

addressing canola yield decline

In southern NSW, the area sown to canola has declined over the last 5-8 years due to yield decline, late sowings, dry springs and low prices. This is a concerning trend not only for canola, but also for cereal crops for which canola provides significant yield advantages.

A GRDC funded scoping study in southern NSW (2002) identified canola yield decline as the number 1 research issue amongst growers. Consequently, the Canola Plus project was established to investigate ways to improve canola yields in the low-medium rainfall zone. This project complemented the Graingrowers funded Best Bet project (p. 5) focussing on the higher rainfall areas, and FarmLink's Canola Survey & Modelling project (p. 7).

With 2005 being the final year for the FarmLink projects, outcomes have shown that blackleg and sclerotinia remain the major barriers to achieving water-limited potential yields, with subsoil constraints also playing a part in some areas. Whilst economic responses can be reliably achieved through blackleg control in southern NSW, responses to sclerotinia control are inconsistent due to its sporadic nature.

1. Canola Plus

Project collaborators:

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(¹CSIRO, ²AgriTech, ³FarmLink)*

Aim: To provide economic management options for control of canola disease (particularly blackleg and sclerotinia) in the low-mid rainfall zone of southern NSW.

Method: Three sites were sown at Dirnaseer, Lockhart and Kamarah (Table 1a) incorporating a number of fungicide treatments for blackleg control:

- untreated control (UTC)
- Maxim (400mL/100kg)
- Jockey (2L/100kg) +/- Maxim
- Impact - full rate (400mL/ha) +/- Maxim
- Impact - half rate (200mL/ha) +/- Maxim

Each plot was split at early flowering, with half receiving Rovral (2L/ha) for sclerotinia control.

Table 1a - Site Details

Site Details	Dirnaseer	Lockhart	Kamarah
Co-operator	Derek Ingold	Geoff Lane	Steve Buchanan (Warrakirri P/L)
Variety (BLR)	Beacon (6)	Beacon (6)	Rainbow (5.5)
Sowing date (emergence)	23rd May (11th June)	11th June	4th May (11th June)
Sowing rate	3kg/ha	3kg/ha	3kg/ha
Plants/m ²	56	40	31
Blackleg % lodging (UTC)	19	12	26
Sclerotinia % (UTC)	7	16	0
Start flower	10th Sept	7th Sept	6th Sept
End flower	20th Oct	17th Oct	7th Oct
Sclero spray	22nd Sept (15% flower)	22nd Sept (40% flower)	21st Sept (40% flower)
Rainfall (sow-windrow)	329mm	413mm	293mm

Figure 1a - Impact treatment, Dirnaseer (Sept '05)



addressing canola yield decline

An additional trial at Dirnaseer also investigated sclerotinia response to timing of fungicide applications (refer 'Sclerotinia Timing Trials' on p. 4).

Regular disease assessments and yields were undertaken by AgriTech.

Results:

Blackleg:

2005 was the first season in the project to produce high blackleg levels, ranging from 12 to 26% lodging (Table 1a). This was reflected in significant yield responses to both Impact and/or Jockey at the 3 sites, with Impact providing higher returns based on gross margins (Table 1b). There was no response to Maxim. These results reflect those being achieved at the higher rainfall Best Bet sites where disease pressure has been greater.

Prior to 2005, fungicide responses in the Canola Plus trials had been limited by the dry seasons. Very low disease levels meant no yield responses in 2004. 2003 responses were variable, with Lockhart showing significant yield responses to Impact despite low disease levels, and Dirnaseer showing a response to Impact due to control of white leaf spot.

Sclerotinia:

Although sclerotinia increased in incidence during the period 1998-2001, it has been sporadic over the last 3 years when the Canola Plus project has been carried out.

In 2005, both Dirnaseer and Lockhart trials had 7% and 16% sclerotinia respectively. Despite Rovral significantly reducing infection levels at both sites, yield responses were only achieved at Dirnaseer (as in 2004), although the responses were uneconomic.

