

Blackleg – potential new management package

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Salisbury, Barbetti, Li Hua, Elliott, Lindbeck,
Sprague. In future – Khangura, Salam,
MacLeod, Anyone else, Everyone else.

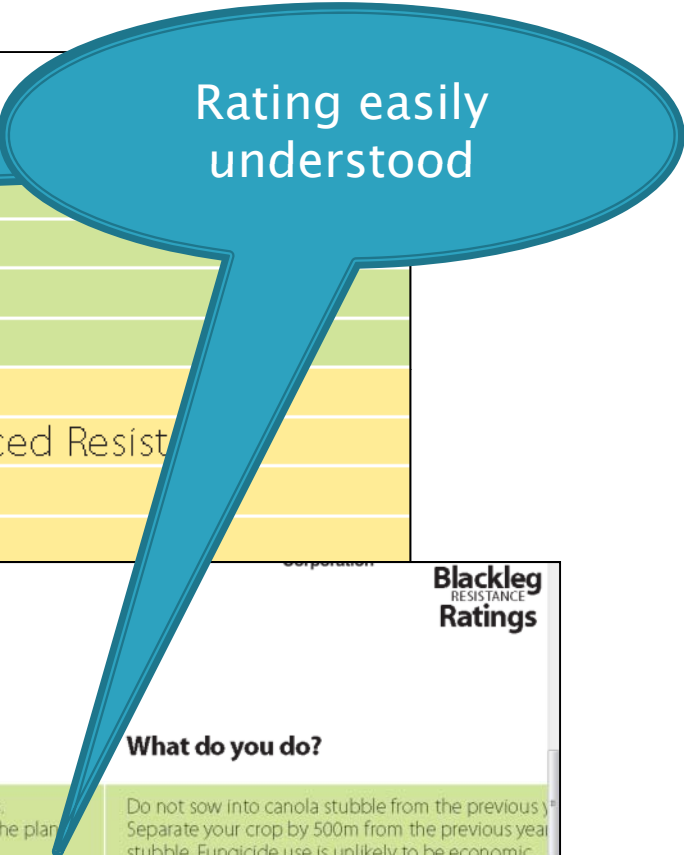
Components of potential new management package

- ▶ Blackleg ratings.
- ▶ Reduced resistance warning on blackleg ratings.
- ▶ Regional blackleg severity.
- ▶ Balanced Assessment for The Risk of Blackleg (the BARB).
- ▶ Cultivar by region blackleg performance.
- ▶ Frequency of virulent blackleg isolates against commercial cultivars.
- ▶ Known resistance genes in each cultivar.



Blackleg ratings

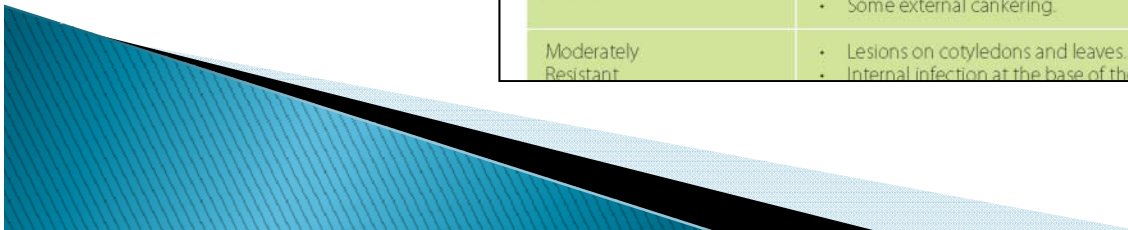
Conventional Varieties			
Hyola 50	R		
Hyola 76	R		
AV-Garnet	MR		
AV-Jade	MR		
AV-Opal	MR		
Tarcoola	MR-MS		
AG-Spectrum	MR-MS	Reduced Resist	
AV-Sapphire	MR-MS		
AG-Muster	MS		
Skipton			
Rivette			
Triazine Tol			
Tornado TT			
ATR-409			



