3.3 Canola

3.3.1 Assessing Blackleg Disease Control Options in Canola - Inverleigh, Vic

Location: Inverleigh

Funding:
This trial was funded by SFS as an initiative to compare different blackleg control measures in Canola.

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Researchers: Stephanie Wallis-Smith, Gary Sheppard, Rohan Wardle, and Colin Hacking, SFS.

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Rainfall (mm):
2007 Annual: 528.6 mm
GSR (April – November): 393 mm

- Growing season rainfall was average
- August to October was very dry only 67% of long term average
- Significant rainfall during November and above average rainfall in December.

Summary of Findings:

- Average Canola yield in the trial was 2.47 t/ha
- Disease pressure at the site was high initially during winter, but after a dry spring Stem Canker didn't develop into a serious problem.
- The highest yielding treatment was Jockey® seed treatment + Intake in furrow®.
- The addition of Intake in furrow® to Jockey® seed treatment was significantly higher yielding than Jockey used alone.
- Intake in furrow® or Jockey® seed treatment used separately showed no significant difference in yield.
- The earlier foliar fungicide timing significantly reduced blackleg lesions on the leaf compared to delaying the application by a further 21 days.

Background to the trial:
Even with the improvements in yield that have come from both better management of our soils and access to improved varieties through the various canola breeding programmes, over the last four or five seasons commercial yields of canola in south west Victoria appear to have reached a plateau. The five year average canola yield in Australia declined from 1.38t/ha in 1995/96 to 1.19t/ha in 2005/06 (-13.9%). (Australian Oilseeds Federation, 2006).

This trial looks at the disease management of the variety Thunder, with particular emphasis on various methods of controlling blackleg using both seed treatments, fertiliser treatments and foliar fungicides.

▼ Table 3.17: Trial inputs

Previous Crop:	Canola
Sowing Date:	9 May 2007
Windrowed:	17 November 2007
Harvest Date:	29 November 2007

	Product	Rate	Date
Herbicides	Trifluralin	1.5Lt	8 May 2007
	Simazine 900	1.1Kg	10 May 2007
	Dual Gold	0.25Lt	10 May 2007
	Atrazine 600	2Lt	30 July 2007
	Select + Hasten	0.25 + 1Lt	30 July 2007
Fertiliser	MAP	100 kg	9 May 2007
	Urea	90 Kg	16 July 2007
Insecticides	Talstar	0.2Lt	10 May 2007

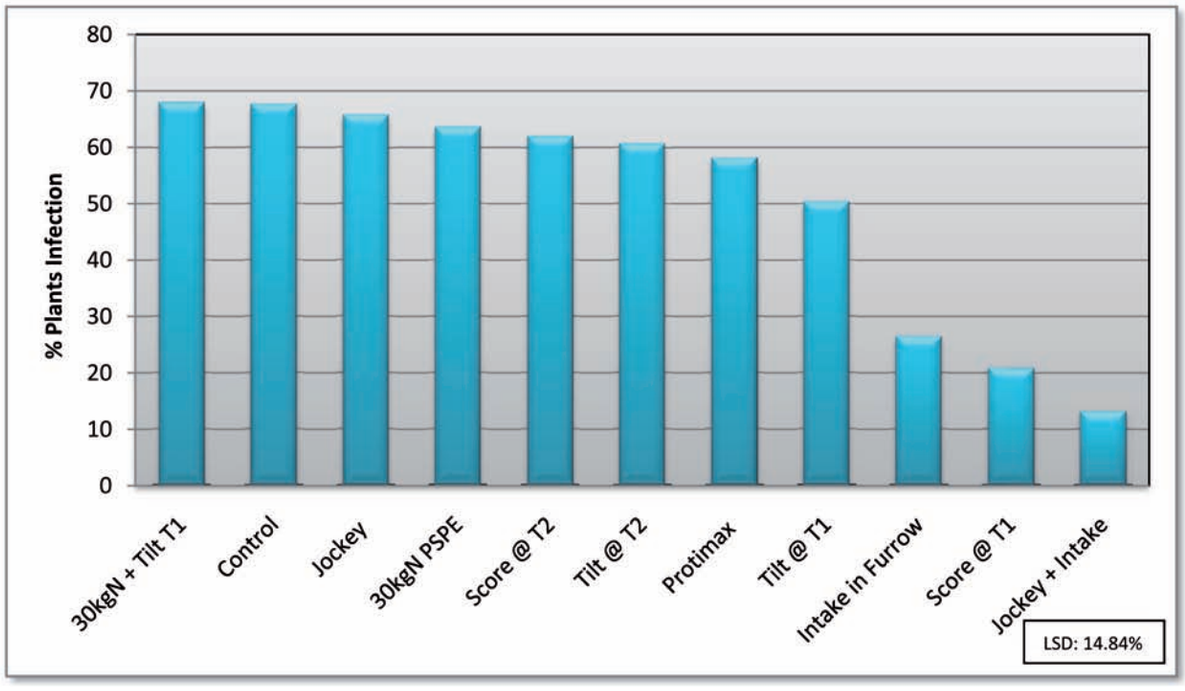
Trial Design:
A fully randomized block design consisting of 4 replicates per treatment. Plot length of 12 metres and plot width of 1.45 metres giving approx 17m² per plot.

