



New Look Blackleg Management Guide for Industry:

Proposal for comment

New format

- Not a replacement but in addition to the current guide
- Each grower is most interested in comparing between a small number of varieties
- One page of information on each commercial variety of canola
- Include blackleg ratings as well as information on:
 - upper canopy infection,
 - major gene resistance, and
 - quantitative resistance

ATR-Bonito^(d) -triazine tolerant, open pollinated

Blackleg Rating	Blackleg Rating + Jockey	Blackleg Rating + Saltro	Blackleg Rating + lleVo	Major Gene Resistance Group	Quantitative Gene Resistance status	Upper canopy blackleg status
MS	MR	Coming in 2020	Coming in 2020	A	Low	Susceptible (see below)

Major Gene Resistance Group status

ATR-Bonito^(d) contains major gene resistance Group A, however this major gene has been extensively overcome by the blackleg fungus in Australia. For specific regional advice, please consult the blackleg regional recommendations on the NVT website <https://www.nvtonline.com.au/2018-australian-blackleg-monitoring-sites/>

Quantitative Gene Resistance status

ATR-Bonito^(d) is reliant on crown canker resistance (quantitative resistance, QR). ATR-Bonito^(d) had good QR when first released (MR) however the resistance has been eroded over time, as such the QR is now less effective (MS).

Resistance group management

Best grown after canola stubble from these cultivars	Still effective but may have lower longevity if sown near canola stubble from these stubbles	Will result in increased disease severity if sown after these cultivars
B, C, BC, H,	BF	A, AB, AC, ABD, ABF, ABS, ABDF,

Likelihood of yield loss

Crown canker

ATR-Bonito^(d) is moderately susceptible to crown cankers and will therefore have significant yield losses if grown under high blackleg severity situations, such as, high rainfall, adjacent to the previous canola crops stubble and in regions of high canola intensity. ATR-Bonito^(d) is highly likely to respond to fungicides if sown in high blackleg situations. Consult BlacklegCM App to determine likely yield responses.

Upper Canopy Infection (UCI) – aerial blackleg

ATR-Bonito^(d) has no resistance against UCI, if ATR-Bonito is sown early and commences flowering early and blackleg is present then ATR-Bonito^(d) will likely have yield losses associated with UCI. Observe leaf lesions to determine if blackleg is present. Consider a foliar fungicide applied at 30% bloom (20 open flowers on the main stem) if warranted. Early flowering = [lower rainfall zones - before late July]; [mid rainfall zones = before mid-August]; [higher rainfall zones = before late August]. Risk of UCI associated with the commencement to flowering is associated with cool wet weather, so the risk reduces as flowering is delayed into warmer drier conditions. However, wet cool weather later in the season may still result in UCI.

Major Gene Resistance (MGR) and Quantitative Resistance (QR) general information

Australian cultivars have both major gene and quantitative blackleg resistance. The major genes when effective completely protect all plant parts; leaves, stems, flowers and pods and will generally have a better blackleg rating e.g. R-MR or above). Unfortunately, in Australia major genes are easily overcome by the blackleg fungus. The effectiveness of the major gene resistance depends on the frequency of isolates that are virulent against that gene in a local blackleg population. When cultivars with major gene resistance are grown initially there are very few isolates in the population that are virulent towards the resistance gene. However, after a cultivar has been grown for 3 or more years, the frequency of isolates that are virulent can increase and the resistance genes become ineffective.

Quantitative resistance is thought to be made up of many minor effect genes that only operate at the crown canker. These genes will slow the development of crown cankers but will not protect the leaves, stems, flowers and pods. Cultivars with effective quantitative resistance genes will have a better blackleg rating e.g. MR or above, cultivars with poor quantitative resistance will have a lower blackleg rating e.g. MS.



