The Best Bet canola project

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Abstract

Anecdotal and benchmarking data indicate that canola yields have been declining over the past five to six years in southern NSW. Despite the role of canola as a break crop in significantly increasing the grain yield of following cereal crops, many growers are beginning to question the economics of growing canola especially in times of low grain prices. The reasons for this decline are being investigated to return canola to its role as the major break crop in southern NSW.

Keywords: canola yield decline, sclerotinia, blackleg, fungicide

Project aim

The aim of the project is to develop management practices that will increase canola productivity in the high rainfall zone of NSW by 35% in five years.

Background

The Best Bet Canola Project commenced in 2001 with Grain Growers Australia as the major sponsor providing funding for five years. Harden Agricultural Consultants are the minor sponsors with other partners involved in the project being the CSIRO and NSW Agriculture.

The project was set up in response to concerns expressed by growers and advisers that canola yields in southern NSW have been declining over the past 5–6 years with a subsequent adverse impact on the profitability of growing canola. Benchmarking undertaken by consultants Holmes and Sackett within their client group across southern NSW and northern Victoria for the period from 1996/7 to 2000/01 has confirmed this decline, not only in actual grain yield but also in water use efficiency of canola crops.

A Project Management Committee made up of representatives of the sponsors, the other partners, and district canola growers determines the priorities for research each year. Agritech Pty. Ltd. was contracted to conduct the trial work.

Project details

The initial meeting of the Management Committee determined that the major issues limiting canola productivity in the higher rainfall zones and which required immediate investigation were:

- Sclerotinia
- Blackleg
- Variety
- Time of Sowing

Weed control, nutrition, tillage and stubble were considered as generally being well managed by most growers. Competency in these areas was seen as a base line for most growers who achieve average or above average productivity.

To incorporate these issues, two trial sites covering different soil types were selected and trials investigating the impact of variety, disease and time-of-sowing were sown at each site.

Results from 2001

Variety

The 2001 trials did not place a great deal of emphasis on varietal differences apart from blackleg rating. The two varieties selected were Hyola 60 and Rainbow.

The results are shown as the average yield across the three times of sowing and the six fungicide treatments.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Hyola 60</th>
<th>Rainbow</th>
<th>t/ha</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galong</td>
<td>2.63</td>
<td>2.31</td>
<td>0.32</td>
<td>13.85</td>
</tr>
<tr>
<td>Wallendbeen</td>
<td>3.27</td>
<td>3.07</td>
<td>0.20</td>
<td>6.51</td>
</tr>
</tbody>
</table>

The varieties performed as expected compared to the variety trials conducted by NSW Agriculture over a number of years.

Sclerotinia

Sclerotinia is seen as one of the most important diseases facing canola production in the higher...
rainfall zones of NSW. The aim of the trial in 2001 was to generate some base line data to determine the percentage loss attributed to this disease.

The trial plots were split with half of each plot being sprayed and half left unsprayed. High rates of fungicide were applied to ensure as high a level as possible of disease control. The rates of fungicide applied were not economic rates but were used to assess the level of yield loss caused by the disease.

The use of the fungicide resulted in a highly significant level of difference between the sprayed and unsprayed treatments. The results in the following table are the average for the two varieties across the three times of sowing and all blackleg treatments at each site.

<table>
<thead>
<tr>
<th></th>
<th>No Spray</th>
<th>Spray</th>
<th>Difference</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galong</td>
<td>2.36</td>
<td>2.60</td>
<td>0.24</td>
<td>11%</td>
</tr>
<tr>
<td>Wallendbeen</td>
<td>2.83</td>
<td>3.51</td>
<td>0.68</td>
<td>24%</td>
</tr>
</tbody>
</table>

At the 2001 canola price of $380.00 tonne, income loss due to sclerotinia was $91.20 per ha at Galong and $258.40 per ha at Wallendbeen.

