



# UPPER CANOPY BLACKLEG

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**GRDC**<sup>™</sup>  
GRAINS RESEARCH  
& DEVELOPMENT  
CORPORATION



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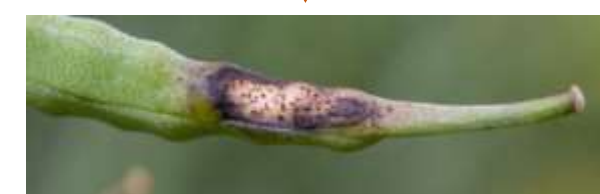
**Crown canker:**  
Infection during seedling stage



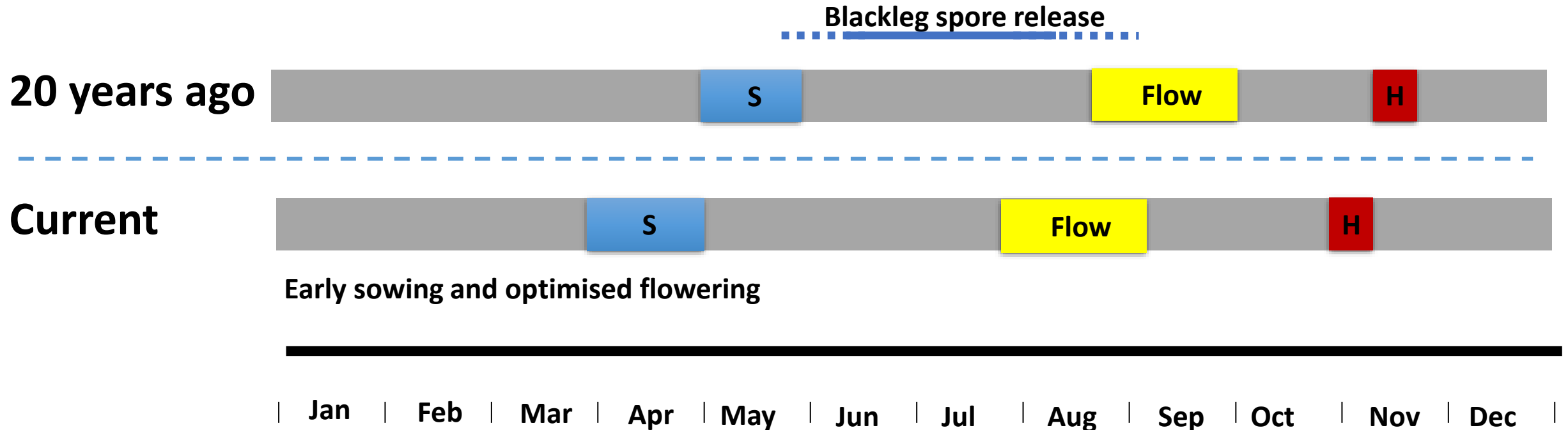
**Upper canopy infection:**  
Infection during flowering



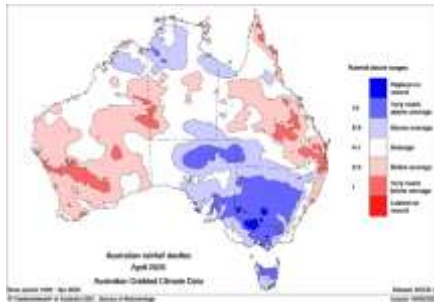
**Pod infection:** Infection during pod fill