Example

ATR-Bonito ^d -triazine tolerant, open pollinated

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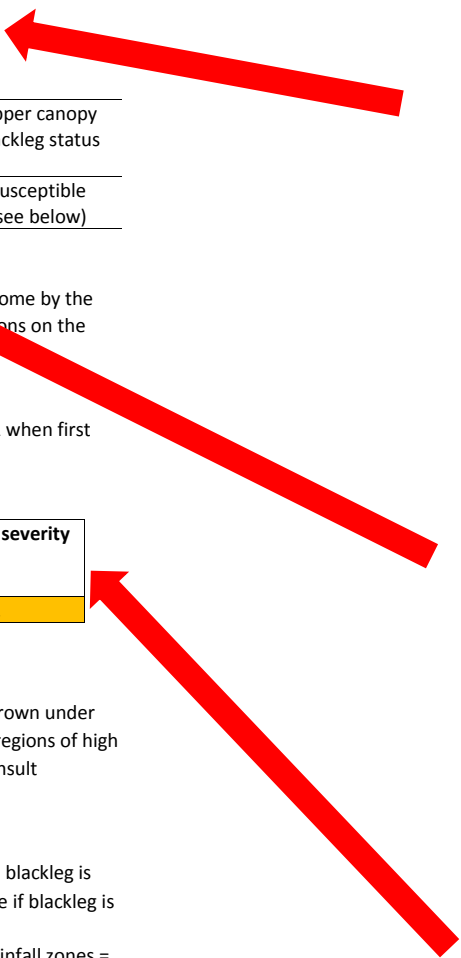
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From current guide:
Variety name, herbicide tolerance, additional information such as winter, hybrid etc.

From current guide: Blackleg ratings (incl. with fungicide treatment), resistance group

From current guide:
Recommendations for rotations, can be more specific than it is currently



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Proposed guide:
Additional ways to classify potential blackleg damage



Proposed guide:
Major gene and quantitative resistance status, each variety



Proposed guide:
Likelihood of yield loss due to crown canker and upper canopy infection (response to fungicide)



Proposed guide:
Summary of major gene and quantitative resistance

New format: feedback

- Produced a mock-up of ten varieties sent to breeders for comment
- Feedback from breeders so far:
 - Needs to be clearly branded as MGP/GRDC produced document (not breeders) ✓
 - Old format was clear, why change?
 - Make both formats available with the new format as a 'dig-deeper' attachment? ✓
 - Science not settled on groups and rotations
 - How is upper canopy infection being measured and, if it is just based on blackleg rating, why is it different?
 - Give more prominence to adult plant resistance ✓
 - Expect more discussion from breeders querying statements about their varieties

New format: summary of examples

Name	Major gene resistance group	Blackleg rating	Quantitative resistance status	Upper canopy infection status
ATR-Bonito ⁽¹⁾	A	MS	Low	Susceptible
Nuseed Quartz	ABD	R	?	Resistant
Hyola [®] 350TT	ABDF	R	?	Resistant
ATR-Stingray ⁽¹⁾	C	MR-MS	Moderate	Susceptible
Pioneer [®] 43Y92CL	B	R-MR	Very good	Susceptible
Pioneer [®] 45Y25RR	BC	MR-MS	Moderate	Susceptible
BASF 3000 TR	B	MS-S	Very low	Susceptible
VICTORY [®] V75-03CL	AB	R-MR	Very good	Susceptible
Hyola [®] 970CL	H	R	?	Resistant
DG 408RR	AC	MS	Low	Susceptible

Quantitative resistance helps to slow the formation of crown cankers but is masked by strong Bl ratings, so we cannot comment on those cases

When major genes are effective they will protect all parts of the plant, including the upper canopy

New format: summary of examples

DISCUSS

Name	Major gene resistance group	Blackleg rating	Quantitative resistance status	Upper canopy infection status
ATR-Bonito ^(b)	A	MS	Low	Susceptible
Nuseed Quartz	ABD	R	?	Resistant
Hyola [®] 350TT	ABDF	R	?	Resistant
ATR-Stingray ^(b)	C	MR-MS	Moderate	Susceptible
Pioneer [®] 43Y92CL	B	R-MR	Very good	Susceptible
Pioneer [®] 45Y25RR	BC	MR-MS	Moderate	Susceptible
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Hyola [®] 970CL	H	R	?	Resistant
DG 408RR	AC	MS	Low	Susceptible

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When major genes are effective they will protect all parts of the plant, including the canopy