2009 CAA blackleg resistance ratings descriptions

Blackleg RESISTANCE Ratings

Rating	What do you see?	What do you do?
Resistant (R)	<ul style="list-style-type: none"> Some lesions on cotyledons and leaves. Some internal infection at the base of the plant when cut near maturity. 	Do not sow into canola stubble from the previous year. Separate your crop by 500m from the previous year stubble. Fungicide use is unlikely to be economic.
Resistant to Moderately Resistant (R-MR)	<ul style="list-style-type: none"> Lesions on cotyledons and leaves. Some internal infection at the base of the plant when cut near maturity. Some external cankering. 	Do not sow into canola stubble from the previous year. Separate your crop by 500m from the previous year stubble. Fungicide use is unlikely to be economic.
Moderately Resistant	<ul style="list-style-type: none"> Lesions on cotyledons and leaves. Internal infection at the base of the plant when 	Do not sow into canola stubble from the previous year. Separate your crop by 500m from the previous year



Reduced resistance

Reduced resistance – resistance rating has fallen during the previous 3 years.

Conventional Varieties		
Hyola 50	R	
Hyola 76	R	
AV-Garnet	MR	
AV-Jade	MR	
AV-Opal	MR	
Tarcoola	MR-MS	
AG-Spectrum	MR-MS	Reduced Resistance
AV-Sapphire	MR-MS	
AG-Muster	MS	
Skipton	MS	
Rivette	MS-S	
Triazine Tolerant Varieties		
Tornado TT	MR	
ATR-409	MR	

5 year Blackleg Survey – New South Wales

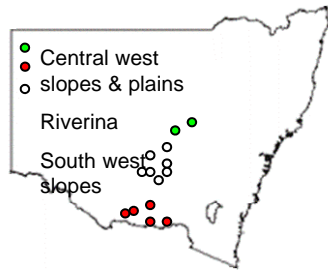


Figure 1. A map displaying the surveyed sites.



Figure 2. Cutting a canola plant at the crown to assess blackleg severity.

The blackleg severity of plants was determined at windrowing stage by pulling stalks from the ground and cutting at the crown of the plant with secateurs. The cross section of the crown was then examined for the percentage of internal infection (darkening). See figures 2 and 3.

Table 1 below displays the mean blackleg severity within a common polygenic cultivar for each year in each region. Table 2 shows the relationship between blackleg severity and yield loss.

The variations between years are due to seasonal conditions. Plants with 100% blackleg severity were found in every region in every year except 2006.

The highest mean blackleg severity observed, 51%, was at Aria Park in 2005. This would have resulted in approximately 20% yield loss.



Figure 3. The discoloured cross sections caused by blackleg, increasing in severity from left to right.

Table 1. Mean blackleg severity over five years in three NSW canola growing regions.

Region	2004	2005	2006	2007	2008
Central west slopes & plains		24	2	10	22
Riverina	7	25	2	9	16
South West Slopes	20	38	1	16	11

Table 2. Effect of blackleg severity on canola yield

Blackleg severity	Percentage yield loss*
0-14	0
15-44	11
45-74	21
75-100	44

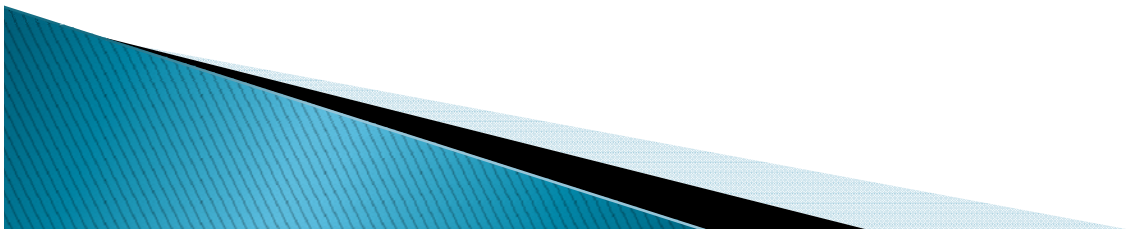
*Yield loss will vary due to spring rainfall

