **NS**

**p = 0.001**
- **NS**
EFFECT OF NITROGEN SOURCES ON TAKE-ALL (WHEAT)

**Experiment**: 77E4

**Location**: Esperance Downs Research Station (CW17)

**Aim**: As 77MT19 (N = 25 kg/ha)

**Treatments**:

1. Nil
2. Na NO₃ topdressed 175 kg/ha
3. Agran 34 topdressed 74 "
4. Urea topdressed 54 "
5. (NH₄)₂ SO₄ drilled with seed 116 "
6. Agran No. 1 drilled with seed 141 "
7. Agran No. 2 drilled with seed 205 "
8. D.A.P. 18:46 drilled with seed 142 "

**Methods**: Sandy gravel over clay at about 40 cm. Area virgin 1965, sown to Kondinin Rose clover in 1966, both clovers nearly disappeared in 1968 leaving grass pasture (predominantly silver grass with some barley grass) until 1976. Scarified May 11, ploughed May 31, sown to Madden (50 kg/ha) on July 15. For T.1, 2, 3 and 4 super drilled with seed (305 kg/ha); T.5, 6 and 7 as mixture (284, 179, 54). Sampled for take-all and root soil pH on October 13 (GS35). Results mean of 4 replications.

**Results**: Table 1.

**Comments**: The take-all level was very low and no effect of N source on take-all could be detected. However, of particular interest is the contrast between the results of this experiment and those for the pasture/wheat treatment (T4) in 76E6 (Padock CW4). Both paddocks have similar histories. The major differences appear to be as follows:

<table>
<thead>
<tr>
<th>76E6 (T4)</th>
<th>77E4 (T4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- In area with infected plants.</td>
<td>No wheat close by.</td>
</tr>
<tr>
<td>- Worked up days = 65</td>
<td>Worked up days = 22.</td>
</tr>
<tr>
<td>- Urea (30 kg/ha).</td>
<td>Urea (25 kg/ha)</td>
</tr>
<tr>
<td>- In area with heavily infected plots</td>
<td>In area with only lightly infected plots</td>
</tr>
<tr>
<td>- Take-all assessed GS38</td>
<td>GS35</td>
</tr>
<tr>
<td>- Take-all incidence %</td>
<td></td>
</tr>
<tr>
<td>Nil</td>
<td>2</td>
</tr>
<tr>
<td>L</td>
<td>45</td>
</tr>
<tr>
<td>M</td>
<td>41</td>
</tr>
<tr>
<td>S</td>
<td>12</td>
</tr>
</tbody>
</table>
These results suggest that time of working and time of sowing need further investigation in EDRS.
TABLE 1

EFFECT OF NITROGEN SOURCES ON TAKE-ALL OF WHEAT

Results = for Experiment 77E4

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rates of N kg/ha</th>
<th>Plants per m</th>
<th>Take-all incidence %</th>
<th>Root soil pH (Oct 13)</th>
<th>Yield kg/ha</th>
<th>Av. 100 grain weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nil</td>
<td>0</td>
<td>20.1</td>
<td>72 27 1 0</td>
<td>5.58</td>
<td>2556</td>
<td></td>
</tr>
<tr>
<td>2. Na NO₃ (TD)</td>
<td>28</td>
<td>18.7</td>
<td>77 21 2 0</td>
<td>5.74</td>
<td>2611</td>
<td></td>
</tr>
<tr>
<td>3. Agran 34 (TD)</td>
<td>25</td>
<td>21.6</td>
<td>77 22 1 0</td>
<td>5.63</td>
<td>2692</td>
<td></td>
</tr>
<tr>
<td>4. Urea (TD)</td>
<td>25</td>
<td>19.0</td>
<td>80 20 0 0</td>
<td>5.55</td>
<td>2570</td>
<td></td>
</tr>
<tr>
<td>5. (NH₄)₂ SO₄ (D)</td>
<td>24</td>
<td>14.1</td>
<td>82 18 0 0</td>
<td>5.25</td>
<td>2621</td>
<td></td>
</tr>
<tr>
<td>6. Agras No. 1 (D)</td>
<td>25</td>
<td>17.7</td>
<td>82 17 1 0</td>
<td>5.40</td>
<td>2642</td>
<td></td>
</tr>
<tr>
<td>7. Agras No. 2 (D)</td>
<td>25</td>
<td>15.8</td>
<td>86 14 0 0</td>
<td>5.42</td>
<td>2681</td>
<td></td>
</tr>
<tr>
<td>8. D.A.P. (D)</td>
<td>26</td>
<td>18.2</td>
<td>79 20 1 0</td>
<td>5.47</td>
<td>2634</td>
<td></td>
</tr>
</tbody>
</table>

LSD p = 0.05
      = 0.01
      = 0.001
EFFECT OF NITROGEN SOURCES IN TAKE-ALL (WHEAT)

Experiment: 77ES6
Location: R. Curby, Salmon Gums
Aim: As 77MT19 (N = 25 kg/ha)
Treatments:
1. Nil
2. Na NO₃ topdressed 145 kg/ha
3. Agran 34 topdressed 73 "
4. Urea topdressed 53 "
5. (NH₄)₂ SO₄ drilled with seed 119 "
6. Agran No. 1 drilled with seed 131 "
7. Agran No. 2 drilled with seed 201 "
8. D.A.P. 18:46 drilled with seed 133 "

Methods:
Circle Valley sand. Run down pasture (native). Last cropped in 1975. Sown to Madden (50 kg/ha) on June 24. For T.1, 2, 3 and 4 super drilled with seed (305 kg/ha); T5, 6 and 7 as mixture (290, 167, 62 respectively). Sampled for take-all and root soil pH on October 12 (GS36). Results mean of 4 replications.

Results: Table 1

Comments: The take-all level was low and no effect of N source on take-all could be detected.
### Table 1

**EFFECT OF NITROGEN SOURCES ON TAKE-ALL OF WHEAT**

Results - for Experiment 77ES6

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rates of N kg/ha</th>
<th>Plants per m</th>
<th>Take-all incidence</th>
<th>Root soil pH (Oct 12)</th>
<th>Yield kg/ha</th>
<th>Av. 100 grain weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nil</td>
<td>0</td>
<td>17.1</td>
<td>10 85 5 0 5</td>
<td>6.41</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>2. Na NO₃ (TD)</td>
<td>23</td>
<td>14.9</td>
<td>6 76 14 4 18</td>
<td>6.57</td>
<td>136</td>
<td></td>
</tr>
<tr>
<td>3. Agran 34 (TD)</td>
<td>25</td>
<td>14.4</td>
<td>10 86 4 0 4</td>
<td>6.31</td>
<td>162</td>
<td></td>
</tr>
<tr>
<td>4. Urea (TD)</td>
<td>24</td>
<td>13.6</td>
<td>6 86 8 0 8</td>
<td>6.32</td>
<td>169</td>
<td></td>
</tr>
<tr>
<td>5. (NH₄)₂SO₄ (D)</td>
<td>25</td>
<td>13.3</td>
<td>8 92 0 0 0</td>
<td>6.01</td>
<td>141</td>
<td></td>
</tr>
<tr>
<td>6. Agras No. 1 (D)</td>
<td>24</td>
<td>13.6</td>
<td>5 87 7 1 8</td>
<td>5.96</td>
<td>127</td>
<td></td>
</tr>
<tr>
<td>7. Agras No. 2 (D)</td>
<td>24</td>
<td>15.1</td>
<td>10 87 3 0 3</td>
<td>6.01</td>
<td>134</td>
<td></td>
</tr>
<tr>
<td>8. D.A.P. (D)</td>
<td>24</td>
<td>15.2</td>
<td>9 86 4 1 5</td>
<td>6.16</td>
<td>141</td>
<td></td>
</tr>
</tbody>
</table>

LSD p = 0.05
= 0.01
= 0.001

NS NS NS NS NS 0.13 0.18 0.24 31
EFFECT OF NITROGEN SOURCES ON TAKE-ALL (WHEAT)

Experiment: 77GE10
Location: A. Criddle, Dongara
Aim: As 77MT19 (N = 25 kg/ha)

Treatments:
1. Nil
2. Na NO₃ topdressed 165 kg/ha
3. Agran 34 topdressed 67 "
4. Urea topdressed 55 "
5. (NH₄)₂ SO₄ drilled with seed 118 "
6. Agras No. 1 drilled with seed 145 "
7. Agras No. 2 drilled with seed 210 "
8. D.A.P. 18:46 drilled with seed 140 "

Methods: Black Wattle sand. No details of paddock history. Sown to Gamenya (47 kg/ha) on July 7. For T.1, 2, 3 and 4 super drilled with seed (296 kg/ha); T.5, 6 and 7 as mixture (287, 185, 65). Sampled for take-all on September 29 (GS36). Results mean of 4 replications.

