

Molecular Marker Development

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Aims

- Identify candidate genes for genetically mapped resistance genes
- Develop molecular markers for routine screening of blackleg resistance genes
- Deliver novel sources of qualitative blackleg resistance

Resistance genes

- Chromosome A02: *LepR1*
- Chromosome A07: *Rlm1*, *Rlm3*, *Rlm4*, *Rlm7*,
Rlm9
- Chromosome A10: *LepR2*, *Rlm2*, *LepR3*
- Chromosome C03: *Rlm13*, *Rlm6* - *napus*

Molecular marker development

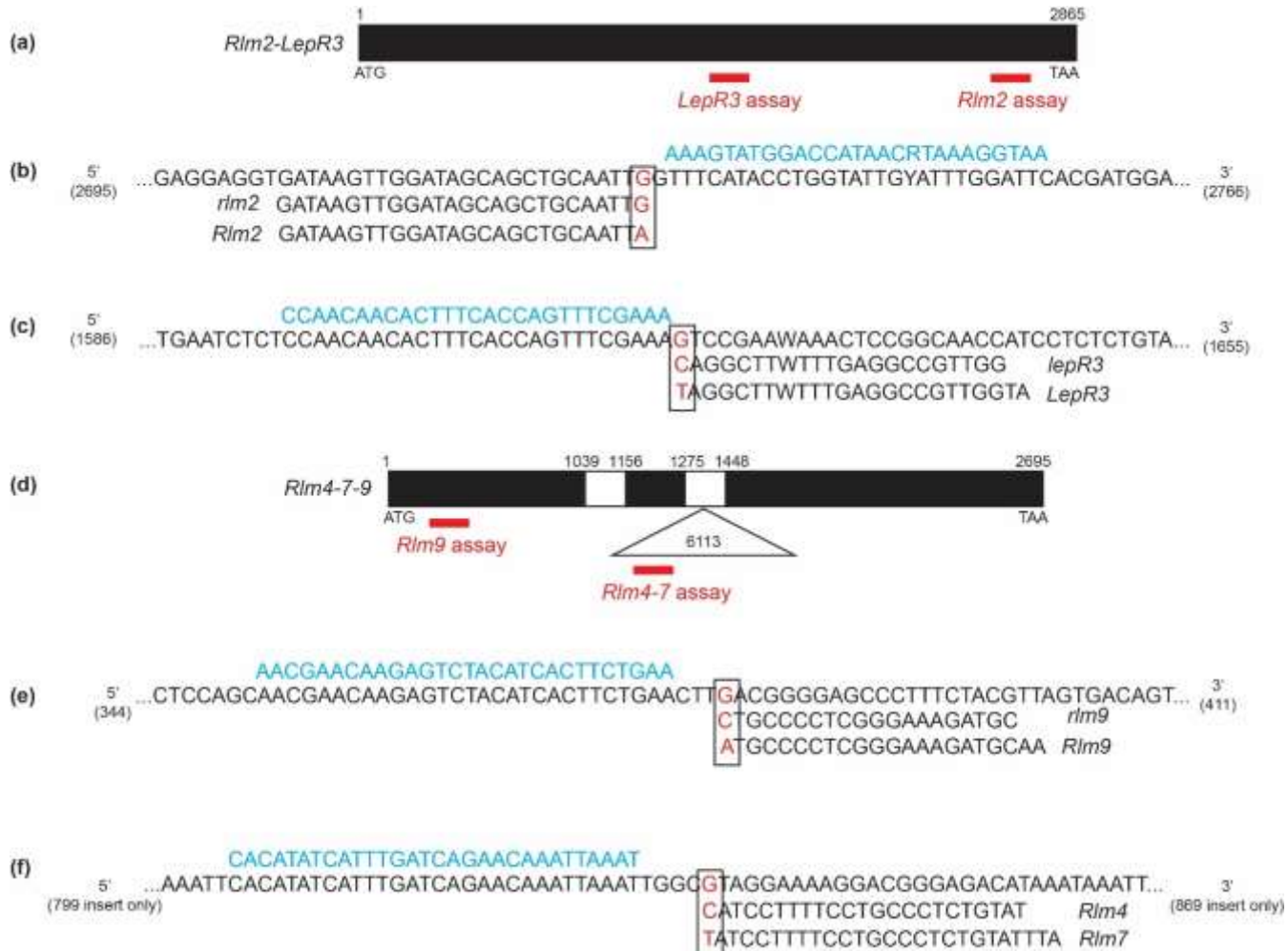
- Screened 128 current and past Australian varieties
- Undertook genome sequencing
- Correlated information with phenotypic screening