# CHANGING FARMING SYSTEMS RESULTS IN CHANGED CROP PHENOLOGY

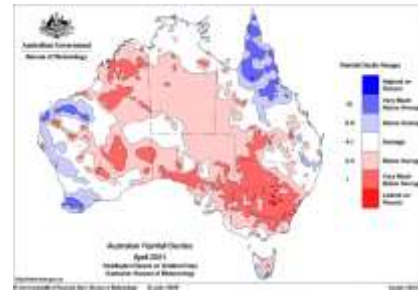


Flowering time shift = 20 – 30 days



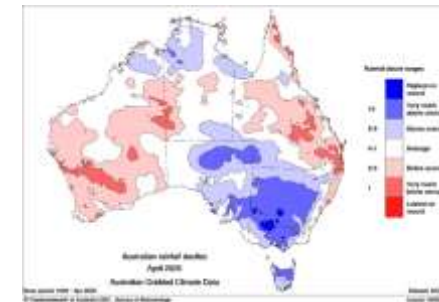
April 2020

Site	2020
<b>NSW</b>	<b>7.0</b>
Beckom	7.3
Cootamundra	4.3
Cudal	7.7
Gerogery	0.0
Grenfell	5.3
Lockhart	6.3
Wagga Wagga	17.7
<b>SA</b>	<b>44.7</b>
Arthurton	4.7
Cummins Landmark	108.3
Keith	12.3
Wangary Landmark	65.0
Yeelanna	33.3
<b>Vic</b>	<b>12.2</b>
Charlton	19.7
Diggora	1.3
Hamilton	14.7
Horsham	4.0
Kaniva	11.0
Lake Bolac	7.7
Wunghnu	11.0
Yarrawonga	28.0
<b>WA</b>	<b>6.6</b>
Bolgart	0.0
Kendenup	1.3
Kojonup	0.0
Stirlings South	1.7
Wagin	11.7
Williams	25.0



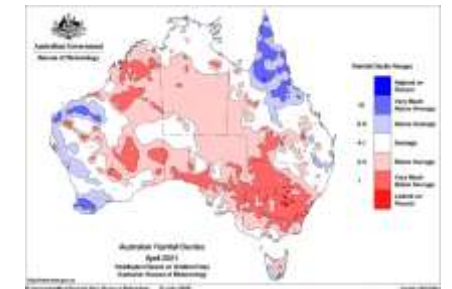
April 2021

Site	2021
<b>NSW</b>	<b>0.7</b>
Beckom	0.0
Cootamundra	0.0
Cudal	0.0
Gerogery	0.0
Grenfell	0.0
Lockhart	0.0
Wagga Wagga	4.3
<b>SA</b>	<b>6.8</b>
Arthurton	16.7
Cummins Landmark	8.3
Keith	0.0
Wangary Landmark	22.7
Yeelanna	6.7
<b>Vic</b>	<b>2.8</b>
Charlton	14.3
Diggora	1.3
Hamilton	0.0
Horsham	2.0
Kaniva	3.3
Lake Bolac	0.0
Wunghnu	0.0
Yarrawonga	0.0
<b>WA</b>	<b>1.2</b>
Bolgart	1.0
Kendenup	0.0
Kojonup	0.0
Stirlings South	2.0
Wagin	2.7
Williams	2.0



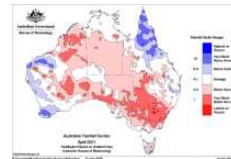
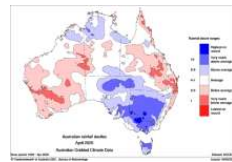
April 2020

2021 average crown canker severity 12%

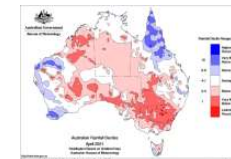
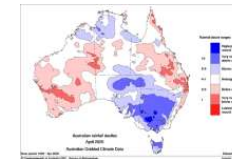