Results: Table 1.

Comments: The take-all level was low and no effect of N sources on take-all could be detected.
TABLE 1

EFFECT OF NITROGEN SOURCES ON TAKE-ALL OF WHEAT

Results - for Experiment 77GE10

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate of N kg/ha</th>
<th>Plants per m</th>
<th>Take-all incidence %</th>
<th>Yield kg/ha</th>
<th>Av. 100 grain weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nil</td>
<td>0</td>
<td>14.0</td>
<td>9 87 4 0</td>
<td>1929</td>
<td></td>
</tr>
<tr>
<td>2. Na NO₃ (TD)</td>
<td>26</td>
<td>15.7</td>
<td>7 89 4 0</td>
<td>2067</td>
<td></td>
</tr>
<tr>
<td>3. Agran 34 (TD)</td>
<td>23</td>
<td>18.6</td>
<td>5 95 0 0</td>
<td>1868</td>
<td></td>
</tr>
<tr>
<td>4. Urea (TD)</td>
<td>25</td>
<td>15.5</td>
<td>6 88 6 0</td>
<td>1741</td>
<td></td>
</tr>
<tr>
<td>5. (NH₄)₂ SO₄ (D)</td>
<td>25</td>
<td>15.8</td>
<td>11 86 3 0</td>
<td>1693</td>
<td></td>
</tr>
<tr>
<td>6. Agras No. 1 (D)</td>
<td>26</td>
<td>15.8</td>
<td>8 92 0 0</td>
<td>1818</td>
<td></td>
</tr>
<tr>
<td>7. Agras No. 2 (D)</td>
<td>25</td>
<td>13.0</td>
<td>10 90 0 0</td>
<td>1916</td>
<td></td>
</tr>
<tr>
<td>8. D.A.P. No. 2 (D)</td>
<td>25</td>
<td>12.7</td>
<td>6 93 1 0</td>
<td>1599</td>
<td></td>
</tr>
<tr>
<td>LSD p = 0.05</td>
<td></td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td></td>
</tr>
</tbody>
</table>

Note: NS = Not Significant
**EFFECT OF RATES OF (NH₄)₂ SO₄ AND Na NO₃ ON TAKE-ALL**

**Experiment**: 77E6

**Location**: Esperance Downs Research Station (CW17)

**Aim**: To determine the effect of different rates of (NH₄)₂ SO₄ and Na NO₃ on take-all of wheat.

**Treatments**: Table 1.

**Methods**: Paddock details and soil preparation as 77E4. Sown to Madden (50 kg/ha) on July 12. All topdress treatments applied July 14. All treatments except T.7 super (200 kg/ha) drilled with seed. T.7 super as part of mixture (183 kg/ha). Sampled for take-all October 13 (GS36). Results mean of 3 replications.

**Results**: Table 1.

**Comments**: The take-all level was very low and no effect of rates of N could be detected. Only the (NH₄)₂ SO₄ drilled affected emergence.
### Table 1

**Effects of Rates of Nitrogen on Take-all of Wheat**

Results - for Experiment 7786

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate of N kg/ha</th>
<th>Plants per m</th>
<th>Take-all incidence</th>
<th>Yield kg/ha</th>
<th>Av. 100 grain weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nil</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>1. Nil</td>
<td>0</td>
<td>22.2</td>
<td>77</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>2. (NH₄)₂SO₄ (TD)</td>
<td>20</td>
<td>20.5</td>
<td>81</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>3. &quot;</td>
<td>30</td>
<td>21.6</td>
<td>69</td>
<td>29</td>
<td>2</td>
</tr>
<tr>
<td>4. &quot;</td>
<td>47</td>
<td>22.7</td>
<td>87</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>5. &quot;</td>
<td>58</td>
<td>22.9</td>
<td>89</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>6. &quot;</td>
<td>75</td>
<td>21.4</td>
<td>85</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>7. &quot;</td>
<td>41</td>
<td>12.6</td>
<td>88</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>8. NaNO₃</td>
<td>10</td>
<td>24.5</td>
<td>72</td>
<td>26</td>
<td>2</td>
</tr>
<tr>
<td>9. &quot;</td>
<td>31</td>
<td>23.1</td>
<td>82</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>10. &quot;</td>
<td>43</td>
<td>22.7</td>
<td>80</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>11. &quot;</td>
<td>61</td>
<td>23.8</td>
<td>77</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>12. &quot;</td>
<td>74</td>
<td>19.9</td>
<td>82</td>
<td>18</td>
<td>0</td>
</tr>
</tbody>
</table>

LSD p = 0.05

\[\begin{align*}
\text{p} &= 0.01 \\
\text{p} &= 0.001
\end{align*}\]
EFFECT OF RATES OF (NH₄)₂ SO₄ AND Na NO₃ ON TAKE-ALL

Experiment : 77ES7
Location : D. Maganotti, Salmon Gums
Aim : As 77E6
Treatments :


Results :

Comments : The take-all level was low and no effect of rates of N could be detected.
## TABLE 1

**EFFECT OF RATES OF NITROGEN ON TAKE-ALL OF WHEAT**

Results - for Experiment 77ES7

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate of N kg/ha</th>
<th>Plants per m</th>
<th>Take-all incidence %</th>
<th>Root soil pH (Nov 2)</th>
<th>Yield kg/ha</th>
<th>Av. 100 grain weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nil</td>
<td>0</td>
<td>19.8</td>
<td>54 44 2 0</td>
<td>6.90</td>
<td>428</td>
<td></td>
</tr>
<tr>
<td>2. (NH₄)₂SO₄</td>
<td>15</td>
<td>16.9</td>
<td>66 32 2 0</td>
<td>6.64</td>
<td>472</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>29</td>
<td>20.0</td>
<td>63 37 0 0</td>
<td>6.83</td>
<td>503</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>45</td>
<td>15.9</td>
<td>56 43 1 0</td>
<td>6.56</td>
<td>456</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>61</td>
<td>20.2</td>
<td>72 28 0 0</td>
<td>6.62</td>
<td>459</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>76</td>
<td>15.7</td>
<td>60 39 1 0</td>
<td>6.28</td>
<td>572</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>43</td>
<td>8.9</td>
<td>71 29 0 0</td>
<td>6.56</td>
<td>447</td>
<td></td>
</tr>
<tr>
<td>8. NaNO₃</td>
<td>15</td>
<td>20.0</td>
<td>59 37 4 0</td>
<td>6.97</td>
<td>562</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>28</td>
<td>16.7</td>
<td>43 56 1 0</td>
<td>6.86</td>
<td>516</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>45</td>
<td>15.5</td>
<td>72 27 1 0</td>
<td>6.79</td>
<td>442</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>60</td>
<td>17.3</td>
<td>72 26 2 0</td>
<td>6.84</td>
<td>556</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>74</td>
<td>16.8</td>
<td>60 40 0 0</td>
<td>6.83</td>
<td>556</td>
<td></td>
</tr>
</tbody>
</table>

LSD p = 0.05
= 0.01
= 0.001

NS = Not Significant
EFFECT OF RATES OF \((NH_4)_2SO_4\) ON TAKE-ALL

**Experiment**: 77LG7

**Location**: C. Fisher, Lake Grace

**Aim**: To study the effect of different rates of \((NH_4)_2SO_4\) on take-all of wheat.

**Treatments**: Table 1

**Methods**: Paddock details and soil preparation as 77LG6. Sown to Gamenya (45 kg/ha) on May 31. For T.1, 7, 8, 9 and 10 super drilled with seed (200 kg/ha); T.2, 3, 4, 5 and 6 as mixture (201, 200, 205, 198, 208 respectively). Bulk soil pH between drill row and on drill row determined July 7. Sampled for take-all and plant dry weight on October 19 (GS38). Crop too poor to harvest. Results mean of 3 replications.