Victoria score – less drought

Seasonal effect

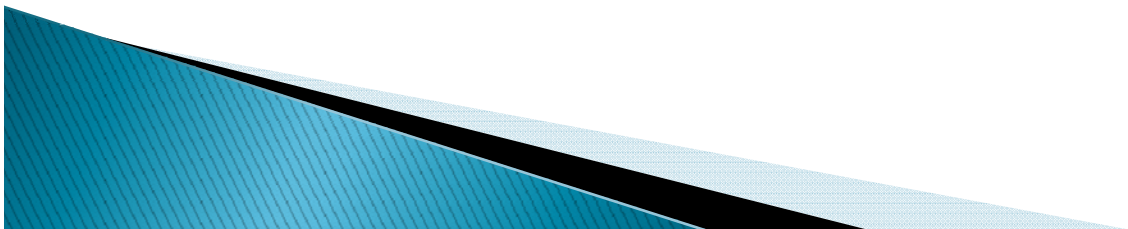
Region	2004	2005	2006	2007	2008
North Central/North East	9	48	11	17	5
Western District	22	50	54	39	13
Wimmera	7	49	1	19	18

Regional effect



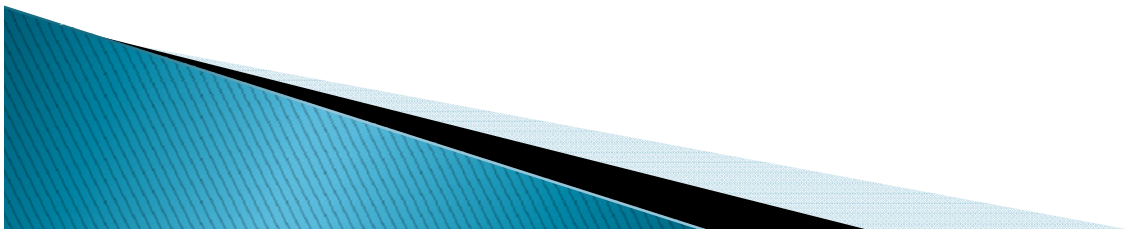
The BARB

- ▶ Lists all factors that are known to effect blackleg severity.
- ▶ Therefore – you do not need to remember anything – just consult the BARB each year.



The BARB

1. Annual rainfall (mm)
2. Autumn rainfall total
3. Month sown
4. Canola intensity % on farm
5. Cultivar Blackleg rating
6. Jockey or Impact seed dressing
7. Dist to 1 year old stubble
8. Dist to 2 year old stubble
9. Dist 1 yr old stubble of same cultivar
10. Dist 2 yr old stubble of same cultivar
11. Years of same cultivar sown in a row



Severity factor weighting

Blackleg risk severity factor	Individual factor score									Your score
	9	8	7	6	5	4	3	2	1	
Rainfall	<600	600	550	500	450	400	350	300	250	
Canola intensity	<20%	20%	15%			10%		5%		
Blackleg rating	VS	S-VS	S	MS-S	MS	MR-MS	MR	R-MR	R	
Dist to stubble	0	100	200	300	400	500	>500			
Years of same cultivar	<3 Years			3 years			2	1	0	
								Total score		

Lake Bolac

Blackleg risk severity factor	Individual factor score									Your score
	9	8	7	6	5	4	3	2	1	
Rainfall	<600	600	550	500	450	400	350	300	250	9
Canola intensity	<20%	20%	15%			10%		5%		9
Blackleg rating	VS	S-VS	S	MS-S	MS	MR-MS	MR	R-MR	R	2
Dist to stubble	0	100	200	300	400	500	>500			7
Years of same cultivar	<3 Years			3 years			2	1	0	9
								Total score		36

Table 1. Responses from Attendees of the Agronomists Field Crop Pathology Workshop held at the Grains Innovation Park, Horsham in October 2009 -Advisors

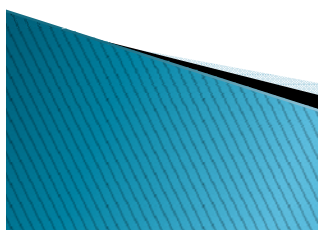
Question	Yes (%)	No (%)	Un decided (%)
Are all the questions easy to understand/complete?	93	5	2
Do you think the BARB will improve blackleg management?	69	6.5	24.5
If you scored a high BARB score would you change your management to reduce your score?	64	5	31
Would you recommend the BARB to your clients?	77	7	16
Should we release a version of BARB for March 2010?	64	13	23
Should it be released each year with the blackleg ratings?	87	6.5	6.5