▼ **Table 3.18: Treatments, timings, rates and dates applied.**

Treatment	Treatment application date	Rate
Control		
Jockey® seed dressing	9th May (Sowing)	20 ml / kg
Intake in furrow®	9th May (Sowing)	400 ml / ha
Score® at T1	3rd July	250 ml / ha
Score® at T2	24th July	250 ml / ha
Tilt® at T1	3rd July	500 ml / ha
Tilt® at T2	24th July	500 ml / ha
Jockey® + Intake in furrow®	9th May (Sowing)	20 ml / kg + 400 ml / ha
30kg N PSPE[1]	28th May	30kgN / ha
30kg N PSPE + Tilt® at T1	N, 28th May + Tilt, 3rd July	30kgN / ha + 500 ml / ha
Protimax®	12th September	75 ml/ha

[1] PSPE post sowing pre-emergence

Results:



▲ **Figure 3.18: Blackleg disease severity – Percentage plants infected (3rd July to 24th July).**

The results from the first assessment, measuring the percentage leaf infected with Blackleg lesions, shows that only the Intake in furrow®, Jockey® plus Intake® and the foliar fungicide Score®, at the early timing, had a significant effect at controlling the amount of infection compared to all the other treatments. This was from a period 8 to 11 weeks after sowing.

The blackleg lesions on the young developing plant are an indicator as to the background level of infection. The spores off infected stubbles land on the new emerging plants and it is from this infection that the fungus spreads down the leaf stem and into the main stem of the plant. If the conditions are right, this infection can produce a canker on the stem which in the worst cases will cause the stem break at the canker, or in less severe cases restrict the flow of nutrients to the flowers and pods.

The second assessment was taken just after windrowing. A Stem disease index was calculated using the following scale to assess the percentage of stem area affected by blackleg symptoms:

0 - Healthy stem
1 - <50% the stem circumference affected
2 - >50% the stem circumference affected
3 - Whole stem girdled by a lesion
4 - plant dead

Canola crown cross sections, showing various levels of internal infection. Numbers 1 and 2 have minor infection and are unlikely to cause yield loss. Numbers 3 and 4 have enough infection to cause yield loss.

▲ **Photo 3.1: Various levels of stem disease showing blackleg symptoms.**

▼ **Table 3.19: Stem disease index scores for each treatment.**

Treatment	Stem Disease Index	Significant Difference[1]
Jockey® Seed Dressing + Intake	0.50	a
Score® @ T1	0.54	ab
Score® @ T2	0.54	ab
Jockey®	0.54	ab
Intake in Furrow®	0.60	abc
Tilt® @ T1	0.61	abc
30KgN + Tilt® T1	0.65	abc
30KgN PSPE	0.66	abc
Protimax®	0.75	abc
Tilt® @ T2	0.83	bc
Control	0.86	c
LSD (p=.05)	**0.29**	
CV	**30.83**	

▼ **Table 3.20: Grain yield of the different treatments.**

Treatment	Yield (t/ha)	Significant Difference[1]
Jockey® Seed Dressing + Intake®	2.66	a
Score® @ T1	2.59	ab
Control	2.54	abc
Score® @ T2	2.51	abcd
Tilt® @ T1	2.51	abcd
Intake in Furrow®	2.46	abcd
30KgN PSPE	2.43	bcd
30KgN + Tilt® T1	2.43	bcd
Protimax®	2.36	cd
Tilt® @ T2	2.35	cd
Jockey®	2.31	d
Site Mean	**2.47**	
LSD (p=.05)	**0.20**	
CV	**5.72**	

[1] Means followed by same letter do not significantly differ (P=.05, LSD)

Although there were some significant differences between the stem disease index scores the very high CV for this assessment suggests that the results should be interpreted with caution. That being said, the implications for the effect on grain yield would suggest that the control should be lower yielding than both the Score® treatments, Jockey® + Intake® and Jockey® on its own.

Conclusions:

- Disease pressure at the site was high during the early establishment phase in May and June. This gave high levels of blackleg lesions which reached our threshold for foliar fungicide application of 15 – 20% plants infected.
- Once the threshold was reached only Intake in furrow®, Jockey® plus Intake® and the foliar fungicide Score® controlled further plant infection.

  With the change to a very dry spring the initial infections didn't develop into a serious problem with stem canker
- The control treatment was certainly the most cost effective option and statistically it was no different in yield to the highest yielding treatment of Jockey® + Intake in furrow®.
- The addition of Intake in furrow® to Jockey® seed treatment was significantly higher yielding than Jockey® used alone.
- Intake in furrow® or Jockey® seed treatment used individually showed no significant difference in yield.
- The earlier foliar fungicide timing significantly reduced blackleg lesions on the leaf compared to delaying the application by a further 21 days and Score® is clearly the more robust choice compared to Tilt® if application is delayed.
- Protimax®, an organic fertiliser based on amino acids, was applied at stem extension but this treatment was significantly lower yielding than either the Jockey® + Intake® or the Score® applied at T1.
- The addition of 30 kgN post sowing pre emergence made no difference to the final yield and in this trial the extra cost was not recovered. The addition of the extra N may not have been necessary as the previous crop had been canola.

It is hoped that we will be able to run this trial again in 2008 and include some additional treatments to try and unlock canola's yield potential on a consistent basis.