**Results**: Table 1

**Comments**: Levels of take-all very high. High rates of NH₄-N caused significant reductions in severity of take-all. Drilling \((NH_4)_2SO_4\) again proved superior to top dressing \((NH_4)_2SO_4\).

Although yield could not be determined, plant dry weight appears to be related to severity of take-all. However, regression analyses will be required before the contributions attributable to N and take-all can be determined.
## TABLE 1

**EFFECT OF RATES OF NITROGEN ON TAKE-ALL OF WHEAT**

Results = for Experiment 77LG7

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate of N kg/ha</th>
<th>Plants per m</th>
<th>Take-all incidence %</th>
<th>Bulk soil pH</th>
<th>Av. plant dry weight (mg)</th>
<th>Yield kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. (NH₄)₂SO₄ (D)</td>
<td>94</td>
<td>14.9</td>
<td>Nil 0 15 45A 40A 85A</td>
<td>5.17 5.24</td>
<td>2600</td>
<td>Failed</td>
</tr>
<tr>
<td>5. &quot; (D)</td>
<td>59</td>
<td>17.8</td>
<td>L 0 14 26B 68AB 86AB</td>
<td>5.14 5.14</td>
<td>1774</td>
<td>&quot;</td>
</tr>
<tr>
<td>4. &quot; (D)</td>
<td>46</td>
<td>20.5</td>
<td>M 0 4 26B 70BC 96BC</td>
<td>5.14 5.20</td>
<td>1608</td>
<td>&quot;</td>
</tr>
<tr>
<td>9. &quot; (TD)</td>
<td>93</td>
<td>18.3</td>
<td>S 0 2 20B 78BCD 98BC</td>
<td>5.17 5.14</td>
<td>1405</td>
<td>&quot;</td>
</tr>
<tr>
<td>8. &quot; (TD)</td>
<td>60</td>
<td>16.2</td>
<td>M+S 0 0 18B 82BCDE 100C</td>
<td>5.14 5.20</td>
<td>1274</td>
<td>&quot;</td>
</tr>
<tr>
<td>3. &quot; (D)</td>
<td>30</td>
<td>18.7</td>
<td>Nil 0 1 12BC 87CDE 99C</td>
<td>5.10 5.17</td>
<td>1162</td>
<td>&quot;</td>
</tr>
<tr>
<td>7. &quot; (TD)</td>
<td>45</td>
<td>17.9</td>
<td>L 0 2 6CD 92DEF 98C</td>
<td>5.14 5.20</td>
<td>937</td>
<td>&quot;</td>
</tr>
<tr>
<td>2. &quot; (D)</td>
<td>15</td>
<td>20.1</td>
<td>M 0 0 5CD 95EF 100C</td>
<td>5.14 5.20</td>
<td>839</td>
<td>&quot;</td>
</tr>
<tr>
<td>1. Nil</td>
<td>0</td>
<td>16.9</td>
<td>S 0 0 4D 96F 100C</td>
<td>5.34 5.20</td>
<td>404</td>
<td>&quot;</td>
</tr>
<tr>
<td>10. Na NO₃ (TD)</td>
<td>44</td>
<td>20.9</td>
<td>M+S 0 0 2D 98F 100C</td>
<td>5.20 5.24</td>
<td>899</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

LSD p = 0.05
0.01
0.001
EFFECT OF RATES OF \((\text{NH}_4)_2\text{SO}_4\) ON TAKE-ALL

**Experiment**: 77JE6

**Location**: D. Reimers, Gairdner River

**Aim**: As 77LG7

**Treatments**: Table 1

**Methods**: Paddock details as 77JE31. Sown to Madden (50 kg/ha) on June 2. For T.1, 7, 8, 9 and 10 sown drilled with seed (200 kg/ha); T.2, 3, 4, 5 and 6 as mixture (207, 204, 208, 198, 200 respectively). Sampled for take-all on October 18 (GS39). Results mean of 3 replications.

**Results**: Table 1

**Comments**: Levels of take-all moderate. High rates of NH₄-N caused significant reductions in take-all severity. There appears to be no relationship between yield and take-all severity. Drilled (NH₄)₂SO₄ significantly reduced plant numbers. This may have influenced yield, but regression analyses would be necessary to determine any relationships between take-all severity, plant numbers and yield.
<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate of N kg/ha</th>
<th>Plants per m</th>
<th>Take-all incidence</th>
<th>Yield kg/ha</th>
<th>Av. 100 grain weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. (NH₄)₂SO₄ (D)</td>
<td>90</td>
<td>13.5</td>
<td>1 86_ABC 10_ABC 3_AB 13_ABC</td>
<td>1894</td>
<td></td>
</tr>
<tr>
<td>5. &quot;</td>
<td>59</td>
<td>12.9</td>
<td>2 94_A 4_A 6_A 4_A</td>
<td>1906</td>
<td></td>
</tr>
<tr>
<td>4. &quot;</td>
<td>47</td>
<td>10.1</td>
<td>0 94_AB 6_AB 0_AB 6_AB</td>
<td>1772</td>
<td></td>
</tr>
<tr>
<td>9. &quot; (TD)</td>
<td>90</td>
<td>19.1</td>
<td>0 78_BCD 17_CDE 5_ABC 22_BC</td>
<td>1956</td>
<td></td>
</tr>
<tr>
<td>8. &quot; (TD)</td>
<td>59</td>
<td>19.9</td>
<td>1 76_CDE 13_BCD 10_BCDE 23 CD</td>
<td>1934</td>
<td></td>
</tr>
<tr>
<td>3. &quot; (D)</td>
<td>31</td>
<td>12.6</td>
<td>0 73_CDE 17_CDE 10_CDE 27_CDE</td>
<td>1859</td>
<td></td>
</tr>
<tr>
<td>7. &quot; (TD)</td>
<td>42</td>
<td>20.1</td>
<td>3 71_CDE 21_CDEF 5_ABCD 26_CDE</td>
<td>1922</td>
<td></td>
</tr>
<tr>
<td>2. &quot; (D)</td>
<td>15</td>
<td>16.5</td>
<td>0 66_DEF 22_DEF 12_CDE 34_DEF</td>
<td>1950</td>
<td></td>
</tr>
<tr>
<td>1. Nil</td>
<td>0</td>
<td>18.2</td>
<td>0 60_EF 25_EF 15_E 46.DE</td>
<td>1812</td>
<td></td>
</tr>
<tr>
<td>10. Na NO₃ (TD)</td>
<td>42</td>
<td>18.0</td>
<td>0 54_F 32_F 14.DE 46_E</td>
<td>1728</td>
<td></td>
</tr>
<tr>
<td>LSD p = 0.05</td>
<td></td>
<td></td>
<td>3.9</td>
<td>*** *** ** **</td>
<td>97</td>
</tr>
<tr>
<td>0.01</td>
<td></td>
<td></td>
<td>5.3</td>
<td>**</td>
<td>na</td>
</tr>
<tr>
<td>0.001</td>
<td></td>
<td></td>
<td>7.2</td>
<td>**</td>
<td>na</td>
</tr>
</tbody>
</table>
Experiments: 77LG25

Location: C. Fisher, Lake Grace

Aim: Preliminary investigation into the effects of bulk soil pH and rhizosphere soil pH on take-all incidence and severity.