Table 2. Responses from Attendees of the 2009 Mininera Field Day -growers

Question	Yes (%)	No (%)	Un decided (%)
Are all the questions easy to understand/complete?	80	20	0
Do you think the BARB will improve blackleg management?	90	0	10
If you scored a high BARB score would you change your management to reduce your score?	90	0	10
Should it be released each year with the blackleg ratings?	100	0	0

**2009 SA
Regional
Blackleg
Severity -
Visual blackleg
mortality
scores**

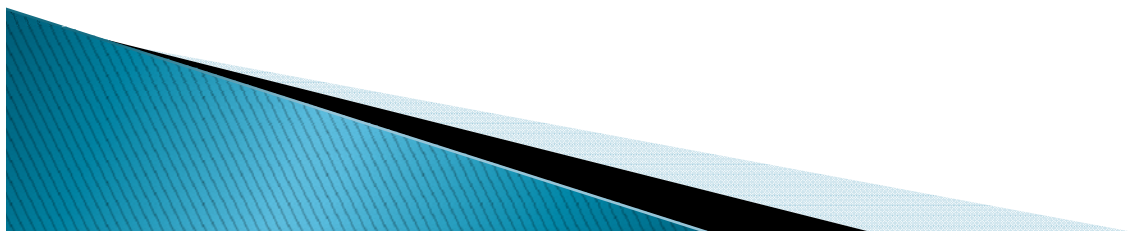
Name	Rating	York Peninsula	South East	Lower Eyre Peninsula	Mid North
Hyola 50	R				
Hyola 571CL	R				
Hyola 76	R				
OasisCL	R				
Pioneer 46Y83	R				
Hyola 433	R-MR				
LightningTT	R-MR				
Monola 130CC	R-MR				
Monola 76TT	R-MR				
Monola 77TT	R-MR				
V3001	R-MR				
ATR Marlin	MR				
ATR409	MR				
AV Garnet	MR				
CB Argyle	MR				
CB Mallee	MR				
CB Tumby	MR				
CB Jardee	MR				
Hurricane TT	MR				
Pioneer 45Y77	MR				
Pioneer 45Y82	MR				
Pioneer 46Y78	MR				
Rottnest TTC	MR				
Sahara CL	MR				
Tawriffic TT	MR				
CB Scaddan	MR-MS				
Tarcoola	MR-MS				
ATR Cobbler	MS				
BravoTT	MS				
Pioneer 43C80	MS				
Pioneer 44C79	MS				
CB Tanami	MS-S				
CB Telfer	MS-S				



Blackleg frequency of virulent isolates – not yet available

- ▶ 1. Regionally capture blackleg spores
- ▶ 2. Quantitative PCR

- ▶ Example of output to industry
- ▶ 2011 in Wimmera– 2% of spores –attack variety X
- ▶ 2012 in Wimmera– 8% of spores –attack variety X
- ▶ 2013 in Wimmera– 28% of spores –attack variety X
- ▶ 2014 recommendation switch to cultivar with different blackleg resistance.



2009 Isolate from Hyola50

@ Coultas (EP) (high blackleg severity in 2008)

Hyola50 –
0.5% of
isolates



Hyola50 –
99.5 % of
isolates



This slide is a hypothetical not actual data

R genotypes of varieties

Variety	R genotype
Wesbrook	No R genes
AV Garnet	<i>Rlm1, Rlm9</i>
Caiman	<i>Rlm7, Rlm9 (Rlm4)</i>
Ripper	<i>Rlm2, Rlm4</i>
46C76	<i>Rlm3</i>
Oscar	<i>Rlm3</i>
Taparoo	<i>Rlm3</i>
Q2	<i>Rlm3, Rlm9</i>
TI1Pinnacle	<i>Rlm3, Rlm9</i>
AG-Emblem	<i>Rlm4</i>
ATR Summit	<i>Rlm4</i>
BLN3347	<i>Rlm4</i>
Dunkeld	<i>Rlm4</i>
Karoo	<i>Rlm4</i>
Narendra	<i>Rlm4</i>
Thunder TT	<i>Rlm4</i>
Wesroona	<i>Rlm4</i>