April 2021

2022 average crown canker severity 36%

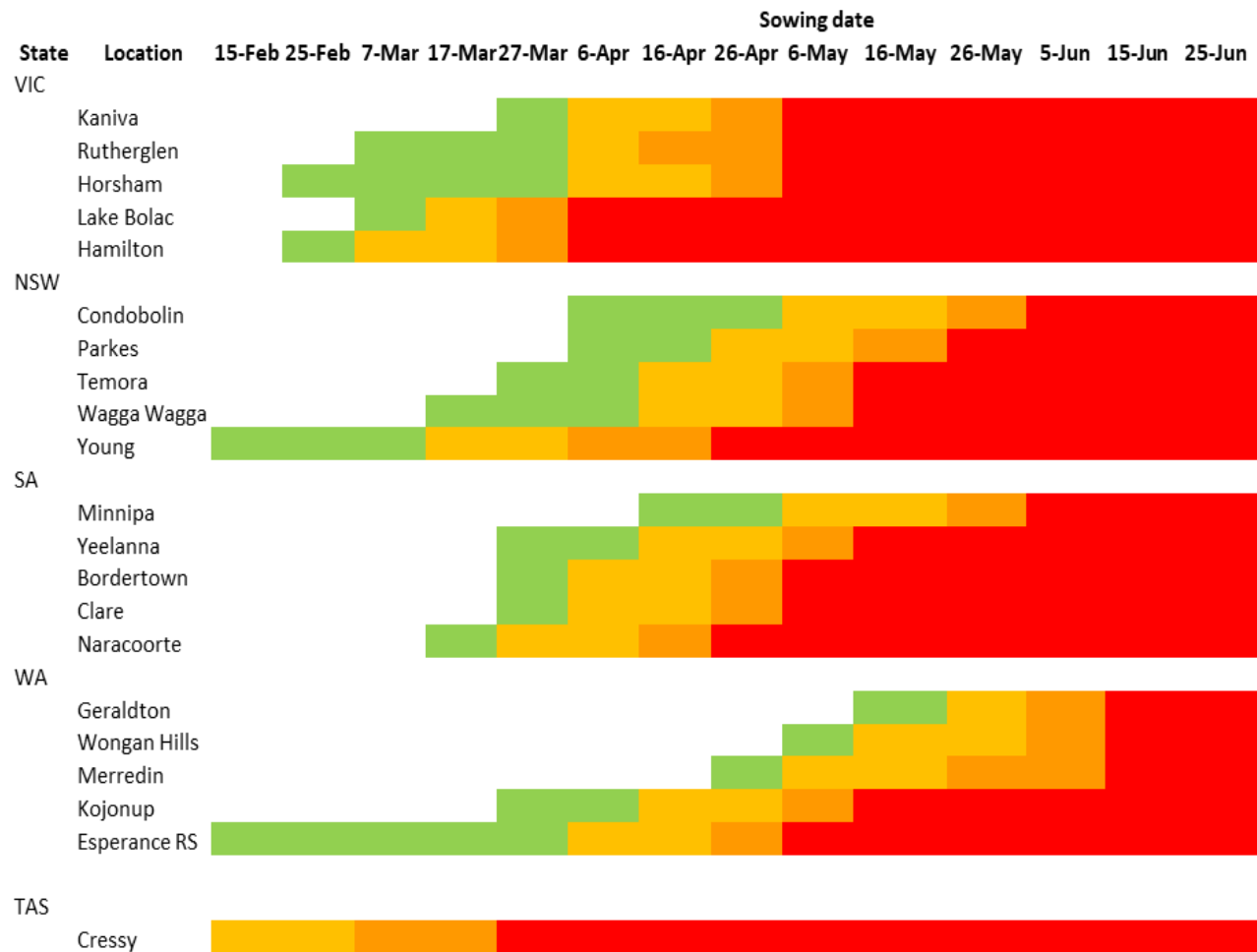


WA	2020	2021
Bolgart	39	30
Gibson	19	
Kendenup	15	6
Kojonup	19	5
Munglinup	25	4
Stirlings South	22	9
Wagin	32	42
Williams	44	5



WA	2020	2021
Bolgart	1.0	0.0
Kendenup	0.0	1.3
Kojonup	0.0	0.0
Munglinup	0.7	
Stirlings South	2.0	1.7
Wagin	2.7	11.7
Williams	2.0	25.0