Treatments:
1. Nil
2. Ammonium sulphate (As) 212 kg/ha (N = 44.5)
3. Potassium sulphate (Ps) 290 "
4. Iron sulphate (Is) 1080 "
5. Sodium nitrate (Sn) 279 " (N = 44.6)
6. Hydrated lime (Hl) 197 "

Methods: Shallow sand over gravel. Wheat 1976 with high incidence of take-all. Titration curves to increase or decrease pH by up to 1.5 units were determined by Government Chemical Laboratories. Other details of rates of application provided by Dr. W. Cox. It was hoped that: As would decrease root soil pH while providing N; Ps would decrease root soil pH without N; Is would decrease bulk soil pH by 1 unit; Sn would increase root soil pH while providing N; Hl would increase bulk soil pH to 7.

All treatments applied as top dressing before seeding. Sown to Gamenya (45 kg/ha) on May 31. Super drilled with seed at 200 kg/ha. Sampled for bulk soil pH (on the drill row), root soil pH, plant dry weight and take-all on July 12, Aug 3, Aug 31, Sept 21 and Oct 20 (6, 9, 13, 16 and 20 weeks after sowing). Crop too poor to harvest. Results mean of 4 replications.

Results: Table 1, 2 and 3 and Fig. 1.

Comments: In some respects the results from this experiment were disappointing. No yield results could be obtained and although there were significant differences in take-all, the differences were marginal. The extremely high levels of take-all and drought stress for much of the growing season probably had a strong influence on the results. The use of topdressed (NH₄)₂SO₄ rather than drilled may have also reduced the possibility of the 'NH₄-N effect' being operative. However this experiment did provide some valuable information on the effects of various treatments on root soil and bulk soil pH (Table 1 and Fig. 1).
## TABLE 1

**EFFECT OF SOIL pH ON TAKE-ALL OF WHEAT**

Results - for Experiment 77LG25

<table>
<thead>
<tr>
<th>Description</th>
<th>Treat.</th>
<th>Weeks from sowing date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Plants per m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Nil</td>
<td>20.6</td>
<td>22.4</td>
</tr>
<tr>
<td>2. As</td>
<td>24.1</td>
<td>22.1</td>
</tr>
<tr>
<td>3. Ps</td>
<td>18.2</td>
<td>21.3</td>
</tr>
<tr>
<td>4. Is</td>
<td>21.8</td>
<td>21.1</td>
</tr>
<tr>
<td>5. Sn</td>
<td>21.2</td>
<td>23.5</td>
</tr>
<tr>
<td>6. Hl</td>
<td>21.2</td>
<td>18.4</td>
</tr>
<tr>
<td>LSD</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Bulk soil pH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Nil</td>
<td>5.08</td>
<td>5.23</td>
</tr>
<tr>
<td>2. As</td>
<td>5.05</td>
<td>5.09</td>
</tr>
<tr>
<td>3. Ps</td>
<td>5.05</td>
<td>5.21</td>
</tr>
<tr>
<td>4. Is</td>
<td>4.75</td>
<td>4.78</td>
</tr>
<tr>
<td>5. Sn</td>
<td>5.10</td>
<td>5.27</td>
</tr>
<tr>
<td>6. Hl</td>
<td>5.23</td>
<td>5.43</td>
</tr>
<tr>
<td>LSD</td>
<td>0.09</td>
<td>0.12</td>
</tr>
<tr>
<td>Root soil pH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Nil</td>
<td>5.44</td>
<td>5.48</td>
</tr>
<tr>
<td>2. As</td>
<td>4.84</td>
<td>5.04</td>
</tr>
<tr>
<td>3. Ps</td>
<td>5.47</td>
<td>5.45</td>
</tr>
<tr>
<td>4. Is</td>
<td>5.10</td>
<td>5.10</td>
</tr>
<tr>
<td>5. Sn</td>
<td>6.01</td>
<td>5.68</td>
</tr>
<tr>
<td>6. Hl</td>
<td>5.81</td>
<td>5.88</td>
</tr>
<tr>
<td>LSD</td>
<td>0.18</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>0.26</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>0.35</td>
<td>0.18</td>
</tr>
</tbody>
</table>

* Samples for bulk soil pH taken at 5 weeks

33.
Fig 1

ROOT SOIL

pH 6

pH 5

LSD

Weeks

0 6 9 13 16 20

34.
# TABLE 2

**EFFECT OF SOIL pH ON TAKE-ALL OF WHEAT**

Results - for Experiment 77LG25

<table>
<thead>
<tr>
<th>Description</th>
<th>Treat.</th>
<th>Weeks from sowing date</th>
<th>6</th>
<th>9</th>
<th>13</th>
<th>16</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Av. plant dry weight (mg)</strong></td>
<td>1. Nil</td>
<td>61</td>
<td>204</td>
<td>302</td>
<td>535</td>
<td>437</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. As</td>
<td>88</td>
<td>229</td>
<td>641</td>
<td>565</td>
<td>919</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Ps</td>
<td>62</td>
<td>207</td>
<td>312</td>
<td>413</td>
<td>408</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Is</td>
<td>59</td>
<td>175</td>
<td>284</td>
<td>526</td>
<td>1054</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Sn</td>
<td>107</td>
<td>313</td>
<td>598</td>
<td>964</td>
<td>1026</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Hl</td>
<td>62</td>
<td>205</td>
<td>394</td>
<td>371</td>
<td>483</td>
<td></td>
</tr>
<tr>
<td><strong>LSD</strong></td>
<td>NS</td>
<td>71</td>
<td>272</td>
<td>227</td>
<td>290</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Av. top dry weight (mg)</strong></td>
<td>1. Nil</td>
<td>44</td>
<td>122</td>
<td>195</td>
<td>348</td>
<td>335</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. As</td>
<td>67</td>
<td>229</td>
<td>641</td>
<td>565</td>
<td>919</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Ps</td>
<td>45</td>
<td>129</td>
<td>195</td>
<td>251</td>
<td>317</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Is</td>
<td>41</td>
<td>109</td>
<td>186</td>
<td>326</td>
<td>442</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Sn</td>
<td>85</td>
<td>200</td>
<td>382</td>
<td>587</td>
<td>844</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Hl</td>
<td>45</td>
<td>127</td>
<td>259</td>
<td>213</td>
<td>381</td>
<td></td>
</tr>
<tr>
<td><strong>LSD</strong></td>
<td>13</td>
<td>51</td>
<td>207</td>
<td>195</td>
<td>253</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Av. root dry weight (mg)</strong></td>
<td>1. Nil</td>
<td>17</td>
<td>72</td>
<td>107</td>
<td>187</td>
<td>102</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. As</td>
<td>21</td>
<td>124</td>
<td>298</td>
<td>289</td>
<td>175</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Ps</td>
<td>18</td>
<td>84</td>
<td>117</td>
<td>162</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Is</td>
<td>18</td>
<td>66</td>
<td>98</td>
<td>200</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Sn</td>
<td>22</td>
<td>113</td>
<td>216</td>
<td>377</td>
<td>181</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Hl</td>
<td>17</td>
<td>78</td>
<td>135</td>
<td>158</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td><strong>LSD</strong></td>
<td>NS</td>
<td>23</td>
<td>81</td>
<td>80</td>
<td>40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

35
### Table 3

**EFFECT OF SOIL pH ON TAKE-ALL OF WHEAT**

Results - for Experiment 77LG25

<table>
<thead>
<tr>
<th>Treat.</th>
<th>Take-all incidence %</th>
<th>6+ weeks from sowing date</th>
<th>9</th>
<th>13</th>
<th>16</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Nil</td>
<td>1480 19C 0 0 30A 63C 24 50 26</td>
<td>6A 52 42C 0 2 98B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. As</td>
<td>4C 90 6AB 0 1 7D 27A 1 35 53 12</td>
<td>30C 54 16A 1 14 85A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Ps</td>
<td>2AB 81 17BC 0 0 38AB 61C 1 14 59 27</td>
<td>9AB 54 37BC 0 1 99B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Is</td>
<td>7D 87 6A 0 2 48BC 48BC 2 35 44 21</td>
<td>25BC 59 16A 0 6 94B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Sn</td>
<td>2AB 93 5A 0 0 59CD 41AB 0 30 52 18</td>
<td>13ABC 65 22AB 0 5 95B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Hl</td>
<td>3BC 82 15ABC 0 0 32AB 63C 5 23 56 21</td>
<td>6A 60 34BC 0 0 100B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSD</td>
<td>*** NS ** NS</td>
<td>NS NS NS * NS NS NS - - **</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

† weeks from sowing date
CLEANING CROPS AND TAKE-ALL CONTROL

Experiment : 76E6

Location : Esperance Downs Research Station (CW2)

Aim : To study the effect of cleaning crops and 'Spray-seed' fallow on the incidence of take-all in wheat in the following season.