Variety	R genotype
ATR Barra	<i>Rlm4, Rlm9</i>
AV-Sapphire4	<i>Rlm4, Rlm9</i>
AV-Sapphire1	<i>Rlm4, Rlm9</i>
AV-Sapphire2	<i>Rlm4, Rlm9</i>
Skipton	<i>Rlm4, Rlm9</i>
Tarcoola	<i>Rlm4, Rlm9</i>
Tornado TT	<i>Rlm4, Rlm9</i>
46Y78	<i>RlmS?</i>
Surpass 400	<i>Rlm1, RlmS</i>
ATR Marlin	<i>RlmS?</i>
Av Jade	Potentially new R gene?
Dune	Potentially new R gene?
Hyola50	Potentially new R gene?
Oasis CL	Potentially new R gene?
Rocket CL	Potentially new R gene?
Sahara CL	Potentially new R gene?

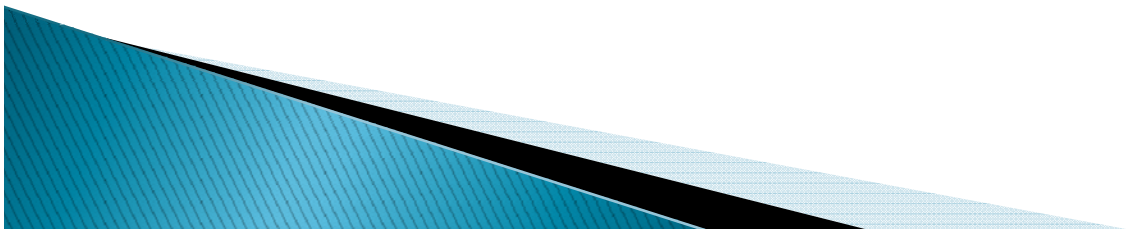
The package

- ▶ It will be produced on a annual basis.
- ▶ It will contain everything that you need to know.
- ▶ It will contain regionally specific knowledge.
- ▶ For many growers it will confirm that their current management is sufficient.
- ▶ For some growers it will give strategies for better managing blackleg.
- ▶ It will lead to less disease and will extend the life of canola cultivars.



WA involvement – Need for national package that is regionally specific.

1. Blackleg severity of single cultivar at NVT yield sites – destructive sampling.
2. Blackleg severity at sites with severe blackleg – visual score mortality for all cultivars.
3. Blackleg severity in differential lines – 6 differentials sown at 4 NVT sites in WA – destructive sampling.
4. Stubble / isolates collected from NVT sites.
5. Differentials screened in pots with stubble from sites with severe blackleg.
6. Provide components and advice to WA regionally specific management package
7. Promote the package in WA.

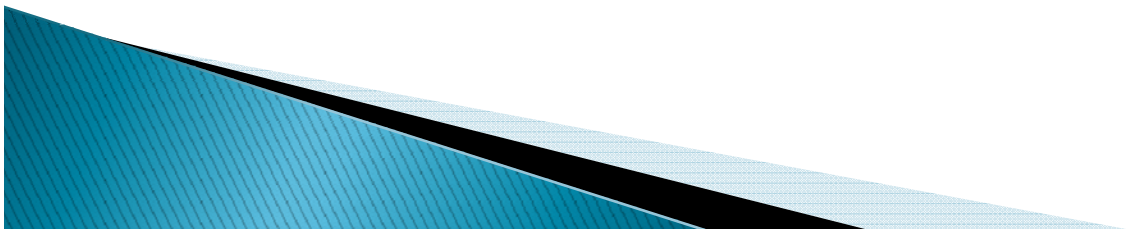


▶ First package for 2011 season.

1. Ratings + reduced resistance warnings
2. BARB
3. Regional severity
4. Regional cultivar blackleg severity

2012 package.

1. Ratings + reduced resistance warnings
2. BARB
3. Regional severity
4. Regional cultivar blackleg severity
5. Known R genes – (depending on Diff project)
6. Warning if fungal avr genes against known cultivar R genes are increasing.



Delivery

1. A3 Ratings with BARB & Regional Cultivar reactions / regional blackleg severity
2. Web based PDFs of each individual component.
3. Computer based model delivery.
4. Need to establish a core team to oversee delivery.

