

## addressing canola yield decline

### 4. Canola Survey & Modelling

#### Project collaborators:

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*With the Canola Plus and Best Bet projects focusing on disease management to address canola yield decline, the Canola Survey and Modelling project was established to determine if there were factors other than disease (eg. subsoil constraints, compaction, micronutrients) that were limiting canola yields.*

*Modelling showed that most paddocks (~75%) yielded to their potential based on seasonal conditions, with disease being generally low over the 3-year period. However in the survey area south of Wagga, monitoring showed rooting depth and yields were being reduced by compaction, sodicity and high soil strength.*

130 paddocks in southern NSW were surveyed by local consultants over the 3 years of the project. Information collected included:

- general crop details (paddock history, rainfall, crop management, yield)
- disease assessments (blackleg, sclerotinia)
- micronutrient testing
- root restriction (level of 'J'-rooting)

In response to high root restriction levels found in the southern region in 2003, CSIRO also deep soil sampled paddocks in 2004/05 to determine factors that may be limiting root growth and consequent yield.

The area surveyed was divided into 3 regions:

- northern - north of Cootamundra to Canowindra
- central - between Wagga and Cootamundra
- southern - south of Wagga to Corowa

Modelling using the crop simulation model APSIM (and a revised water use efficiency calculation) showed that the surveyed crops generally yielded to their water limited potential (Table 4a). Those not meeting their potential yield could usually be explained by high disease

Table 4a - Survey & Modelling Summary

	2003	2004	2005
<b>Northern</b>			
ave. yield (t/ha)	1.9	1.4	2.3
% pdks achieving potential yield	58	81	25
% pdks with uncertain constraints	11	6	0
ave. blackleg lodging (%)	0	1	4
ave. sclerotinia (%)	0	6	11
ave. 'J'-root score (0-5)	1.9	1.6	1.8
% pdks with 'J'-root > 3.0	10	0	0
<b>Central</b>			
ave. yield (t/ha)	1.3	1.2	2.0
% pdks achieving potential yield	87	80	100
% pdks with uncertain constraints	9	7	0
ave. blackleg lodging (%)	0	3	9
ave. sclerotinia (%)	0	17	14
ave. 'J'-root score (0-5)	2.1	2.1	1.9
% pdks with 'J'-root > 3.0	0	13	11
<b>Southern</b>			
ave. yield (t/ha)	2.3	1.7	2.1
% pdks achieving potential yield	86	50	75
% pdks with uncertain constraints	14	50	25
ave. blackleg lodging (%)	9	2	8
ave. sclerotinia (%)	1	2	13
ave. 'J'-root score (0-5)	2.8	3.0	2.8
% pdks with 'J'-root > 3.0	60	60	50

Figure 4a - Soil sampling post harvest, Lockhart (Dec '05)



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levels, frost, hail, etc. (Monitoring showed that micronutrients or nitrogen deficiency were not responsible for widespread yield problems).

In some cases, the cause of yield deficit could not be readily explained (see '% pdks with uncertain constraints' in Table 4a), but appear to be related to soil constraints. In the southern region where the % of 'uncertain constraints' was highest, the incidence of 'J'-root symptoms (Figure 4b) was also high. 60% of paddocks surveyed in this region had root restriction levels greater than 3, with rooting depth reduced from 2m to 1m on some soils.

Soil sampling to a depth of 2m (Figure 4a) indicated that the restriction in rooting depth in the south was related to a number of constraints, including compaction, salinity and subsoil sodicity. Acidity was also low ( $\text{pH}_{\text{CaCl}_2}$  4.2 - 4.5), but surprisingly this did not appear to be affecting crop performance in some cases.

Compaction and acidity were also observed in the other 2 regions, while subsoil sodicity was also present at some sites in the central region. The impact of these soil related factors on canola yields is the focus of a further GRDC initiative to commence this year.

#### *Crop Modelling to predict yields*

As in previous years, workshops were held in spring 2005 with the consultants and growers participating in the paddocks surveys. The APSIM canola model was used by Mike Robertson and Shaun Lisson (CSIRO) as a 'real time' tool to predict paddock yields based on management scenarios identified by the growers. With the emphasis on nitrogen rates and timing, growers were able to use the model outcomes to help make topdressing decisions. Responses were very positive with the aim that the APSIM canola model will be made commercially available in the near future.

Figure 4b - 'J'-rooting (measure of root restriction)



Note: root restriction is scored on a scale of 0-5.

## DOVURO Seeds

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#### **New canola benchmark in the making!**

##### Key Points

- ATR-Summitt, new mid TT canola
- Improved yield, oil and vigour
- Ideal replacement for ATR-Grace

Dovuro Seeds has released a new mid maturity, triazine tolerant canola variety for the 2006 growing season.

The new variety, ATR-Summitt, has been bred for higher yields, improved oil and better seedling vigour than the existing canola benchmarks of ATR-Beacon and ATR-Grace.

Dovuro Seeds Sales Agronomist Jack Hart said that ATR-Summitt was a mid maturity (1-3 days later than ATR-Beacon) triazine tolerant canola variety that would be an ideal alternative for farmers currently growing ATR-Grace or ATR-Beacon. ATR-Summitt has performed extremely well against other current mid maturity triazine tolerant canola's in 2004 Stage 4 and 2005 Dovuro trials, with an average 25% increase in yield compared to ATR-Beacon in Dovuro's 2005 strip trials.

Oil content of ATR-Summitt is a solid 1% improvement over ATR-Beacon, similar to that of BravoTT.

ATR-Summitt's early seedling vigour has been given a rating of 8 which puts it 3 points in front of ATR-Beacon and very similar to TornadoTT.

The Canola Association of Australia have given ATR-Summitt a Blackleg Rating of 6.5, a 1 point improvement on ATR-Beacon and a half point up on ATR-Grace. Justin Kudnig, Dovuro Seeds New Product Manager commented that "a Blackleg rating of 6.5 is adequate for the mid to high rainfall areas to which ATR-Summitt is suited, but growers who would like extra protection should consider the use of a fungicide such as Jockey seed treatment".

Andrew Garland, Manager of Brook's Farms, Barooga, NSW, commented that "ATR-Summitt's outstanding trial results convinced us to put in a crop. We were very happy with the yield improvement and extra oil over ATR-Beacon, and particularly impressed with the early seedling vigour. ATR-Summitt will be included in our 2006 canola program".

**For more information on ATR-Summitt contact Jack Hart 0427 690022.**

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