Treatments : Table 1

Methods : 1975 - paddock history similar to that described for 77E4; 1976 - ploughed June 11, lupins sown June 30, cereals sown July 7, T.5 sprayed with 'Spray-seed' July 5, few non-grass weeds in T.5 spot sprayed October 6; 1977 - ploughed May 26, cultivated June 2, wheat sown June 17. Sampled for take-all October 13 (GS38). Results mean of 4 replications.

Results : Table 1. Details of grasses and weeds in 1976 treatments were as follows: lupin - weed free; spray-fallow - excellent bare fallow; oats - weed free; wheat - a few grasses and other weeds in take-all patches; pasture - one quadrat (1m x 1m) was removed from each replication. Average dry weight of sub clover 167 g/quadrat, while the average dry weight of grasses was 131 g. The grasses were mostly Vulpia myuros, of which 65% of the plants were infected with G. graminis. The remaining grasses (total for all quadrats) were barley grass (21 plants, 13 infected); Bromus mollis (5, 1); Bromus diandrus (1, 1) and ARG (1, 0).

Comments : High levels of take-all. There were highly significant differences in incidence and severity of take-all. Lupins and spray-fallow (oats to a lesser extent) caused marked reductions in take-all. The levels of take-all in the pasture treatment have been discussed previously (see 77E4).
<table>
<thead>
<tr>
<th>Treatments</th>
<th>Take-all incidence 1976</th>
<th>Take-all incidence 1977</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>kg/ha</td>
</tr>
<tr>
<td></td>
<td>Nil  L  M  S</td>
<td>Nil  L  M  S  M+S</td>
<td></td>
</tr>
<tr>
<td>1976 1977</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Lupins</td>
<td>-  -  -  -</td>
<td>55^A 37^B 6^A 4^AB 10^A</td>
<td>2222</td>
</tr>
<tr>
<td>Wheat</td>
<td></td>
<td>49^A 35^B 12^AB 4^A 16^A</td>
<td>2109</td>
</tr>
<tr>
<td>5. Spray-fallow</td>
<td>-  -  -  -</td>
<td>12^B 58^C 22^B 8^AB 30^B</td>
<td>1772</td>
</tr>
<tr>
<td>2. Oats</td>
<td>97  3  0  0</td>
<td>2^C 45^BC 41^C 12^B 53^C</td>
<td>1317</td>
</tr>
<tr>
<td>4. Pasture†</td>
<td>-  -  -  -</td>
<td>0^C 13^A 44^C 43^C 87^D</td>
<td>609</td>
</tr>
<tr>
<td>1. Wheat</td>
<td>7  44  12  36</td>
<td>***  ***  ***  ***</td>
<td></td>
</tr>
<tr>
<td>LSD p = 0.05</td>
<td>-  -  -  -</td>
<td>***  ***  ***  ***</td>
<td>308</td>
</tr>
<tr>
<td>0.01</td>
<td>na</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>0.001</td>
<td>na</td>
<td>na</td>
<td></td>
</tr>
</tbody>
</table>

† See text for comments on grasses and clovers
CLEANING CROPS AND TAKE-ALL CONTROL

Experiment: 76N5
Location: Newdegate Research Station (N2)
Aim: As 76E6
Treatments: Tables below

Results

<table>
<thead>
<tr>
<th>Treatments 1976</th>
<th>Take-all incidence</th>
<th>Grass numbers†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nil</td>
<td>L</td>
</tr>
<tr>
<td>4. Sprayfallow</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. Pasture</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. Oats</td>
<td>95.8</td>
<td>3.6</td>
</tr>
<tr>
<td>1. Wheat</td>
<td>79.6</td>
<td>14.4</td>
</tr>
</tbody>
</table>

† For T4 and T3, total number of plants from 5 quadrats (1 per replication) each 1m x 0.5m. T4 = av. dry weight of clover and grass per quadrat was 14g and 47g resp.; T3 = 251g and 21g resp.
† For T2, total number of plants from 7.5m of drill row.
‡ For T1, total number of plants from 15m of drill row.
$ Bd = Bromus diandrus; Vm = Vulpia myuros; Pd = Pentaschistis diroides; ARG = annual rye grass.
* Grasses from T4 and T3 bioassayed for presence of G. graminis, only 4 B. myuros infected.

<table>
<thead>
<tr>
<th>Treatments 1977</th>
<th>Take-all infection</th>
<th>Yield kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nil</td>
<td>L</td>
</tr>
<tr>
<td>4. Wheat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. &quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. &quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. &quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSD p = 0.05</td>
<td>0.01</td>
<td></td>
</tr>
</tbody>
</table>

Comments: Grass control on spray-fallow in 1976 only moderately effective. The spray-seed reduced the density of grass, but the surviving plants were greatly increased in size.
CLEANING CROPS AND TAKE-ALL CONTROL

Experiment : 76M47

Location : Merredin Research Station (T3).

Aim : As 76F6

Treatments : Tables below

Methods : 1975 = Grassy pasture; 1976 = Cultivated June 28, cereals sown July 6, T4 sprayed with 'Spray-seed' July 6; 1977 = Sampled for take-all October 24 (GS46). Results mean of 5 replications.

Results :

<table>
<thead>
<tr>
<th>Treatments 1976</th>
<th>Take-all incidence</th>
<th>Grass density†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nil</td>
<td>L</td>
</tr>
<tr>
<td>4. Sprayfallow</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. Pasture</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. Oats</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>1. Wheat</td>
<td>92</td>
<td>8</td>
</tr>
</tbody>
</table>

† Grass density rating Nil (0) to dense stand (5)

<table>
<thead>
<tr>
<th>Treatments 1977</th>
<th>Take-all incidence</th>
<th>Yield kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nil</td>
<td>L</td>
</tr>
<tr>
<td>4. Wheat</td>
<td>1331</td>
<td></td>
</tr>
<tr>
<td>3. &quot;</td>
<td>992</td>
<td></td>
</tr>
<tr>
<td>2. &quot;</td>
<td>834</td>
<td></td>
</tr>
<tr>
<td>1. &quot;</td>
<td>611</td>
<td></td>
</tr>
<tr>
<td>LSD p = 0.05</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td>0.01</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>0.001</td>
<td>na</td>
<td></td>
</tr>
</tbody>
</table>

Comments : Grass control on spray-fallow (1976) only moderately effective. I expect low levels of take-all in 1977. High yield on T4 in 1977 may be due to moisture conservation or nitrogen release in 1976.
CLEANING CROPS AND TAKE-ALL CONTROL

Experiment : 76A7
Location : Avondale Research Station (6D)
Aim : As 76E6
Treatments : Tables below.
Methods : 1975 - Grassy pasture; 1976 - Cereals and lupins sown July 1, T5 sprayed with 'Spray-seed' on July 7; 1977 - Sampled for take-all on October 24 (GS43). Results mean of 4 replications.

Results :

<table>
<thead>
<tr>
<th>Treatments 1976</th>
<th>Take-all incidence %</th>
<th>Grass details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nil</td>
<td>L</td>
</tr>
<tr>
<td>3. Lupins</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5. Sprayfallow</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. Oats</td>
<td>98</td>
<td>2</td>
</tr>
<tr>
<td>4. Pasture</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1. Wheat</td>
<td>79</td>
<td>21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatments 1976</th>
<th>Take-all incidence %</th>
<th>Yield kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nil</td>
<td>L</td>
</tr>
<tr>
<td>3. Wheat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. &quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. &quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. &quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. &quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LSD NS

Comments :
CLEANING CROP AND TAKE-ALL CONTROL

Experiment : 76LG27
Location : R. Carruthers, Lake Grace
Aim : As 76E6
Treatments : Tables below.
Methods : 1975 - Pasture with high level of barley grass (heavily infected with G. graminis); 1976 - Cereal crop June 6; 1977 - Sampled for take-all on October 26 (GS42). Results mean of 5 replications.

