

# BLACKLEG MANAGEMENT GUIDE

# FACT SHEET



NATIONAL APRIL 2024

## Autumn 2024 update to manage risk

Blackleg can cause severe yield loss, but it can be successfully managed. This guide and the BlacklegCM app will help growers and advisers to manage canola crops to reduce blackleg infection, and identify a high-risk situations where practices need to change to reduce or prevent yield loss.

### KEY POINTS

- Never sow your canola crop into last year's canola stubble
- Choose a cultivar with adequate blackleg resistance for your region
- Relying only on fungicides to control blackleg poses a high risk of fungicide resistance
- If your monitoring has identified yield loss and you have grown the same cultivar for three years or more, choose a cultivar from a different resistance group
- Monitor your crops in autumn to determine yield losses in the current crop

*Leptosphaeria maculans*, the causal agent of blackleg, is a sexually reproducing pathogen that may overcome cultivar resistance genes. Fungal spores are released from canola stubble and spread extensively via wind and rain splash. The disease is more severe in areas of intensive canola production.

### STEP 1: Identify your farm's blackleg risk.

TABLE 1: Regional blackleg factors.

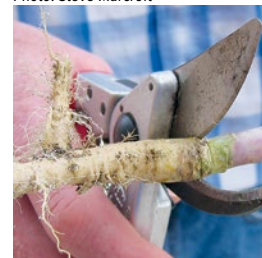
Environmental factors that determine risk of severe blackleg infection	Blackleg severity risk factor								
	High risk			Medium risk			Low risk		
Regional canola intensity (% area sown to canola)	above 20	16–20	15	11–14	11–14	10	6–9	5	below 5
Annual rainfall (mm)	above 600	551–600	501–550	451–500	401–450	351–400	301–350	251–300	below 250
Total rainfall received March–May prior to sowing (mm)	above 100	above 100	above 100	above 100	91–100	81–90	71–80	61–70	below 60

Combined high canola intensity and adequate rainfall increase the probability of severe blackleg infection.

### STEP 2: Determine each crop's blackleg severity in autumn.

- Assess the level of disease in your current crop. Sample the crop anytime from the end of flowering to windrowing (swathing). Pull 60 randomly chosen stems out of the ground, cut off the roots with a pair of secateurs and, using the reference photos in Table 2, estimate the amount of disease in the stem cross-section. Yield loss commonly occurs when more than 50 per cent of the cross-section of the cut stem is discoloured.
- A dark-coloured stem is a symptom of blackleg (Table 2). Stem cankers are clearly visible at the crown of the plant. Severe cankers may cause the plant to fall over as the roots become separated from the stem.
- If you have identified that you are in a high-risk situation (Step 1), use Steps 3 and 4 to reduce your risk of blackleg for future seasons.
- If you are in a low-risk situation and you have not identified yield loss due to blackleg infection when assessing your crop, continue with your current management practices.

Photo: Steve Marcroft



Cut a plant at the crown to assess internal infection.

TABLE 2: Crop blackleg severity.

High risk	Medium risk			Low risk		
Cankered	100%	80%	60%	40%	20%	0%

Yield loss occurs when more than half of the cross-section is discoloured.

### STEP 3: Change management practices to reduce the risk of blackleg infection.

If your crop monitoring (Step 2) showed yield loss (cut stems were >50 per cent discoloured) in the previous year, consider changing your management practices for each canola paddock to be sown to reduce blackleg severity.

- For each management practice, circle where each canola paddock fits to determine the risk of blackleg. For example, **blackleg rating**: if your cultivar is SF Spark TT, circle 'MR', indicating a low risk of blackleg; or **distance from last year's canola stubble**: if your proposed canola crop is 200 metres away, high risk is indicated.
- Review each management practice to determine which are increasing risk and how the risk can be reduced. For example, for **distance from last year's canola stubble**, choose a different paddock, at least 500m away from last year's stubble, to reduce the risk from high to low.

**WARNING: 'CANOLA ON CANOLA' WILL CAUSE A SIGNIFICANT YIELD LOSS AND WILL REDUCE THE EFFECTIVE LIFE OF CANOLA CULTIVARS AND FUNGICIDES.**

Blackleg management practices that determine risk of blackleg infection, from highest to lowest effectiveness are:

#### A. BLACKLEG RATINGS

The cultivar blackleg rating is the most important blackleg management tool. If your previous crop had a high level of disease, choose a cultivar with a higher blackleg rating. The 2024 blackleg ratings are listed in Table 3.