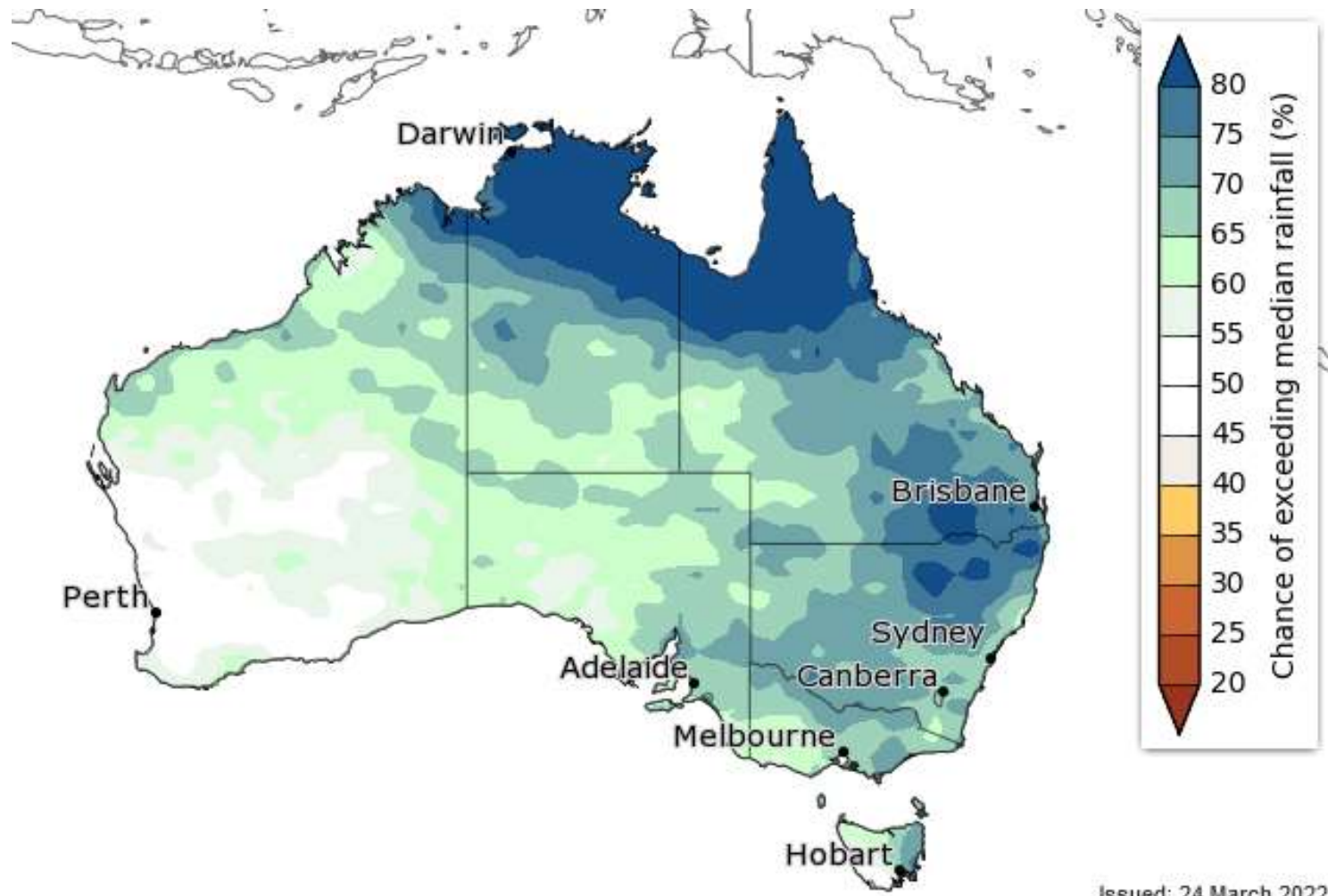
# New addition to BlacklegCM



CSIRO analysis



# BOM FORECAST APRIL RAINFALL



Issued: 24 March 2022







**Vertical stubble**



**Horizontal stubble**



**Vertical  
stubble**

**Horizontal  
stubble**

2021  
Standing verse lying stubble  
1 year old verse 2 year stubble  
Stubble quantity



# STANDING VS LYING STUBBLE

Stubble age	Stubble orientation	Crown canker severity		UCI severity	
		Early sown 27 <sup>th</sup> April	Late sown 15 <sup>th</sup> June	Early sown 27 <sup>th</sup> April	Late sown 15 <sup>th</sup> June
Last season stubble	Lying	49.8 <sup>c</sup>	85.6 <sup>ab</sup>	56.7 <sup>a</sup>	4.5 <sup>d</sup>
	Standing	54.4 <sup>c</sup>	84.7 <sup>ab</sup>	69.1 <sup>a</sup>	10.9 <sup>cd</sup>
2 year old stubble	Lying	36.6 <sup>d</sup>	80.6 <sup>ab</sup>	32.1 <sup>b</sup>	2.2 <sup>d</sup>
	Standing	34.7 <sup>de</sup>	92.5 <sup>a</sup>	26.0 <sup>b</sup>	8.0 <sup>d</sup>