Sowing date:

In 2003 and 2004, 3 sowing dates were included in the Canola Plus trials to determine the impact of sowing time on yield. Results clearly showed that yields decrease with each week sowing is delayed, so the additional sowing times were dropped in 2005.

Acknowledgements: Derek Ingold (co-operator, Dirnaseer), Geoff Lane (co-operator, Lockhart), Steve Buchanan (co-operator, Ardlethan).

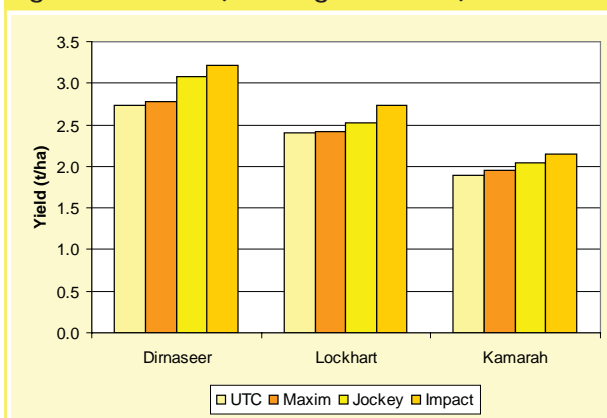
Table 1b - Yields & Gross Margins

Treatments	Yield (t/ha)	Gross Margin (\$/ha) cf UTC
Dirnaseer LSD = 0.15		
UTC	2.7	\$522
Maxim	2.8	+ \$9
Jockey	3.1*	+ \$98
Impact	3.2*	+ \$125
1/2 Impact	3.0*	+ \$71
Jockey/Maxim	2.9*	+ \$44
Impact/Maxim	3.2*	+ \$100
1/2 Impact/Maxim	3.0*	+ \$56
Lockhart LSD = 0.13		
UTC	2.4	\$420
Maxim	2.4	+ \$3
Jockey	2.5	+ \$35
Impact	2.7**	+ \$83
1/2 Impact	2.6*	+ \$44
Jockey/Maxim	2.5	+ \$32
Impact/Maxim	2.6*	+ \$35
1/2 Impact/Maxim	2.6*	+ \$44
Kamarah LSD = 0.18		
UTC	1.9	\$267
Maxim	2.0	+ \$15
Jockey	2.0	+ \$41
Impact	2.2*	+ \$59
1/2 Impact	2.0	+ \$23
Jockey/Maxim	2.1*	+ \$50
Impact/Maxim	2.0	+ \$19
1/2 Impact/Maxim	2.0	+ \$29

Note: *significantly better than UTC; **significantly better than Jockey.

Gross margins calculated assuming canola @ \$300/t (no oil increments), variable costs @ \$300/ha. Chemical costs from NSW DPI Winter Crop Variety Sowing Guide 2006: Maxim @ \$1.04/kg, Jockey @ \$1.45/kg, Impact @ \$19.40/ha.

Figure 1b - Yields (blackleg treatments)



addressing canola yield decline

2. Sclerotinia Timing Trials

Project collaborators:

Tamrika Hind-Lanoiselet (NSW DPI) FarmLink, HDRAS, Grenfell/Greenethorpe Cropping Groups

Trials to determine the effect of fungicide timing on sclerotinia control in southern NSW were undertaken at 4 sites in 2005 and 7 sites in 2004 as part of the Canola Plus, Best Bet and NSW DPI projects (Tamrika Hind-Lanoiselet). These were in addition to the 'split-plot' fungicide treatment applied to the Canola Plus and Best Bet trials.

Trials showed that although fungicides reduced sclerotinia levels at some timings, there were no corresponding yield increases.

Aim: To determine the most effective flowering stage for fungicide control of sclerotinia.

Method: Fungicide treatments (2L/ha Rovral and 1L/ha Sumisclex) were applied at the following timings:

- ~20% flower
- pre-rain front (or ~ 1 week after 1st application)
- post-rain front (or ~ 1 week after 2nd application)
- all 3 timings (Rovral only)

Results: Disease assessments were undertaken by NSW DPI (Table 2a).

