

AUSTRALIAN CANOLA VARIETY RATINGS 2021 SPRING FACT SHEET BLACKLEG MANAGEMENT GUIDE

Quantify the risk, paddock by paddock

Blackleg can cause severe yield loss, but it can be successfully managed. This Guide and the BlacklegCM app (see Useful Resources, page 6) will help growers and advisers to effectively manage canola crops against blackleg infection, and determine if there is a high-risk situation where practices need to change to reduce or prevent yield loss. Follow Steps 1 through to 4 in sequence, starting below the Key Points.

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 spring 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: Use Table 1 to determine your farm's blackleg risk.

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 spring.

- 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 (below), 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

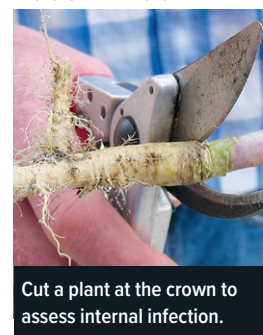
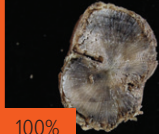

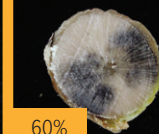

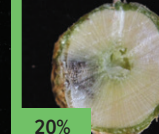
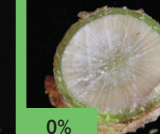


TABLE 2 Crop blackleg severity.

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

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

STEP 3: Management practices can reduce the risk of blackleg infection.

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

- For each of the eight management factors listed below, 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.
- Complete all eight management factors to determine which practices are causing increased risk and how they 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, reducing 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 2021 blackleg ratings are listed in Table 3 on page 4 and 5.

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, page 4 and 5).

If you have:

- high or increasing levels of blackleg in your crop (from monitoring disease levels each year);
- used the management practices outlined here 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 page 4 and 5 – Blackleg Resistance Groups).

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

STEP 3 FROM PAGE 2

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. Link is in the Useful Resources section, on page 6.

STEP 4: 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, which have enabled it to overcome cultivar blackleg resistance. By rotating between cultivars with different resistance genes, you can reduce the probability of resistance breakdown and reduce 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, page 4 and 5.
- **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: ATR-Wahoo[®] belongs to resistance group A

DG 670TT belongs to resistance groups B and F

If your previously grown cultivar is not included in Table 3 (page 4 and 5), as it is no longer commercially available, refer to Table 4 (page 6).

2. Using **Section B**, look down the column with the resistance group of the variety grown previously (for example, column A if ATR-Wahoo[®] was grown previously, or column BF if DG 670TT 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: ATR-Wahoo[®] (resistance group A) for 2021 planting – sown after cultivars shaded

- Red (for example, ATR-Mako[®], Group A) is not recommended and anything shaded
- Green (for example, ATR-Stingray[®], Group C) is best.

DG 670TT (resistance groups B and F) for 2021 planting – sown after cultivars shaded

- Red (for example, SF Ignite TT, Group BF) is not recommended, following cultivars shaded
- Yellow (for example, Nuseed[®] Quartz, Group ABD) is okay and anything shaded
- Green (for example, ATR-Mako[®], Group A) is best.

TABLE 3 2021 Spring blackleg ratings and resistance groups. See page 3 (Step 4) for information on how to use this table.