Results :

<table>
<thead>
<tr>
<th>Treatments 1976</th>
<th>Take-all incidence</th>
<th>Grass details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nil</td>
<td>L</td>
</tr>
<tr>
<td>1. Wheat</td>
<td>22</td>
<td>45</td>
</tr>
<tr>
<td>2. Oats</td>
<td>96</td>
<td>4</td>
</tr>
<tr>
<td>3. Fallow+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4. Barley</td>
<td>35</td>
<td>44</td>
</tr>
</tbody>
</table>

* Fallow was normal fallow but became weedy and was sprayed with 'Spray-seed'.

<table>
<thead>
<tr>
<th>Treatments 1977</th>
<th>Take-all incidence</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nil</td>
<td>L</td>
</tr>
<tr>
<td>1. Wheat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. &quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. &quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. &quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments :
EFFECT OF SPRAY FALLOW AND TIME OF PLANTING ON TAKE-ALL

Experiment : 77GE35

Location : J. Burton, Dongara

Aim : To determine the effect of spray fallows and time of planting on the incidence of take-all in wheat.

Treatments :

<table>
<thead>
<tr>
<th>Treat.</th>
<th>Plants per m</th>
<th>Take-all incidence</th>
<th>Yield kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29.1</td>
<td>Nil 0^A</td>
<td>36^C</td>
</tr>
<tr>
<td>2</td>
<td>23.5</td>
<td>L 64 M 22^A</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>33.1</td>
<td>M 80 S 12^A</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>25.6</td>
<td>S 37 M+S 5^B</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>35.1</td>
<td>M 65 L 22^A</td>
<td>13</td>
</tr>
<tr>
<td>6</td>
<td>26.1</td>
<td>S 41 M+S 6^B</td>
<td>0</td>
</tr>
</tbody>
</table>

LSD p=0.05 7.9 *** NS ** (NS: 1, 3, 5 only) 364

Methods : Black wattle sand. Grassy pasture. 'Spray-seed' applied at 2 L/ha. All spray treatments resprayed September 17. 1977 – Gamenya sown (55 kg/ha) with 130 kg/ha of super. T1, 3 and 5 sampled for take-all August 30 (GS36) and T2, 4 and 6 on September 29 (GS34).

Results : Mean of 4 replications.
## Analysis of Variance for Mod. + Sev. take-all and yield

<table>
<thead>
<tr>
<th>Variance due to</th>
<th>df</th>
<th>Mod + Sev take-all VR</th>
<th>Yield VR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replications</td>
<td>3</td>
<td>8.16 **</td>
<td>10.90 ***</td>
</tr>
<tr>
<td>Treatments</td>
<td>2</td>
<td>6.47 **</td>
<td>4.81 **</td>
</tr>
<tr>
<td>Spray</td>
<td>2</td>
<td>1.78 NS</td>
<td>3.19 NS</td>
</tr>
<tr>
<td>Time of sowing</td>
<td>1</td>
<td>27.09 ***</td>
<td>12.04 **</td>
</tr>
<tr>
<td>S x T</td>
<td>2</td>
<td>1 NS</td>
<td>2.82 NS</td>
</tr>
<tr>
<td>Error</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Yield: Early mean 639 kg/ha

: Late mean 981 kg/ha

LSD for Time means p = 0.05 210

Comments: The spray-fallows had no effect on take-all. Neither fallow was satisfactory. The early fallow had a large amount of weed regrowth and the late fallow was very patchy. Late sowing caused a considerable reduction in take-all incidence and severity and increase in yield.
EFFECT OF SPRAY FALLOW AND TIME OF PLANTING ON TAKE-ALL

Experiment : 76LG26
Location : Newdegate Research Station (N2)
Aim : As 77GB35

Treatments : 1976 1977

1. Pasture Wheat sown June 2
2. Pasture " " July 6
3. 'Spray-seed' June 11 " " June 2
4. 'Spray-seed' " " July 6
5. 'Spray-seed' Sept 23 " " June 2
6. 'Spray-seed' " " July 6

Methods : Grey sand. Grassy pasture. All sprayed plots re-sprayed on October 13. 1977 = Gamenya sown 45 kg/ha with super (90 kg/ha) and topdressed with urea (36 kg/ha). T1, 3 and 5 sampled for take-all on October 5 (GS36) and T2, 4, 6 on October 25 (GS38).

Results mean of 4 replications.

<table>
<thead>
<tr>
<th>Treat.</th>
<th>Plants per m</th>
<th>Take-all incidence %</th>
<th>Yield kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Nil</td>
<td>L</td>
</tr>
<tr>
<td>1</td>
<td>15.8</td>
<td>84</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>15.6</td>
<td>89</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>16.2</td>
<td>97</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>14.2</td>
<td>93</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>15.6</td>
<td>84</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>15.0</td>
<td>84</td>
<td>10</td>
</tr>
</tbody>
</table>

LSD p=0.05 NS NS NS NS = 256

Comments : Take-all levels low.
EFFECT OF SPRAY FALLOW AND TIME OF PLANTING ON TAKE-ALL

Experiment : 76LG38
Location : J. Watson, Newdegate
Aim : As 76GE35

Treatments :
1. Pasture Wheat sown June 2
2. Pasture Wheat sown July 6
3. 'Spray-seed' July 9 Wheat sown June 2
4. 'Spray-seed' Wheat sown July 6
5. 'Spray-seed' Sept 10 Wheat sown June 2
6. 'Spray-seed' Wheat sown July 6

Methods : Grey sand. Grassy pasture. T3 and 4 re-sprayed July 28 and August 10. 1977 - Gamenya sown (45 kg/ha) with super (110 kg/ha). T1, 3 and 5 sampled for take-all on October 5 (GS36) and T2, 4, 6 on October 25 (GS38). Results mean of 4 replications.

Results

<table>
<thead>
<tr>
<th>Treat.</th>
<th>Plants per m</th>
<th>Take-all incidence</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Nil</td>
<td>L</td>
</tr>
<tr>
<td>1</td>
<td>17.5</td>
<td>80</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>17.7</td>
<td>86</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>17.1</td>
<td>96</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>16.8</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>18.5</td>
<td>77</td>
<td>18</td>
</tr>
<tr>
<td>6</td>
<td>16.4</td>
<td>77</td>
<td>21</td>
</tr>
</tbody>
</table>

LSD NS NS NS - - 189

Comments : Take-all levels low.
EFFECT OF RATE OF SOWING ON TAKE-ALL

Experiment : 77JE7
Location : I. Goldfinch, Jerdacuttup
Aim : To study the effects of plant density on incidence and severity of take-all in wheat.
Treatments : Table below.
Results mean of 3 replications.