Sclerotinia petal tests (% petal infestation) were variable between sites. Despite higher test results in 2005, disease levels were generally low, probably due to delayed flowering in hotter conditions (sclerotinia prefers mild to warm temperatures).

Fungicides reduced sclerotinia stem rot at several sites with higher disease levels in both 2004 and 2005 (Table 2a). However there were no significant yield increases as a result of fungicide application.

Acknowledgements: Fleur Lewington (NSW DPI), AgriTech (Young), all farmer co-operators.

Table 2a - Sclerotinia Timing Trial (disease assessments)

Location	% Petal infestation	% Sclerotinia stem rot
Beckom ('04)	2	0.0
Binalong ('04)	76	5.9*
Dimaseer ('04)	15	7.4*
Greenethorpe ('04)	9	0.03
Henty ('04)	79	4.8*
Lockhart ('04)	0	0.0
Wallendbeen ('04)	36	0.03
Dimaseer ('05)	44	0.7**
Galong ('05)	61	5.1**
Wallendbeen ('05)	81	6.5**
Greenethorpe ('05)	78	0.1

Note: *fungicides significantly reduced infection at earlier application times; **fungicides significantly reduced infection at all application times.

Figure 2a - Sclerotinia on canola



Photo: Tamrika Hind-Lanoiselet

addressing canola yield decline

3. Best Bet

Project collaborators:

John Kirkegaard¹, Susie Sprague¹, Peter Hamblin², Chris Duff³, HDRAS, Grenfell/Greenethorpe Cropping Groups (¹CSIRO, ²AgriTech, ³Delta Agribusiness, formerly Chandlers Landmark)

The Best Bet (Harden District Rural Advisory Service) and Grenfell/Greenethorpe Cropping Group projects were funded by Graingrowers Association to address canola disease issues in higher rainfall areas. Similar treatments were used in FarmLink's Canola Plus project focussed on the low-mid rainfall zone (p. 2) to allow comparison of results.

2005 was the final year for both the Best Bet and Grenfell/Greenethorpe projects.

Aim: To provide economic management options for control of canola disease (particularly blackleg and sclerotinia) in the higher rainfall zone of southern NSW.

Method: Four sites were sown at Galong, Wallendbeen, Grenfell and Greenethorpe (Table 3a) incorporating a number of fungicide treatments for blackleg control:

- untreated control (UTC)
- Maxim (400mL/100kg)
- Jockey (2L/100kg)
- Impact (400mL/ha)
- Jockey + Maxim (Galong & Wallendbeen only)
- Impact + Maxim (Galong & Wallendbeen only)

Each treatment was applied to 2 varieties with blackleg ratings of 6 and 7.5. The Galong and Wallendbeen trials also had 2 sowing times. All plots were split at early flowering, with half receiving Rovral (2L/ha) for sclerotinia control.

Regular disease assessments (Table 3b) and yield (Table 3c) were undertaken by AgriTech.

Results:

Blackleg:

There were significant yield responses to both Jockey and Impact in varieties rated 6 at all sites except Grenfell, with Impact also being significantly better than Jockey. Gross Margins

Table 3a - Site Details

Site Details	Galong	Wallend-been	Grenfell	Green-ethorpe
Variety (BLR)	Grace (6) Thunder (7.5P)	Grace (6) Thunder (7.5P)	Beacon (6) Tornado (7.5)	Beacon (6) Bravo (7.5P)
Sowing date	S1: 11 Jun S2: 27 Jun	S1: 11 Jun S2: 27 Jun	11 Jun	11 Jun
Sowing rate	3kg/ha	3 kg/ha	3kg/ha	3kg/ha
Plants/m ²	36	25	53	65
Blackleg % lodging (UTC)	Thunder: 3% Grace: 14%	Thunder: 2% Grace: 12%	Beacon: 16% Tornado: 5%	Beacon: 12% Bravo: 12%
Sclerotinia % (UTC)	5%	2%	6%	0%
Start flower	S1: 20 Sep S2: 30 Sep	S1: 20 Sep S2: 30 Sep	10 Sep	10 Sep
End flower	S1: 30 Oct S2: 3 Nov	S1: 30 Oct S2: 3 Nov	17 Oct	22 Oct
Sclerotinia spray	S1: 35% fl S2: 20% fl	S1: 20% fl S2: 20% fl	35% fl	40% fl
Rainfall (sow-w'row)	500mm	516mm	458mm	417mm