Variety	2021 Blackleg Rating				2021 Blackleg Rating ILeVo	2021 Blackleg Rating Salto	Type	Section A – Resistance group of cultivar										Section B – Resistance group of previous year's cultivar (stubble)									
	Bare	Jockey	Rating	Salto				A	B	C	AB	AC	AD	ABC	ABD	ABF	ABS	ABDF	ABDS	ADF	BF	BC	H				
CONVENTIONAL VARIETIES																											
Nuseeq [®] Quartz	R						Hybrid	ABD																			
Nuseeq [®] Diamond	MR	R	R	R	R	R	Hybrid	ABF																			
TRIAZINE-TOLERANT VARIETIES																											
HyTtec [®] Trifecta	R				R	R	Hybrid	ABD																			
HyTtec [®] Trident	R				R	R	Hybrid	AD																			
Hyola [®] Blazer TT	R				R	R	Hybrid	ADF																			
DG Murray TT	R-MR				R	R	Open pollinated	H																			
HyTtec [®] Trophy	R-MR	R	R	R	R	R	Hybrid	AD																			
Monola [®] H421TT	R-MR				R	R	High stability oil, hybrid	BC																			
Monola [®] 420TT	R-MR						High stability oil, open pollinated	AD																			
Pioneer [®] 45T03 TT	MR	R	R	R	R	R	Hybrid	ABD																			
DG Bidgee TT	MR						Open pollinated	H																			
SF Spark TT	MR	R-MR	R	R	R	R	Hybrid	ABDS																			
Pioneer [®] 44T02 TT	MR	R-MR					Hybrid	ABD																			
DG 670TT	MR-MS						Hybrid	BF																			
InVigor [®] T 4510	MR-MS	R	R	R	R	R	Hybrid	BF																			
SF Ignite TT	MR-MS	R	R	R	R	R	Hybrid	BF																			
ATR-Stingray ^b	MR-MS	R-MR	R	R	R	R	Open pollinated	C																			
ATR-Mako ^b	MR-MS	R-MR	R	R	R	R	Open pollinated	A																			
SF Turbine TT	MR-MS	R-MR	R	R	R	R	Hybrid	BF																			
SF Dynatron TT	MS	MR	R	R	R	R	Hybrid	BC																			
InVigor [®] T 6010	MS				R	R	Hybrid	BC																			
ATR-Wahoo ^b	MS						Open pollinated	A																			
RGT Capacity TT	MS	MR	R	R	R	R	Hybrid	B																			
ATR-Bonito ^b	MS	MR-MS	R	R	R	R	Open pollinated	A																			
IMIDAZOLINONE-TOLERANT VARIETIES																											
Hyola [®] 970CL	R				R	R	Winter, hybrid, Clearfield [®]	H																			
RGT Nizza CL	R						Winter, hybrid, Clearfield [®]	B																			
Hyola [®] Feast CL	R				R	R	Winter, hybrid, Clearfield [®]	H																			
Hyola [®] Equinox CL	R				R	R	Hybrid, Clearfield [®]	ADF																			

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

CULTIVAR	RESISTANCE GROUP
SF Edimax CL	C
InVigor® T 3510	BF
Hyola® 540XC	Not determined
Hyola® 580CT	BC
Hyola® 559TT	ABD
Hyola® 350TT	ABDF
Saintly CL	B
Banker CL	A
AV-Garnet [®]	A
Monola® 416 TT	B
Hyola® 404RR	ABD
Pioneer® 43Y23 RR	B
Hyola® 530XT	ABD
Monola® 515 TT	Different pattern
DG560TT	BF

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 (www.nvtonline.com.au).

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, <https://www.agric.wa.gov.au/apps/blacklegcm-blackleg-management-app>

Diseases of Canola and their Management: The Back Pocket Guide

Available from *GroundCover*™ Direct, 1800 110 044, www.grdc.com.au/GRDC-BPG-CanolaDiseases

Canopy Infection by Blackleg – a New Evolution <https://grdc.com.au/news-and-media/audio/podcast/canopy-infection-by-blackleg-a-new-evolution>

Marcroft Grains Pathology website www.marcroftgrainspathology.com

Grains Research Development Corporation grdc.com.au

Fungicide Resistance Management <https://www.croplife.org.au/resources/programs/resistance-management/canola-blackleg/>

Blackleg upper canopy infection videos (follow link or search on GRDC website) https://grdc.com.au/search?query=blackleg%20upper%20canopy&meta_error_not=found&s&personal=false&f&orm=search-new&collection=grdc-multi&profile=_default&meta_error_not=found&sort=off&meta_archive_not=1&f.Type%7Ctype=Video

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