<table>
<thead>
<tr>
<th>Treatments Sowing rates kg/ha</th>
<th>Plants per m</th>
<th>Take-all incidence %</th>
<th>Av. 100 grain weight (mg)</th>
<th>Yield kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Nil L M S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. 13</td>
<td>6.7</td>
<td>0 5 22 73</td>
<td></td>
<td>900</td>
</tr>
<tr>
<td>2. 20</td>
<td>8.7</td>
<td>0 6 27 67</td>
<td></td>
<td>1162</td>
</tr>
<tr>
<td>3. 31</td>
<td>16.2</td>
<td>0 0 10 90</td>
<td></td>
<td>1137</td>
</tr>
<tr>
<td>4. 42</td>
<td>14.6</td>
<td>0 4 42 54</td>
<td></td>
<td>1175</td>
</tr>
<tr>
<td>5. 50</td>
<td>19.8</td>
<td>0 1 24 75</td>
<td></td>
<td>937</td>
</tr>
<tr>
<td>6. 58</td>
<td>17.6</td>
<td>0 0 22 78</td>
<td></td>
<td>1097</td>
</tr>
<tr>
<td>7. 82</td>
<td>31.1</td>
<td>0 2 19 79</td>
<td></td>
<td>709</td>
</tr>
<tr>
<td>8. 164</td>
<td>51.1</td>
<td>0 2 21 77</td>
<td></td>
<td>853</td>
</tr>
<tr>
<td>LSD p=0.05</td>
<td>7.3</td>
<td>- - NS NS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.01</td>
<td>10.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.001</td>
<td>14.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments : Levels of take-all were very high. Take-all may have been too high to allow any treatment differences to develop.
**LONG TERM ROTATIONS AND TAKE-ALL**

<table>
<thead>
<tr>
<th>Experiment</th>
<th>: 77ES8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>E. Starchevich, Circle Valley</td>
</tr>
<tr>
<td>Aim</td>
<td>To investigate effect of various rotation on the incidence of take-all in wheat.</td>
</tr>
<tr>
<td>Treatments</td>
<td>Table 1.</td>
</tr>
<tr>
<td>Results</td>
<td>Table 1.</td>
</tr>
<tr>
<td>Comments</td>
<td>No take-all detected on wheat from experiment or from a few Danthonia sp. and Stipa sp. found in surrounding bush.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experiment</th>
<th>73SG16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Salmon Gums Research Station (Circle Valley Lease)</td>
</tr>
<tr>
<td>Aim</td>
<td>As above</td>
</tr>
<tr>
<td></td>
<td>1. Wheat Pasture Wheat Pasture Wheat</td>
</tr>
<tr>
<td></td>
<td>2. Wheat Wheat Pasture Pasture Wheat</td>
</tr>
<tr>
<td></td>
<td>3. Wheat Pasture Pasture Pasture Wheat</td>
</tr>
<tr>
<td>Method</td>
<td>All paddocks in wheat were sampled for take-all (1.5 ha plots - 12 transects x 5 sites; 0.75 ha plots - 6 x 5; 0.5 ha plots - 4 x 4) on September 13 (GS36).</td>
</tr>
<tr>
<td>Results</td>
<td>Not available</td>
</tr>
<tr>
<td>Comments</td>
<td>The presence of Rhizoctonia may add a complication to take-all assessments.</td>
</tr>
</tbody>
</table>
TABLE 1

LONG TERM ROTATION AND TAKE-ALL

Results - for Experiment 77ES8

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Total numbers from 5 replications</th>
<th>Yield kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. Plots examined</td>
<td>Fusarium type</td>
</tr>
<tr>
<td>Virgin Fallow Wheat</td>
<td>411</td>
<td>5</td>
</tr>
<tr>
<td>&quot; &quot; &quot; &quot; &quot; Medic(P) Wheat</td>
<td>416</td>
<td>1</td>
</tr>
<tr>
<td>&quot; &quot; &quot; &quot; Medic(G) Wheat</td>
<td>451</td>
<td>1</td>
</tr>
<tr>
<td>&quot; &quot; &quot; &quot; Wheat Wheat</td>
<td>405</td>
<td>1</td>
</tr>
</tbody>
</table>

LSD p = 0.05

+ Roots appeared dry near the crown-yielded *F. roseum*, *F. oxysporum* or Trichoderma spp.

+ Brown root tips superficially similar to *Rhizoctonia*, but all yielding either *F. roseum* or *F. oxysporum*.

P = poor medic - undersown with Harbinger (3 kg/ha) in cropping year;

G = good medic - sown following crop.
CONTINUOUS WHEAT AND TAKE-ALL

Experiment : 74SG16
Location : Salmon Gums Research Station (Circle Valley Lease)
Aim : To provide an area of continuous wheat for the study of take-all decline and to study the effect on take-all of two cultivation methods.

Treatments :

<table>
<thead>
<tr>
<th>Year</th>
<th>Northern Site (0.47 ha)</th>
<th>Southern Site (0.47 ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1972</td>
<td>Wheat</td>
<td>Wheat</td>
</tr>
<tr>
<td>1973</td>
<td>Natural medic</td>
<td>Natural medic</td>
</tr>
<tr>
<td>1974</td>
<td>Wheat - spray seed, ploughed, harrowed, Agran 24:24 (100 kg/ha)</td>
<td>Wheat - as Northern site</td>
</tr>
<tr>
<td>1975</td>
<td>Wheat - scratch for ARG, spray-seed, super (200 kg/ha)</td>
<td></td>
</tr>
<tr>
<td>1976</td>
<td>Wheat - scratch for ARG, spray-seed, Agran 18:18 (142.5 kg/ha)</td>
<td>Wheat - scratch for ARG, ploughed, super (200 kg/ha)</td>
</tr>
<tr>
<td>1977</td>
<td>Wheat - sprayseed, Agran 34 (70 kg/ha)</td>
<td>Wheat - ploughed, Agran 34 (70 kg/ha)</td>
</tr>
</tbody>
</table>

Results :

<table>
<thead>
<tr>
<th>Year</th>
<th>Take-all incidence % (plant infected)</th>
<th>Yield kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Northern</td>
<td>Southern</td>
</tr>
<tr>
<td>1974</td>
<td>NA†</td>
<td>NA</td>
</tr>
<tr>
<td>1975</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>1976</td>
<td>31.0</td>
<td>26.3</td>
</tr>
<tr>
<td>1977</td>
<td>217</td>
<td>271</td>
</tr>
</tbody>
</table>

† In 1974 and 1975 take-all assessed in small mapping experiments only. In 1976 and 1979 the area assessed was increased to 60 x 10m.

Comments : The presence of Rhizoctonia may add a complication to take-all assessments.
EFFECT OF SOWING SYSTEMS ON TAKE-ALL

Experiment : 76E33
Location : Esperance Downs Research Station (CW2)
Aim : To study the effect of various sowing systems on take-all in wheat.

Treatments :

1. Normal cultivation and conventional drill.
2. 'Spray-seed' conventional drill.
4. 'Spray-seed' T.D.D.
5. 'Spray-seed' split application T.D.D.

1976

1. Ploughed May 18 conventional drill June 15.
2. 'Spray-seed' June 1 conventional drill June 2.
5. No treatment, conventional drill June 2.

1977

Methods :
Paddock history as 76E6. 1976 - sampled for take-all on October 29 (GS38). 1977 - sampled for take-all on November 2 (GS40). Results mean of 3 replications.

Results :

Table 1.
In 1977 T1 weed free, T5 very heavily infested with weeds. Other treatments some weeds.

Comments :

High level of take-all. Significant difference in severe category in 1977, but difference only marginal and apparently not related to yield differences. No obvious build-up of take-all between seasons.
### TABLE 1

**EFFECT OF SOWING SYSTEMS ON TAKE-ALL**

Results - for Experiment 76E33

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Plants per m</th>
<th>Take-all incidence</th>
<th>Yield</th>
<th>kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16.8</td>
<td>18.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>14.3</td>
<td>15.9</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>14.2</td>
<td>15.3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>11.1</td>
<td>14.3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>13.5</td>
<td>13.4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>LSD p = 0.05</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>0.01</td>
<td>na</td>
<td>na</td>
<td>na</td>
</tr>
</tbody>
</table>
EFFECT OF GRASS CONTROL ON TAKE-ALL

Experiment : 77JE3

Location : D. Reimers, Gairdner River

Aim : To study the effect of spray fallow or grass control on the incidence of take-all in the following season.

Treatments :

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Details for 1977</th>
<th>Dry matter kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 &amp; 2</td>
<td>25 to 30% est. clover in plots</td>
<td>2096</td>
</tr>
<tr>
<td>3 &amp; 4</td>
<td>Few sub clover still remaining</td>
<td>-</td>
</tr>
<tr>
<td>5 &amp; 6</td>
<td>Excellent grass elimination</td>
<td>1556</td>
</tr>
</tbody>
</table>

Methods : 'Surflan' applied at 1.3 kg/ha

Results :

Experiment : 77JE4

Location : C. Parsons, Fitzgerald

Aim : As 77JE3, but with 2 seasons of treatment.