High risk			Medium risk				Low risk	
VS	S-VS	S	MS-S	MS	MR-MS	MR	R-MR	R

VS = very susceptible; S = susceptible; MS = moderately susceptible; MR = moderately resistant; R = resistant

#### B. DISTANCE FROM LAST YEAR'S CANOLA STUBBLE

The distance of your current crop to last year's canola stubble will determine disease severity.

**NEVER** sow your canola crop into last year's canola stubble. Distances from last year's stubble of at least 500m will reduce blackleg severity.

High risk			Medium risk				Low risk	
0m	100m	200m	300m	400m	500m	>500m		

#### C. FUNGICIDE USE

Fungicides will provide an economic return only if your crop is at high risk of yield loss. Fungicides complement other management practices; never rely solely on fungicides.

**RELIANCE ON FUNGICIDES TO CONTROL DISEASE POSES A HIGH RISK OF FUNGICIDE RESISTANCE.**

High risk		Medium risk				Low risk
No fungicide	Foliar-applied fungicide	Seed dressing fungicide	Fertiliser-applied fungicide	Seed dressing + fertiliser-applied fungicide	Seed dressing or fertiliser-applied + foliar fungicide	

#### D. YEARS OF SAME CULTIVAR GROWN

The pathogen will overcome cultivar resistance genes if the same genes are used each year. By sowing a cultivar based on different resistance genes, the ability of the pathogen to overcome resistance will be reduced. All cultivars have been placed into different blackleg resistance groups based on their resistance complement (see Table 3).

If you have:

- high or increasing levels of blackleg in your crop (from monitoring disease levels each year);
- used the management practices outlined in Step 3; and
- sown cultivars from the same resistance group in close proximity (within two kilometres) for three or more years, then sow a cultivar from a different resistance group (see Table 3).

High risk		Medium risk			Low risk	
Sown the same cultivar/resistance group for more than 3 years	Sown the same cultivar/resistance group for 3 years	Sown the same cultivar/resistance group for 2 years	Sown the same cultivar-resistance group the previous year	Sown cultivar from a different resistance group		

#### E. DISTANCE FROM TWO-YEAR-OLD CANOLA STUBBLE

Stubble older than two years produces fewer blackleg spores and will normally have minimal effects on blackleg severity, even where canola is sown into two-year-old stubble. However, two-year-old stubble may cause disease if inter-row sowing canola (see F. Canola stubble conservation) or if the cultivar resistance has been overcome.

High risk		Medium risk				Low risk
		0m	100m	250m	500m	>500m

## F. CANOLA STUBBLE CONSERVATION

Stubble destruction is not effective in reducing blackleg infection. Inter-row sowing canola into two-year-old canola stubble, where germinating seedlings are immediately next to standing stubble, may result in higher levels of blackleg infection.

High risk	Medium risk			Low risk
	Inter-row sowing	Disc tillage	Knife-point tillage	Burning/burying tillage

## G. MONTH SOWN


Canola is most vulnerable to blackleg as a seedling. If crops are sown early in warmer conditions and get through the seedling growth stage quickly, they may escape high blackleg severity.

High risk	Medium risk		Low risk
	June to August	May 15 to 31	May 1 to 14 April 15 to 30

## H. DUAL-PURPOSE GRAZING CANOLA


Grazing canola can increase the severity of blackleg in the crop. To minimise any associated reduction in grain yield, select a cultivar with a high level of blackleg resistance ( $\geq$ R-MR), and if using a cultivar with a lower level of resistance, consider the use of a fungicide (keeping in mind chemical withholding periods).

High risk	Medium risk		Low risk
	Grazing canola		



**BlacklegCM app. Get the app for your iPad or tablet.**

The app is an interactive format of this management guide that allows you to enter individual crop data and estimate blackleg severity for your crop.



## STEP 4: Rotate between cultivars from different blackleg resistance groups.

Canola cultivars have different combinations of blackleg resistance genes. Over time, growing cultivars with the same blackleg resistance genes has led to changes in the pathogen's virulence, enabling it to overcome cultivar blackleg resistance. By rotating between cultivars with different resistance genes, you can reduce the probability of resistance breakdown and disease severity. Based on Steps 1 to 3, have you observed increasing blackleg severity and been growing the same cultivar in close proximity for three years or more?

