Salisbury, Van de Wouw (JPL1), Marcroft (JPL2), Lindbeck, Wratten, Burton, Potter, Howlett.

Supported by



## DIFFERENTIAL PROJECT UPDATE

## Why do it?

- Currently do not know what resistance genes we have in our Australian varieties
- Therefore can not determine whether new cultivars truly have a different source of resistance
- This is a problem if we are to implement management strategies such as 'rotation of resistance'

#### The French do it!

- The French routinely characterize R genes in breeding lines and commercial varieties
- They use a differential set of isolates that can discriminate Rlm1 – Rlm10 and LepR3.
- We can not import these isolates due to quarantine restrictions



## The project aim

- Identify Australian blackleg isolates that can be used to screen for known or unknown blackleg resistance genes
  - Major gene resistance
  - Adult plant (minor gene) resistance
- Use these isolates and screening methods to characterise resistance genes in Australian cultivars and lines

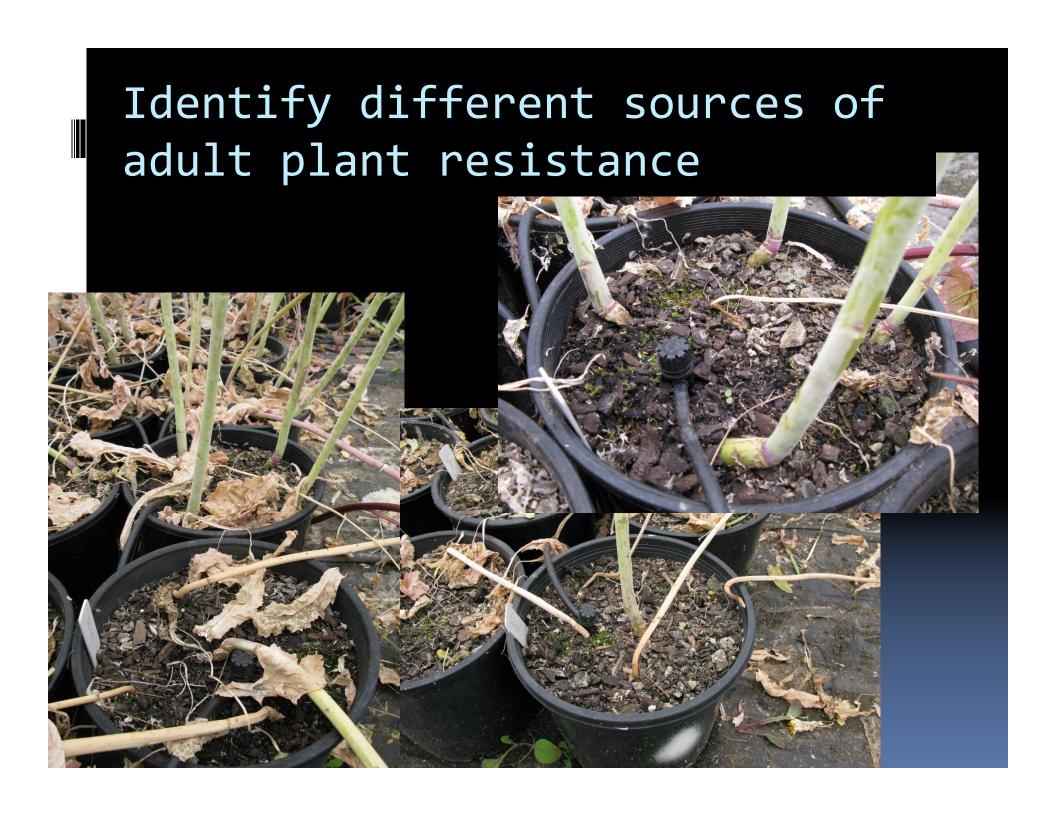
# Cotyledon pathogenicity screens

 Identify major gene resistance (Rlm1-Rlm10, LepR1-4)

Same isolate screened on varieties with different resistance genes







## Methodology

 Completed experiments to determine most reliable screening method

 Use the same plants to screen both major gene and adult plant resistance







# Created Australian blackleg isolate database

- Isolates collected from 1997-2008
- Records information such as year cultured, stubble source, molecular marker data, pathogenicity data
- Copies available from Angela