Rlm1, Rlm4, LepR1	2018	72	73A1 73A2	310	29.60 33.80	1.89	200 200	PCRBD1 NovoSeq	72A	(-)	(+)	(-)	(-)	Spring	Hybrid	Rlm1, Rlm4, LepR1	Correct
Rlm4	2016-4	73	73A1 73A2	430	157.00 238.00	1.88	35 35	PCRBD1 NovoSeq	73A	(-)	(+)	(-)	(-)	Spring	OP	Rlm4	Correct
Rlm4, Rlm6	2016-4	74	74A1 74A2	330	128.00 46.00	1.84	35 35	NovoSeq PCRBD1	74A	(-)	(+)	(-)	(-)	Spring	Hybrid	Rlm4, Rlm6	Correct

KASP marker development

Gene	No. Resistant alleles	No. Susceptible alleles
<i>Rlm2</i>	1	6
<i>LepR3</i>	1	6
<i>Rlm4</i>	2	5
<i>Rlm7</i>	2	5
<i>Rlm9</i>	1	5

KASP marker development



KASP marker development

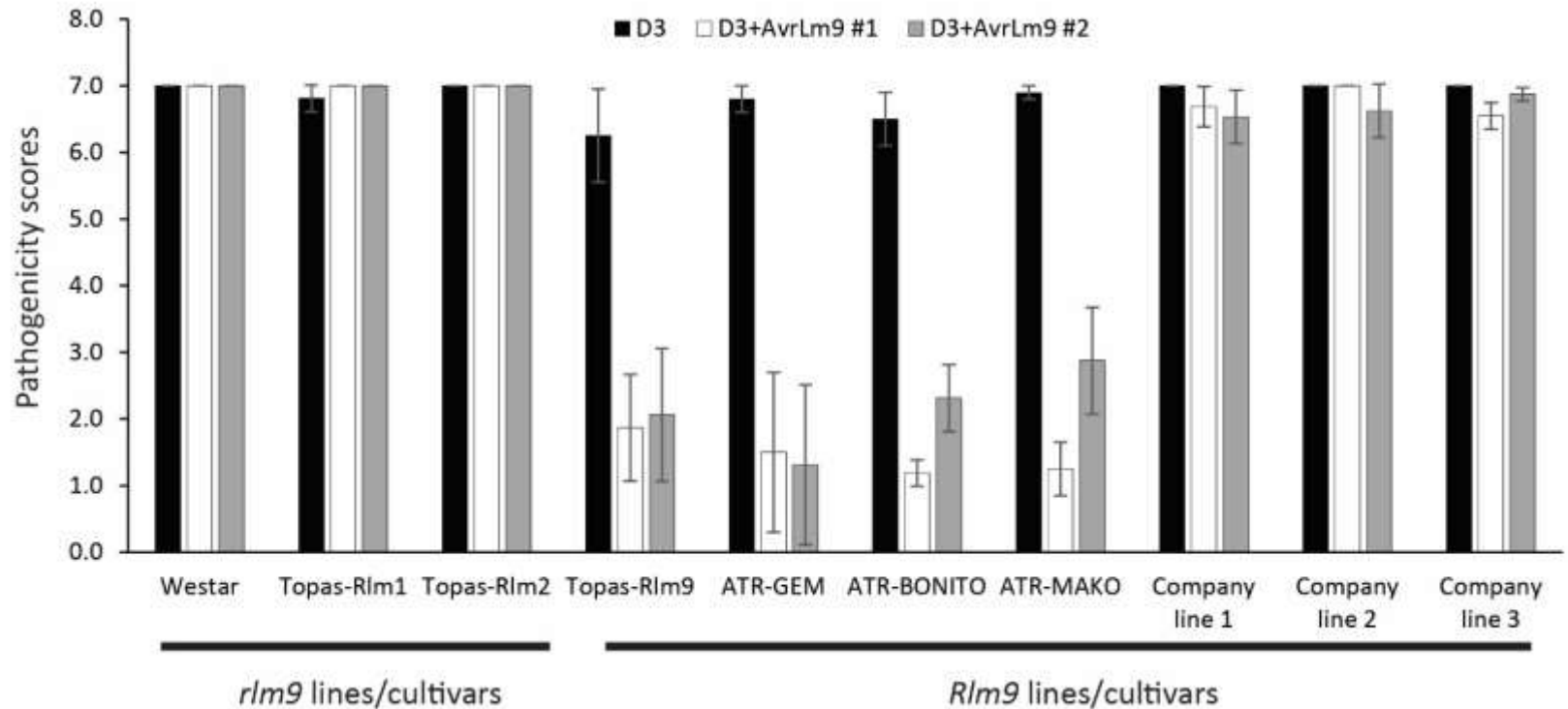
Gene	No. Lines: Phenotyping	No. lines: KASP
<i>Rlm2</i>	4	4
<i>LepR3</i>	217*	33
<i>Rlm4</i>	263	263
<i>Rlm7</i>	48	48
<i>Rlm9</i>	42	42