- **No** – your current management practices should be sufficient to adequately manage blackleg resistance.
- **Yes** – you may be at risk of the blackleg fungus overcoming the blackleg resistance of your cultivar and it is recommended you grow a cultivar with a different combination of blackleg resistance genes.
- To facilitate this process, all cultivars have been placed into groups (A to H) based on their resistance genes in Table 3.
- **You do not need to change resistance groups (cultivars) every year.**

### How to use Table 3

1. Identify the resistance group of your previously grown cultivar using the column labelled **Section A – Resistance group of cultivar** (shaded in light purple ■). Note: some cultivars belong to multiple groups. Some cultivars have not yet been classified and rotation recommendations cannot be made for these cultivars.

Examples: Renegade TT<sup>ϕ</sup> belongs to resistance group A

InVigor<sup>®</sup> LT 4530P belongs to resistance groups B and F

If your previously grown cultivar is not included in Table 3, pages 4 and 5, as it is no longer commercially available, refer to Table 4.

2. Using **Section B**, look down the column with the resistance group of the variety grown previously (for example, column A if Renegade TT<sup>ϕ</sup> was grown previously, or column BF if InVigor<sup>®</sup> LT 4530P was grown previously) to identify cultivars with reduced risk.

- Green = best possible rotation (no resistance genes in common)
- Yellow = Okay rotation (at least one resistance gene not in common)
- Red = not advised (all resistance genes in common)

Examples: Renegade TT<sup>ϕ</sup> (resistance group A) for 2022 planting – sown after cultivars shaded

■ Red (for example, ATR-Bonito<sup>ϕ</sup>, Group A) is not recommended and anything shaded

■ Green (for example, Pioneer<sup>®</sup> 45Y95 CL, Group C) is best.

InVigor<sup>®</sup> LT 4530P (resistance groups B and F) for 2022 planting – sown after cultivars shaded

■ Red (for example, InVigor<sup>®</sup> T4510, Group BF) is not recommended, following cultivars shaded

■ Yellow (for example, Nuseed<sup>®</sup> Quartz, Group ABD) is okay and anything shaded

■ Green (for example, ATR-Bonito<sup>ϕ</sup>, Group A) is best.

**TABLE 3: 2024 autumn blackleg ratings and resistance groups. See page 3 (Step 4) for information on how to use this table.**

Variety	2024 Blackleg rating Bare	2024 Blackleg rating ILeVo®	2024 Blackleg rating Salstro®	Type	Section A – resistance group of cultivar	Section B – resistance group of previous year’s cultivar (stubble)																
						A	B	C	AB	AC	AD	ABC	ABD	ABF	ABS	ABDF	ABDS	ADF	BF	BC	H	AH
<b>CONVENTIONAL VARIETIES</b>																						
Outlaw <sup>Ⓟ</sup>	RMR			Open pollinated	A																	
Nuseed® Quartz	RMR			Hybrid	ABD																	
Nuseed® Diamond	RMR	R	R	Hybrid	ABF																	
<b>TRIAZINE-TOLERANT VARIETIES</b>																						
HyTTec® Trifecta	R			Hybrid	ABD																	
HyTTec® Trident	R			Hybrid	AD																	
Monola® H524TT	R			High stability oil, hybrid	AD																	
DG Bidgee TT <sup>Ⓟ</sup>	R	R	R	Open pollinated	H																	
HyTTec® Trophy	R	R	R	Hybrid	AD																	
DG Torrens TT <sup>Ⓟ</sup>	RMR			Open pollinated	H																	
Hyola® Blazer TT	RMR		R	Hybrid	ADF																	
InVigor® T 4511	RMR	R		Hybrid	Different blackleg resistance pattern, further testing required. Effective rotation with existing groups currently unknown																	
Monola® H421TT	RMR			High stability oil, hybrid	BC																	
ATR-Bluefin <sup>Ⓟ</sup>	RMR			Open pollinated	AB																	
DG Avon TT <sup>Ⓟ</sup>	MR	R	R	Open pollinated	AC																	
SF Spark™ TT	MR	R	R	Hybrid	ABDS																	
InVigor® T 4510	MR	R	R	Hybrid	BF																	
Renegade TT <sup>Ⓟ</sup>	MR			Open pollinated	A																	
HyTTec® Velocity	MR			Hybrid	AB																	
Monola® 422TT	MRMS			Open pollinated	BC																	
ATR-Swordfish <sup>Ⓟ</sup>	MRMS			Open pollinated	AB																	
SF Dynatron™ TT	MRMS	R	R	Hybrid	BC																	
RGT Baseline™ TT	MRMS	R	R	Hybrid	B																	
Bandit TT <sup>Ⓟ</sup>	MRMS	R	R	Open pollinated	A																	
RGT Capacity™ TT	MRMS	RMR	R	Hybrid	B																	
AFP Cutubury <sup>Ⓟ</sup>	MS	MR	RMR	Open pollinated	AB																	
ATR-Bonito <sup>Ⓟ</sup>	MS	RMR	R	Open pollinated	A																	
<b>IMIDAZOLINONE-TOLERANT VARIETIES</b>																						
Hyola® Continuum CL	R		R	Hybrid, Clearfield®	ADF																	
Hyola® Solstice CL	R		R	Hybrid, Clearfield®	ADFH																	
Captain CL	R			Winter, hybrid, Clearfield®	AH																	
Hyola® Feast CL	R		R	Winter, hybrid, Clearfield®	H																	
RGT Nizza™ CL	R			Winter, hybrid, Clearfield®	B																	
Hyola® 970CL	R		R	Winter, hybrid, Clearfield®	H																	
Phoenix CL	R			Winter, hybrid, Clearfield®	B																	
Pioneer® 45Y93 CL	R		R	Hybrid, Clearfield®	BC																	