1		was grown	source	Stubble cultivar	site	State	Isolation method	Synononms	Collected by	Additional information available	Contact	Other notes	
2	1991	1990		B. napus		Vic		1.1	Barbara Howlett	Molecular data	AV or BJH	Purwantara et al European Journal of Plant Pathology 104: 895–902, 1998	
3	1988	1987		B. napus		VA		10	Phillip Salisbury/Barbara Howlett	Molecular data	AV or BJH	Purwantara et al European Journal of Plant Pathology 104: 895–902, 1998	1
4	1988	1987		B. napus		SA		C13	Phillip Salisbury/Barbara Howlett	Path tests and molecular data	AV or BJH	Purwantara et al European Journal of Plant Pathology 104: 895–902, 1998	-
5	1988	1987		B. napus		Vic		M1	Phillip Salisbury/Barbara Howlett	Path tests and molecular data	AV or BJH	Purwantara et al European Journal of Plant Pathology 104: 895–902, 1998	+
6	1987	1986		B. napus		VA		PHW1276	P. H. Williams	Molecular data	AV or BJH	Purwantara et al European Journal of Plant Pathology 104: 895–902, 1998	$\longrightarrow$
7	1987	1986		B. napus		VA		PHW1319	P. H. Williams	Molecular data	AV or BJH	Purwantara et al European Journal of Plant Pathology 104: 895–902, 1998	-
8	2001	2000	Polygenic	Dunkeld	Wonwondah	Vic	single ascospore		Helen Hayden	Path tests and molecular data	AV, BJH or HH		-
9	2001	2000	Polygenic	Dunkeld	Wonwondah	Vic	single ascospore		Helen Hayden	Path tests and molecular data	AV, BJH or HH		$\longrightarrow$
10	2001	2000	Polygenic	Dunkeld	Wonwondah	Vic	single ascospore		Helen Hayden	Path tests and molecular data	AV, BJH or HH		
11	2001	2000	Polygenic	Dunkeld	Wonwondah	Vic	single ascospore		Helen Hayden	Path tests and molecular data	AV, BJH or HH		
1503	2008	2007	Winter	AV-Garnett	Vertere	SA			Ct \$4	Materials des	SM or AV		1 17
1504	2008	2007	Winter	AV-Garnett AV-Garnett	Yeelanna Yeelanna	SA	ascospore ascospore		Steve Marcroft Steve Marcroft	Molecular data Molecular data	SM or AV		+
1505	2008	2007	Winter	AV-Garnett	Yeelanna	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		+
1506	2008	2007	Winter	AV-Garnett	Yeelanna	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		+
1507	2008	2007	Winter	AV-Garnett	Yeelanna	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		+
1508	2008	2007	Winter	Huola50	Vangary	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		+
1509	2008	2007	Vinter	Hyola50	Wangary	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		<del>                                     </del>
1510	2008	2007	Winter	AV-Garnett	Bool Lagoon	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		<del>-  </del>
1511	2008	2007	Winter	AV-Garnett	BoolLagoon	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		+
1512	2008	2007	Winter	AV-Garnett	Bool Lagoon	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		<del>                                     </del>
1513	2008	2007	Winter	AV-Garnett	Bool Lagoon	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		<del>                                     </del>
1514	2008	2007	Vinter	AV-Garnett	BoolLagoon	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		<del>                                      </del>
1515	2008	2007	Juncea	Dune	BoolLagoon	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		<del>                                     </del>
1516	2008	2007	Juncea	Dune	Bool Lagoon	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		1
1517	2008	2007	Juncea	Dune	Bool Lagoon	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		
1518	2008	2007	Juncea	Dune	BoolLagoon	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		1
1519	2008	2007	Juncea	Dune	BoolLagoon	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		
1520	2008	2007	Juncea	Dune	Sherwood	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		
1521	2008	2007	Juncea	Dune	Sherwood	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		
1522	2008	2007	Juncea	Dune	Sherwood	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		
1523	2008	2007	Juncea	Dune	Sherwood	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		
1524	2008	2007	Juncea	Dune	Sherwood	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		
1525	2008	2007	Juncea	Dune	Lake Bolac	VIC	ascospore		Steve Marcroft	Molecular data	SM or AV		
1526	2008	2007	Juncea	Dune	Lake Bolac	VIC	ascospore		Steve Marcroft	Molecular data	SM or AV		
1527	2008	2007	Juncea	Dune	Lake Bolac	VIC	ascospore		Steve Marcroft	Molecular data	SM or AV		
1528	2008	2007	Juncea	Dune	Lake Bolac	VIC	ascospore		Steve Marcroft	Molecular data	SM or AV		
1529	2008	2007	Juncea	Dune	Lake Bolac	VIC	ascospore		Steve Marcroft	Molecular data	SM or AV		
1530	2008	2007	Juncea	Dune	∀angary	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		
1531	2008	2007	Juncea	Dune	Wangary	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		
1532	2008	2007	Juncea	Dune	Wangary	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		
1533	2008	2007	Juncea	Dune	∀angary	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		+
1534	2008	2007	Juncea	Dune	Wangary	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		+
1535	2008	2007	Juncea	Dune	Sherwood	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		+
1536	2008	2007	Juncea	Dune	Sherwood	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		+
1537	2008	2007	Juncea	Dune	Lake Bolac	VIC	ascospore		Steve Marcroft	Molecular data	SM or AV		+
1538	2008	2007	Juncea	Dune	BoolLagoon	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		+
1539	2008	2007	Juncea	Dune	BoolLagoon	SA	ascospore		Steve Marcroft	Molecular data	SM or AV		+
1540	2008	2007	Juncea	Dune	Lake Bolac	VIC	ascospore		Steve Marcroft	Molecular data	SM or AV		+
1541	2008 2008	2007	Juncea	Dune Dune	Lake Bolac	VIC	ascospore		Steve Marcroft	Molecular data Molecular data	SM or AV SM or AV		+
1542			Juncea		Lake Bolac		ascospore		Steve Marcroft		SM or AV		+
1543 1544	2008	2007	Juncea	Dune	Wangary	SA	ascospore		Steve Marcroft	Molecular data	SIVI OF AV		+
1545													+
1546						-							+
1547													+
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### The French are doing it for us

- A set of 30 Australian canola lines are being screened by Rouxel et al to determine which cultivars have which Rlm genes (Rlm1-Rlm10, LepR3).
- We will use this knowledge to identify a set of Australian differential blackleg isolates



#### We can do it ourselves

- By the end of the project we will have:
  - Methodology
    - Major gene (Rlm1-Rlm10, LepR3)
    - Adult plant (minor gene) resistance
  - differential blackleg isolate set
- Use these isolates to characterise the resistance genes in Australian cultivars and lines

# Routine screening

- Commercial cultivars will be screened for known and unknown resistance genes
- We will be able to screen NBGIP new sources of blackleg resistance
- Commercial service for all breeding programs?

# This work is proudly sponsored by an organisation with a 4 letter acronym