Table 3b - Disease Assessments (select treatments)

	Blackleg lodging %		Blackleg root rot (0-5)		Sclero-tinia %
	Grace	Thunder	Grace	Thunder	
Galong					
UTC	14	3	2.0	1.1	5%
Maxim	12	2	1.8	0.9	+ Rovral = 1%
Jockey	6	0	1.4	0.7	
Impact	6	1	1.2	0.6	
W'been					
UTC	12	2	1.9	0.9	2%
Maxim	9	3	1.6	0.7	+ Rovral = 0.3%
Jockey	8	1	1.7	0.6	
Impact	5	1	1.2	0.7	
Grenfell					
UTC	B'con 16	T'nado 5	B'con 2.6	T'nado 0.4	6%
Maxim	12	4	2.1	0.6	+ Rovral = 1%
Jockey	7	2	1.9	0.2	
Impact	5	2	2.1	0.3	
G'thorpe					
UTC	B'con 12	Bravo 12	B'con 2.0	Bravo 2.1	0%
Maxim	14	7	2.4	1.5	+ Rovral = 0%
Jockey	7	4	1.8	2.3	
Impact	2	4	1.3	1.9	

addressing canola yield decline

were also better for Impact at these sites, despite the higher cost (Table 3c).

Responses in varieties rated 7.5 were variable, with results also depending on the yield potential of the variety. For example at Galong, Grace yielded similar to Thunder in the untreated plots despite having much higher blackleg levels. Results also suggest that varieties rated 7.5 may still respond to fungicides if blackleg pressure is high, with yield responses to fungicides being recorded at both Wallendbeen and Greenethorpe.

There were no yield responses to Maxim at any site.

Sclerotinia:

Despite reductions in sclerotinia infection from the Rovral application (Table 3b), there was no impact on yield at any of the sites.

Refer to 'Sclerotinia Timing Trials' on page 4 for results of fungicide application timings.

Sowing date:

Sowing date alone did not have a significant impact on yields, although at Wallendbeen there was an interaction between sowing date and variety with Thunder yielding 0.5t/ha more at the earlier sowing time.

Table 3c - Yields & Gross Margins (select treatments)

Treatments	Yield (t/ha)		Gross Margin (\$/ha) cf UTC	
	Grace	Thunder	Grace	Thunder
Galong				
UTC	1.9	1.9	\$282	\$273
Maxim	2.0	1.9	+ \$3	- \$6
Jockey	2.1*	2.0	+ 47	+ \$8
Impact	2.2*	2.0	+ \$71	- \$1
Wallendbeen				
UTC	2.9	3.1	\$582	\$633
Maxim	2.9	3.1	- \$12	+ \$3
Jockey	3.2*	3.4*	+ \$71	+ \$68
Impact	3.3**	3.4*	+ \$92	+ \$41
Grenfell				
UTC	3.0	2.9	\$594	\$555
Maxim	2.9	2.9	- \$39	+ \$18
Jockey	3.0	3.2	+ \$2	+ \$86
Impact	3.0	3.0	- \$25	+ \$38
Greenethorpe				
UTC	2.5	2.8	\$462	\$549
Maxim	2.6	2.9	+ \$27	+ \$18
Jockey	2.8*	3.1*	+ \$83	+ \$65
Impact	3.0**	3.2*	+ \$119	+ \$95

Note: *significantly better than UTC; **significantly better than Jockey.

Gross margins calculated assuming canola @ \$300/t (no oil increments), variable costs @ \$300/ha. Chemical costs from NSW DPI Winter Crop Variety Sowing Guide 2006: Maxim @ \$1.04/kg, Jockey @ \$1.45/kg, Impact @ \$19.40/ha.

GRDC Visit to Dirnaseer Canola Plus site, Sept '05