## BLACKLEG RESISTANCE GROUP MONITORING

Representative cultivars from all blackleg resistance groups are sown in trial sites in all canola-producing regions across Australia and monitored for blackleg severity. These data provide regional information on the effectiveness of each blackleg resistance group and are available on the National Variety Trials website ([nvt.grdc.com.au](http://nvt.grdc.com.au)).

**TABLE 4: Resistance groups of cultivars that are no longer commercially available.**

CULTIVAR	RESISTANCE GROUP
ATR-Mako <sup>®</sup>	A
ATR-Wahoo <sup>®</sup>	A
DG Bindo TF	AB
DG Murray TT <sup>®</sup>	H
Hyola <sup>®</sup> 410XX	ABD
Hyola <sup>®</sup> Equinox CL	ADF
InVigor <sup>®</sup> T 6010	BC
Monola <sup>®</sup> 420TT	AD
VICTORY <sup>®</sup> V5003RR	AB
VICTORY <sup>®</sup> V7002CL	BF

## USEFUL RESOURCES



**BlacklegCM app**, developed with GRDC investment, allows the user to input information such as paddock selection, variety choice, seed dressing, and banded or sprayed fungicide, and takes into account costs, yield benefits and grain prices to give the best/worse-case scenario and likely estimated economic return. Growers can change the parameters on the app to tailor the output to their own individual crop. It can be downloaded onto tablets (not smartphones) from both the App Store and Google Play, [agric.wa.gov.au/apps/blacklegcm-blackleg-management-app](http://agric.wa.gov.au/apps/blacklegcm-blackleg-management-app)



**UCI BlacklegCM** is a new app to assist grain growers in managing blackleg upper canopy infection (UCI) in canola during flowering stage and to also aid in fungicide management decisions. [agric.wa.gov.au/apps/uci-blacklegcm-blackleg-upper-canopy-infection-management-app](http://agric.wa.gov.au/apps/uci-blacklegcm-blackleg-upper-canopy-infection-management-app)

### Diseases of Canola and their Management:

**The Back Pocket Guide** Available from *GroundCover™* Direct, 1800 110 044, [grdc.com.au/GRDC-BPG-CanolaDiseases](http://grdc.com.au/GRDC-BPG-CanolaDiseases)

**Canopy Infection by Blackleg – a New Evolution** [grdc.com.au/news-and-media/audio/podcast/canopy-infection-by-blackleg-a-new-evolution](http://grdc.com.au/news-and-media/audio/podcast/canopy-infection-by-blackleg-a-new-evolution)

**Marcroft Grains Pathology** [marcroftgrainspathology.com](http://marcroftgrainspathology.com)

### Fungicide Resistance Management

[croplife.org.au/resources/programs/resistance-management/canola-blackleg](http://croplife.org.au/resources/programs/resistance-management/canola-blackleg)

### Blackleg upper canopy infection videos (follow link or search on GRDC website)

[grdc.com.au/search?query=blackleg%20upper%20canopy&meta\\_error\\_not\\_found&personal=false&form=search-new&collection=grdc-multi&profile=\\_default&meta\\_error\\_not\\_found&sort=off&meta\\_archive\\_not=1&Type%7Ctype=Video](http://grdc.com.au/search?query=blackleg%20upper%20canopy&meta_error_not_found&personal=false&form=search-new&collection=grdc-multi&profile=_default&meta_error_not_found&sort=off&meta_archive_not=1&Type%7Ctype=Video)

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## GRDC CODES

**MGP1905-001SAX**  
**MGP2307-001RTX**



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