This information on sclerotinia was important as the total rainfall and growing season rainfall for 2001 were well below average. In this instance it was not the absolute level of rainfall but the timing of rain events at or close to flowering that resulted in disease problems as the rainfall events coincided with the onset of flowering creating a humid canopy ideal for sclerotinia spore development.

**Blackleg**

Blackleg has been seen as a major problem in most varieties although resistance has been found and is being exploited in most canola breeding programs. The big question with this disease is how durable the resistance is. What sort of genetic depth do current varieties have and how long will this last?

This has implications for the future control methods of the disease as current chemical options appear expensive and do not persist long in the plant. Also there is some concern about the correlation of the level of disease prior to elongation of the plant and development of stem canker and yield loss. The inclusion of blackleg fungicide treatments in the trial was aimed at investigating these concerns.

Six treatments were applied to both varieties:
- Impact® – applied to fertiliser
- Jockey® – seed dressed
- Jockey® + Impact® – combination seed and fertiliser treatment as above
- Rovral® – seed dressed
- Thiram® – seed dressed
- UTC Untreated control

There was a low level of significance between treatments for both varieties. Again, the results in the following table are the average for the two varieties across the three times of sowing.

<table>
<thead>
<tr>
<th></th>
<th>Impact®</th>
<th>Jockey®</th>
<th>Jockey®+Impact®</th>
<th>Rovral®</th>
<th>Thiram®</th>
<th>UTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galong</td>
<td>2.55</td>
<td>2.51</td>
<td>2.45</td>
<td>3.10</td>
<td>2.42</td>
<td>2.48</td>
</tr>
<tr>
<td>Wallendbeen</td>
<td>3.28</td>
<td>3.33</td>
<td>3.00</td>
<td>3.20</td>
<td>2.34</td>
<td>2.99</td>
</tr>
</tbody>
</table>

The fungicide treatments did not produce a significant result at either of the sites.

At the Wallendbeen site there appeared to be some affect from the Jockey® + Impact® treatment as there was a small yield reduction when compared to either of these treatments alone. It is unclear at this stage why this occurred but it is unlikely that it was an interaction of the chemicals but rather the total aggregate rate of the two fungicides when applied together.

The inclusion of thiram, a chemical generally considered not to have high efficacy on blackleg, demonstrated the low level of response to blackleg of all the chemicals.

The trials were not significantly challenged by blackleg in 2001 and further work is being done to test the original assumptions.

**Time of Sowing**

Time of sowing was included as a treatment due to the interaction it plays with variety, disease and length of growing season. Three times of sowing were selected so as to cover the main canola sowing period with a spread of about 2 weeks between each time. The actual sowing dates were:
- time 1: 30/04/2001
- time 2: 15/05/2001
- time 3: 28/05/2001

Sowing time by itself is difficult to quantify but there was a clear relationship between time of sowing and sclerotinia spray response as shown in the following results.
### Galong yield (t/ha)

<table>
<thead>
<tr>
<th>Sowing Time</th>
<th>Unsprayed</th>
<th>Hyola 60 Sprayed</th>
<th>Response</th>
<th>Unsprayed</th>
<th>Rainbow Sprayed</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.50</td>
<td>2.86</td>
<td>14%</td>
<td>2.18</td>
<td>2.50</td>
<td>15%</td>
</tr>
<tr>
<td>2</td>
<td>2.80</td>
<td>2.99</td>
<td>7%</td>
<td>2.28</td>
<td>2.69</td>
<td>18%</td>
</tr>
<tr>
<td>3</td>
<td>2.22</td>
<td>2.38</td>
<td>7%</td>
<td>2.05</td>
<td>2.18</td>
<td>6%</td>
</tr>
</tbody>
</table>