MS-S cultivar, group B. No fungicide. Horsham, Vic

# STUBBLE LOAD

## Canola on canola

Stubble orientation	Stubble load	Crown canker severity		UCI severity	
		Early sown	Late sown	Early sown	Late sown
Lying	High x10	49.8 <sup>c</sup>	85.6 <sup>ab</sup>	56.7 <sup>a</sup>	4.5 <sup>d</sup>
	Low	24.4 <sup>de</sup>	80.6 <sup>ab</sup>	27.2 <sup>b</sup>	3.0 <sup>d</sup>

## 1 in 2 year rotation








Stubble orientation	Stubble load	Crown canker severity		UCI severity	
		Early sown	Late sown	Early sown	Late sown
Lying	High x10	36.6 <sup>d</sup>	80.6 <sup>ab</sup>	32.1 <sup>b</sup>	2.2 <sup>d</sup>
	Low	37.5 <sup>d</sup>	75.9 <sup>b</sup>	17.4 <sup>c</sup>	3.6 <sup>d</sup>



MS-S cultivar, group B. No fungicide. Horsham, Vic

# CROWN CANKER RISK








- Sown late   
- Sown adjacent to last year's stubble  
- Increased distance to last year's stubble  
- Increased distance to 2 year only stubble???
- Standing verse lying stubble