Treatments :

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Details for 1977</th>
<th>1977</th>
<th>1978</th>
<th>1979</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nil</td>
<td>Wheat sown early</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1a. Nil</td>
<td>Wheat sown early</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1b. Wheat</td>
<td>&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. 'Surflan' May 13</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td>2a. 'Surflan' May 13</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td>2b. Wheat</td>
<td>&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. 'Spray-seed' July 6</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td>3a. 'Spray-seed' July 6</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td>3b. Wheat</td>
<td>&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Methods : 'Surflan' applied at 1.3 kg/ha. T3 - very poor control of vegetation (August 2), re-sprayed.

Results :

T1 - Very grassy
T2 - Good grass control, but some ARG and Broome grass still present.
T3 - Good control at end of season.

Comments : Treatment 1b. may be changed to 'Surflan' to give a comparison of one and two seasons of grass elimination.
Experiment : Un-numbered

Location : On the Lake Magenta road approximately 18 km north of the Jerramungup-Ravensthorpe road.

Aim : To determine the level of infection of grasses by G. graminis on new land and developed land.

Method : A transect was made from a wheat crop (developed land) across a road and into a burnt area on the edge of some virgin land that was being ploughed for the first time. Wheat and grasses were collected at intervals and bio-assayed for the presence of G. graminis.

Results : Table 1

Comments : On the burnt new land verge there was a relatively dense stand of Stipa compressa. About 10% of these plants were infected with G. graminis capable of attacking wheat. In the fallow large amounts of S. compressa could be seen turned into the soil by the ploughing. As this grass species has a coarse tough root system, it is unlikely to break down rapidly. It is likely therefore to provide a source of infection for the subsequent first wheat crop.
<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Distance from centre of road (m)</th>
<th>Site</th>
<th>Plants infected with take-all % (number examined)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wheat</td>
</tr>
<tr>
<td>NEW</td>
<td>Ploughed</td>
<td>22</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>LAND</td>
<td>Road verge</td>
<td>* 21</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(burnt)</td>
<td>* 15</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* 10</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>ROAD 18m WIDE</td>
<td></td>
<td></td>
<td></td>
<td>RO.A.D</td>
</tr>
<tr>
<td></td>
<td>Road verge</td>
<td>* 10</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(burnt)</td>
<td>* 20</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>23</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Firebreak (ploughed)</td>
<td>28</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>29</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>31</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>33</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>43</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>53</td>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>63</td>
<td>11</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>73</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>83</td>
<td>13</td>
<td>-</td>
</tr>
</tbody>
</table>

* S.c. = Stipa compressa; S.v. = Stipa variabilis; B.r. = Bromus rubens; D.s. = Danthonia semiannularis; V.m. = Vulpia myuros
CONTROL OF BARLEY COVERED SMUT WITH FUNGICIDES

Experiment : 77A3
Location : Avondale Research Station (1A)
Aim : To test the effectiveness of seed dressings for the control of barley covered smut.
Treatments : Table below
Method : Infested seed retained from last season's untreated plots (76A5) was used. In 1976 untreated plots had 1.41% of plants infected. The inoculum level was 34,850 spores per seed. Seed pickled June 14 and sown June 23. Incidence assessed at maturity. Results are the mean of 3 replications.

Results

<table>
<thead>
<tr>
<th>Pickle</th>
<th>Rate g/10 kg</th>
<th>Yield kg/ha</th>
<th>Plants infected %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Untreated</td>
<td></td>
<td>1325</td>
<td>2.30</td>
</tr>
<tr>
<td>2. Pro Gro 25L</td>
<td>100</td>
<td>1494</td>
<td>0.005</td>
</tr>
<tr>
<td>3. Bennel 15%</td>
<td>100</td>
<td>1469</td>
<td>0.027</td>
</tr>
<tr>
<td>4. M.B.C. 15%</td>
<td>100</td>
<td>1481</td>
<td>0.013</td>
</tr>
<tr>
<td>5. Panoram 25</td>
<td>150</td>
<td>1331</td>
<td>0.003</td>
</tr>
<tr>
<td>6. Furavax 7.5%</td>
<td>100</td>
<td>1400</td>
<td>0</td>
</tr>
<tr>
<td>7. Bawsan L</td>
<td>90</td>
<td>1400</td>
<td>0.013</td>
</tr>
<tr>
<td>8. KWG-0519 15%</td>
<td>150</td>
<td>1512</td>
<td>0</td>
</tr>
<tr>
<td>9. EL208 6.6%</td>
<td>150</td>
<td>1381</td>
<td>0.008</td>
</tr>
</tbody>
</table>

Contents : All fungicides gave good control, but level of infection in previous crop still relatively low. The level of infection in the untreated plots has risen over the past 4 seasons as follows:-

1974 = 0.05%  
1976 = 1.41%  
1975 = 0.22%  
1977 = 2.30%  

Bawson L caused some irritation to the eyes.
CONTROL OF BUNT WITH FUNGICIDES

Experiment : 77M3
Location : Merredin Research Station
Aim : To test fungicides for the control of bunt of wheat.
Treatments : Table below
Method : Seed with a very low level of inoculum (1,050 spores per seed) from the previous season's bunticide experiment (76M8) was used in this experiment. Seed pickled June 14 and sown June 21. Incidence assessments made at maturity. Results mean of 3 replications.

Results :

<table>
<thead>
<tr>
<th>Pickle</th>
<th>Rate g/100 kg</th>
<th>Yield kg/ha</th>
<th>Bunt incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Untreated 453</td>
<td>1932</td>
<td>1.32</td>
<td></td>
</tr>
<tr>
<td>2. Bennel 15% 469</td>
<td>150</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3. M.B.C. 15% 453</td>
<td>150</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>4. Panoram 25 469</td>
<td>150</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5. Furavax 7.5% 469</td>
<td>100</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>6. Bawsan L 531</td>
<td>75 ml</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>7. Bravo Flowable 484</td>
<td>200 ml*</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>8. KWG-0519 15% 437</td>
<td>150</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>9. EL 228 6.67% 437</td>
<td>150</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>10. Le San ELL 437</td>
<td>200</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>11. Vitavax 50 L 422</td>
<td>100</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

* Inadvertently used double recommended rate.

Comments : All pickles performed satisfactorily but the disease pressure was very low. Bawsan L caused some irritation to the eyes, while Bravo Flowable caused some irritation to nose and throat.
CONTROL OF OAT LOOSE SMUT WITH FUNGICIDES

Experiment : 77A4

Location : Avondale Research Station (1A)

Aim : To test fungicides for the control of loose smut of oats.

Treatments : Table below.

Method : Seed with a high level of inoculum (848,000 spores per seed) from the property of Mr. D. Brown (Beverley) was used in this experiment. Seed pickled June 14 and sown June 23. Incidence assessments made at maturity. Results mean of 3 replications.

Results

<table>
<thead>
<tr>
<th>Pickle</th>
<th>Rate g/100 kg</th>
<th>Yield kg/ha</th>
<th>Bunt incidence %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Untreated</td>
<td></td>
<td>706</td>
<td>23.0</td>
</tr>
<tr>
<td>2. Pro Gro 25L</td>
<td>100</td>
<td>744</td>
<td>5.5</td>
</tr>
<tr>
<td>3. Bennel 15%</td>
<td>100</td>
<td>787</td>
<td>1.7</td>
</tr>
<tr>
<td>4. M.B.C. 15%</td>
<td>100</td>
<td>831</td>
<td>0.7</td>
</tr>
<tr>
<td>5. Panoram 25</td>
<td>150</td>
<td>819</td>
<td>0</td>
</tr>
<tr>
<td>6. Furavax 7.5%</td>
<td>100</td>
<td>806</td>
<td>0</td>
</tr>
<tr>
<td>7. KWG-0519 15%</td>
<td>150</td>
<td>806</td>
<td>0</td>
</tr>
<tr>
<td>8. EL 228 6.67%</td>
<td>150</td>
<td>762</td>
<td>16.2</td>
</tr>
</tbody>
</table>

Comments : The test fungicide EL 228 performed poorly, while Pro Gro 25 plus performed worse than expected. The remaining products gave good control.