### Wallendbeen yield (t/ha)

<table>
<thead>
<tr>
<th>Sowing Time</th>
<th>Unsprayed</th>
<th>Hyola 60 Sprayed</th>
<th>Response</th>
<th>Unsprayed</th>
<th>Rainbow Sprayed</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.67</td>
<td>3.59</td>
<td>34%</td>
<td>2.68</td>
<td>3.39</td>
<td>26%</td>
</tr>
<tr>
<td>2</td>
<td>3.18</td>
<td>3.88</td>
<td>22%</td>
<td>2.80</td>
<td>3.45</td>
<td>23%</td>
</tr>
<tr>
<td>3</td>
<td>2.84</td>
<td>3.51</td>
<td>23%</td>
<td>2.81</td>
<td>3.29</td>
<td>17%</td>
</tr>
</tbody>
</table>

Variety also contributed to this interaction through the impact of flowering time, rain event and possibly canopy structure, not any difference in genetic susceptibility to sclerotinia.

In this region, early to mid-May sowing times increase yield potential significantly but these crops are also more susceptible to disease. Therefore early sowing may require the inclusion of disease control late in the season. The economic response will also be price per tonne of canola dependant.

At present many canola growers are tending to sow later to avoid disease loss but are potentially reducing yield also.

At this stage early to mid-May sowing appears to give a higher potential yield than from mid-May on. The yield effect of sowing time is supported by the Best Bet Canola results (although the time of sowing plots were not randomised) and anecdotal reports from 10 years of canola production in the region. In the 2002 trials the time of sowing treatments were randomised to ensure that all of the data was analysable.

### Results from 2002

The same varieties (Hyola60 and Rainbow) were used in the trials in 2002.

Given the dry seasonal conditions both varieties performed well with both varieties yielding better at Galong in 2002 than in 2001. This was probably a result of plot layout at the Galong site in 2001 where the sowing times blocks were not randomised. At Wallendbeen yields were higher in 2001 than 2002 but Rainbow performed slightly better than Hyola60 in 2002 compared to 2001.

The results are shown as the average yield across the 3 times of sowing and the 6 fungicide treatments.

<table>
<thead>
<tr>
<th>Fungicide</th>
<th>Impact®</th>
<th>Jockey®</th>
<th>Jockey®+ Impact®</th>
<th>Rovral®</th>
<th>Thiram®</th>
<th>UTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galong</td>
<td>2.85</td>
<td>2.63</td>
<td>2.83</td>
<td>2.67</td>
<td>2.73</td>
<td>2.41</td>
</tr>
<tr>
<td>Wallendbeen</td>
<td>3.11</td>
<td>2.98</td>
<td>3.05</td>
<td>2.77</td>
<td>3.01</td>
<td>2.80</td>
</tr>
</tbody>
</table>

### Sclerotinia

Due to the drought conditions and there were no responses to the sclerotinia treatments.

### Blackleg

Similar treatments to those used in 2001 were applied to both varieties.

The following results are the average for the three sowing times and the two varieties for each of the fungicide treatments. As occurred in 2001, there were again responses to the fungicide treatments despite the fact there was not a high level of blackleg pressure on the trials.
Time of Sowing

The sowing times in 2002 were:

- time 1: 30/04/2002
- time 2: 15/05/02
- time 3: 30/05/02

As occurred in 2001, the highest yields in 2002 were obtained from the mid May sowing time. This tends to confirm the fact that in this region early to mid-May sowings provide the opportunity to maximise potential yields.

The following results are the average of the different fungicide treatments for each variety.

<table>
<thead>
<tr>
<th>Sowing time</th>
<th>Galong yield (t/ha)</th>
<th>Wallendbeen yield (t/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hyola60</td>
<td>Rainbow</td>
</tr>
<tr>
<td>1</td>
<td>2.84</td>
<td>2.44</td>
</tr>
<tr>
<td>2</td>
<td>3.15</td>
<td>2.74</td>
</tr>
<tr>
<td>3</td>
<td>2.61</td>
<td>2.27</td>
</tr>
</tbody>
</table>

Acknowledgement

The assistance of the Grain Growers Association in providing funding for this project is gratefully acknowledged.