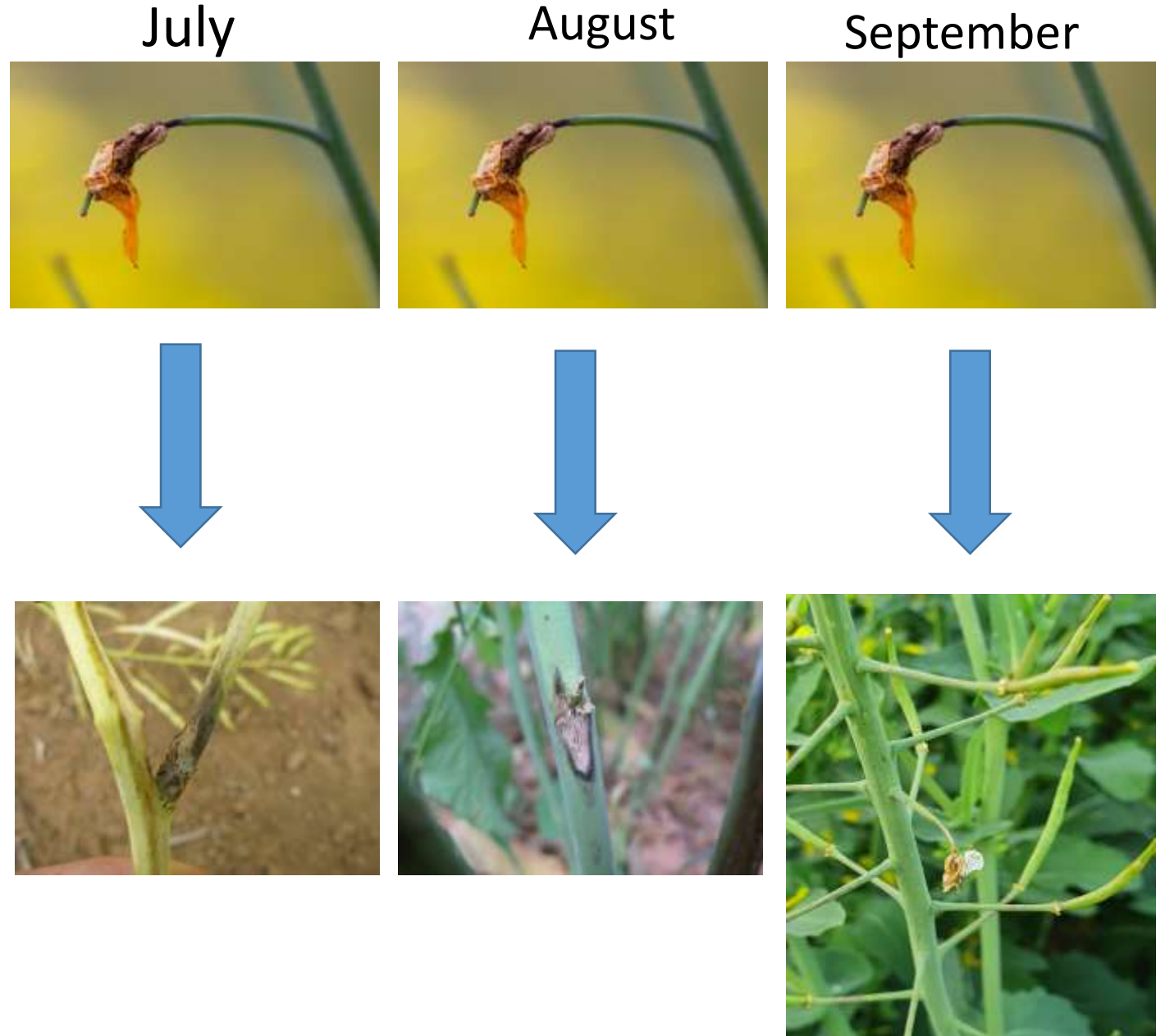
# UCI



- Sow Early 
- Sow late – low disease regardless of any other factors 
- Increased distance to last year's stubble 
- Increased distance to 2 year old stubble 
- Standing verse lying stubble 

# Date of 1<sup>st</sup> flower

- Must have early date to 1<sup>st</sup> flower, to enable blackleg to infect the stems / branches.
- Must have sufficient time between infection and harvest to damage the vascular tissue.





# UCI MAJOR GENE RESISTANCE

Check for leaf lesions at elongation growth stage



- Effective major gene resistance
- Or no disease present
- Will not get UCI



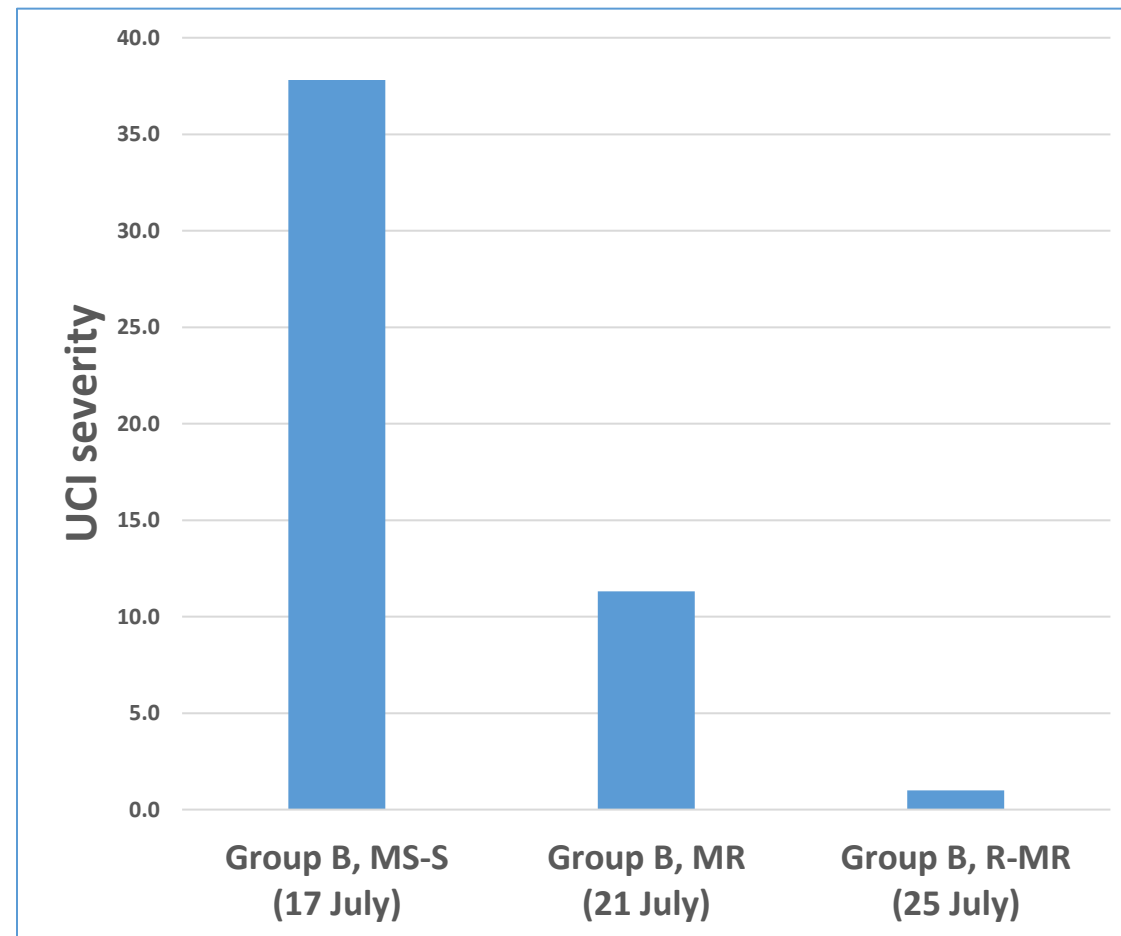
- No effective major gene resistance
- May get UCI (depends on quantitative resistance)