KASP marker development

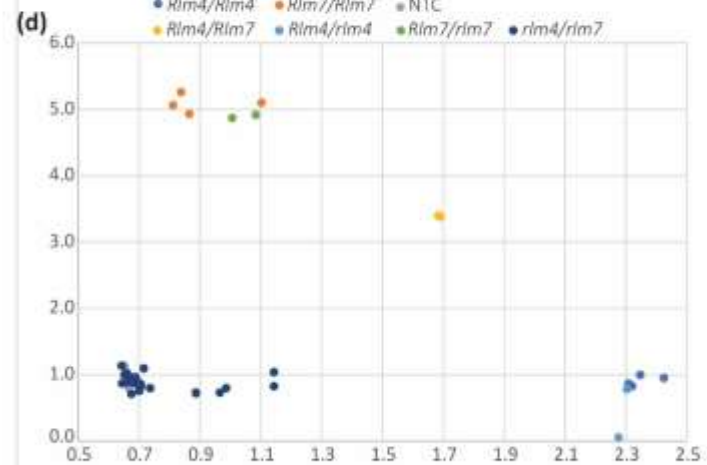
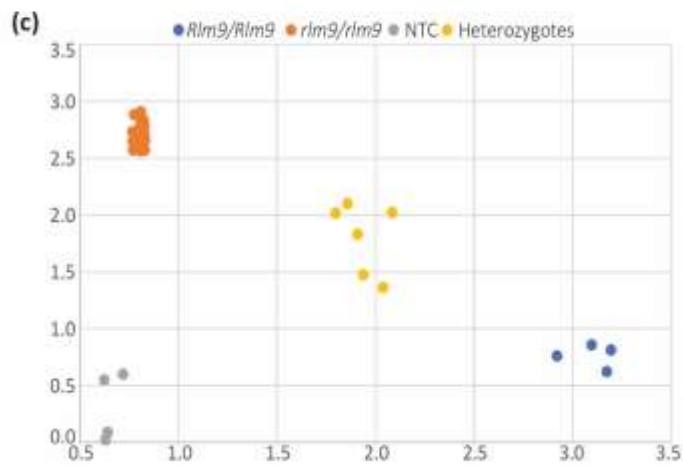
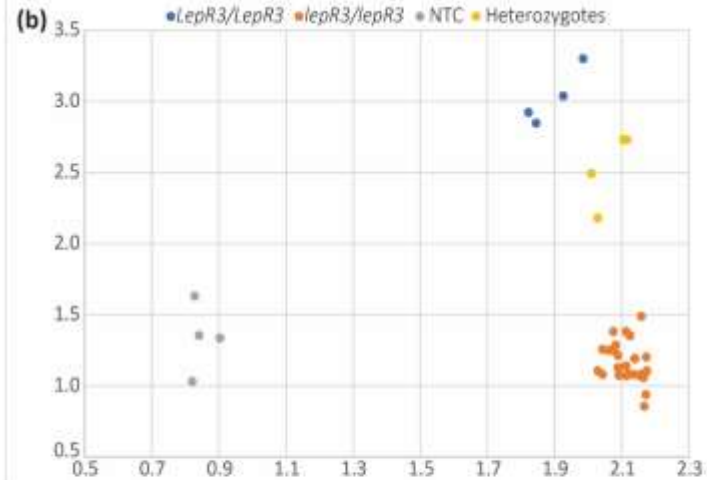
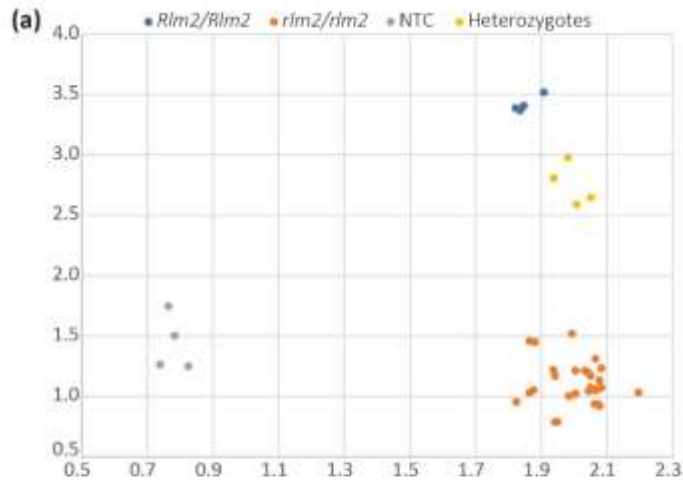
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- * *Rlm1/LepR3*
- 8 lines heterozygous for *Rlm9*
- 18 lines heterozygous for *Rlm4/7*

Rlm9 KASP marker development



KASP marker development



Marker deployment

- MGP offer service for routine screening for known resistance genes using molecular markers
 - New markers added to set as developed
- Assay details provided if required