# UCI QR FIELD

Genetic resistance identified in 2020 Glasshouse study was replicated in 2021 field.



All 3 commenced flowering  
17<sup>th</sup> to 22<sup>nd</sup> July



## UCI disease

### Phenotype =

Host (Gh) x Pathogen (Gp) x Environment X Date to 1<sup>st</sup> flower/phenology  
x Thermal degree days (time from infection to scoring) x Terminal stress



6 November



15 November



2022 – cool finish

Lushness factor.

If stem is green and lush at 50%  
seed colour change then lesions  
may not progress. Yield loss may  
be minor??

# UCI control part 3 – 30% bloom

The fungicide application only has to protect the plant for a short period to get it through the yield loss risk phase.

## Hypothetical Scenario 1

- 1st Flower - July 15 (high risk of UCI yield loss)
- 30% bloom – 30<sup>th</sup> July (apply fungicide)

## Result

1. the 30<sup>th</sup> July fungicide kills existing infections and protects plants for next 3 weeks (?)
2. Plants become vulnerable again on 22nd of August.
3. Rain in August causes new infections, but the new infections occur too late to result in yield loss.

**DON'T DELAY FUNGICIDE APPLICATION IT'S THE JULY EARLY AUGUST INFECTION THAT MUST BE CONTROLLED**



# Current project conclusions UCI

## Environment

- Conducive conditions for disease development.
  - Date to 1<sup>st</sup> flower is the most critical factor (late flower is immune).
  - Distance to last 2 year's canola stubble. Standing/lying less important.
  - Stress prior to harvest.
  - When threshold is met yield loss is severe, often yield loss is low.
- 
- Cultivar resistance – desperately need UCI resistance ratings.
  - When all the stars align fungicide application is very profitable.
  - Fungicides always control disease. Disease does not always cause yield loss.



# SCOUTING

-CHECK FOR DARKENED BRANCHES /  
BLACK PITH



# 30% BLOOM FUNGICIDE DECISION



Lack of blackleg ratings for UCI could stuff up this decision.

Apply fungicide at 30% bloom

High yield potential

UCI fungicide???

Early bloom

Late bloom

Leaf lesions present

No leaf lesions present

Don't apply fungicide

Low yield potential

Don't apply fungicide

Work out economics

Monitor sprayed and unsprayed crop to determine UCI severity for future year decision making.



# AIMING FOR BLACKLEG UCI APP



- Being developed with DPIRD / GRDC

**BlacklegCM- Blackleg Management App**