Molecular markers for rust resistance

An update

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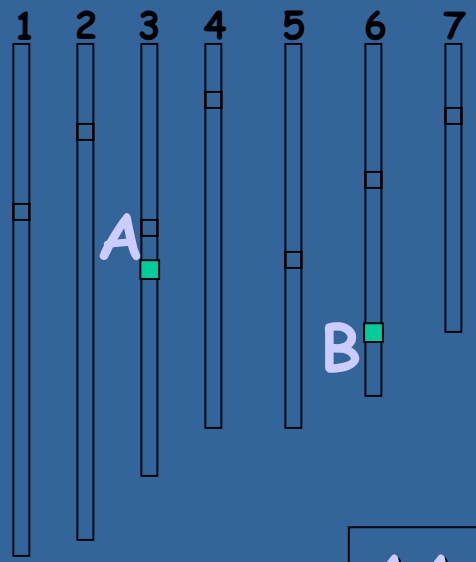
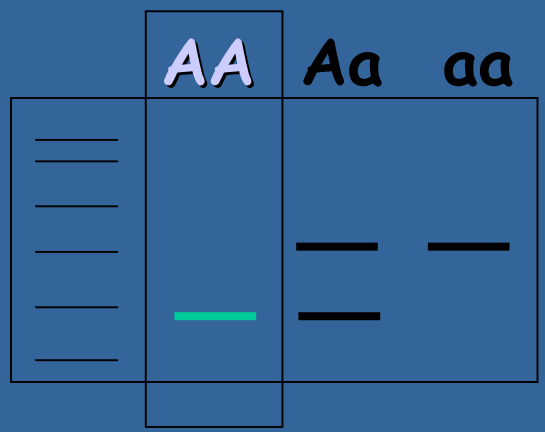
Marker assisted selection for multiple resistance genes

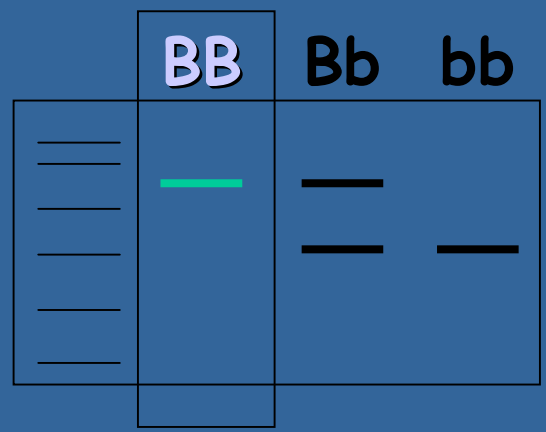


Resistance locus A (AAbb)

X

Resistance locus B (aaBB)



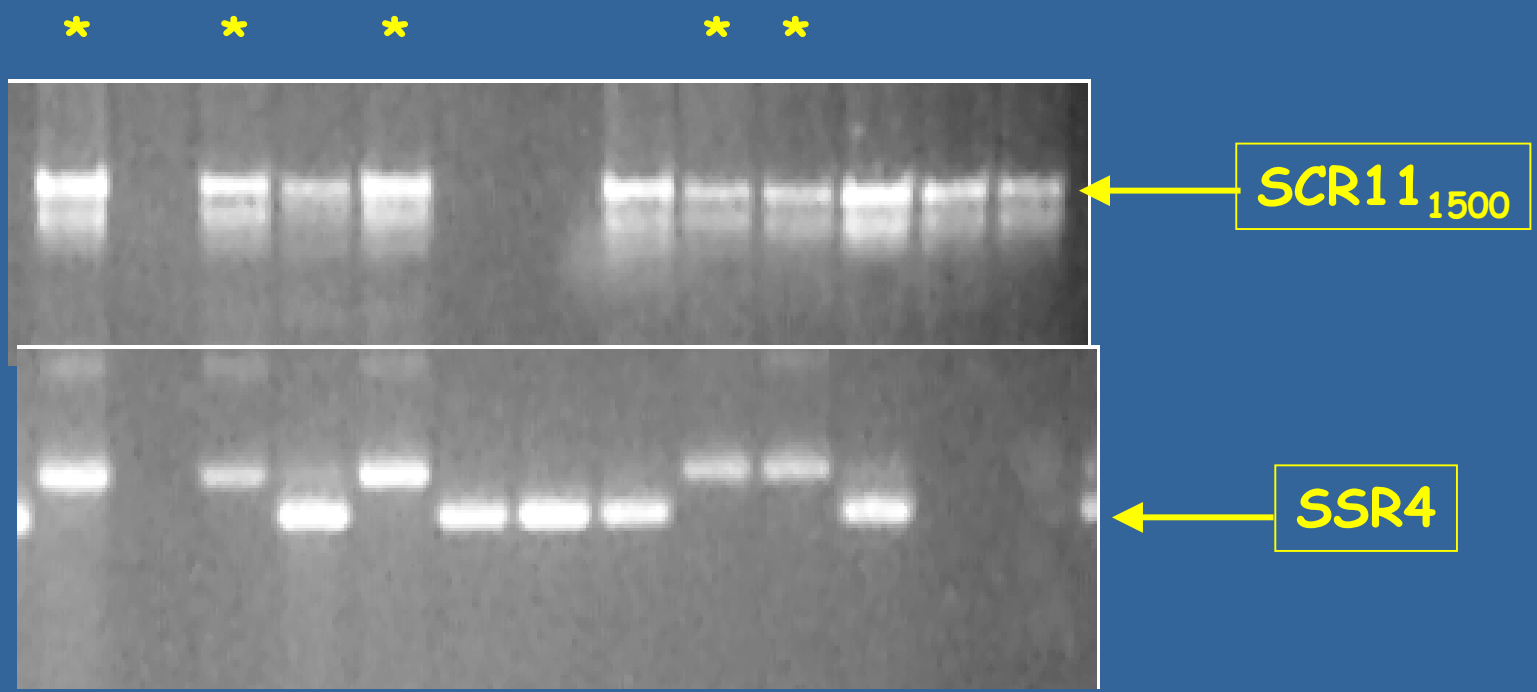


Pyramiding two genes:

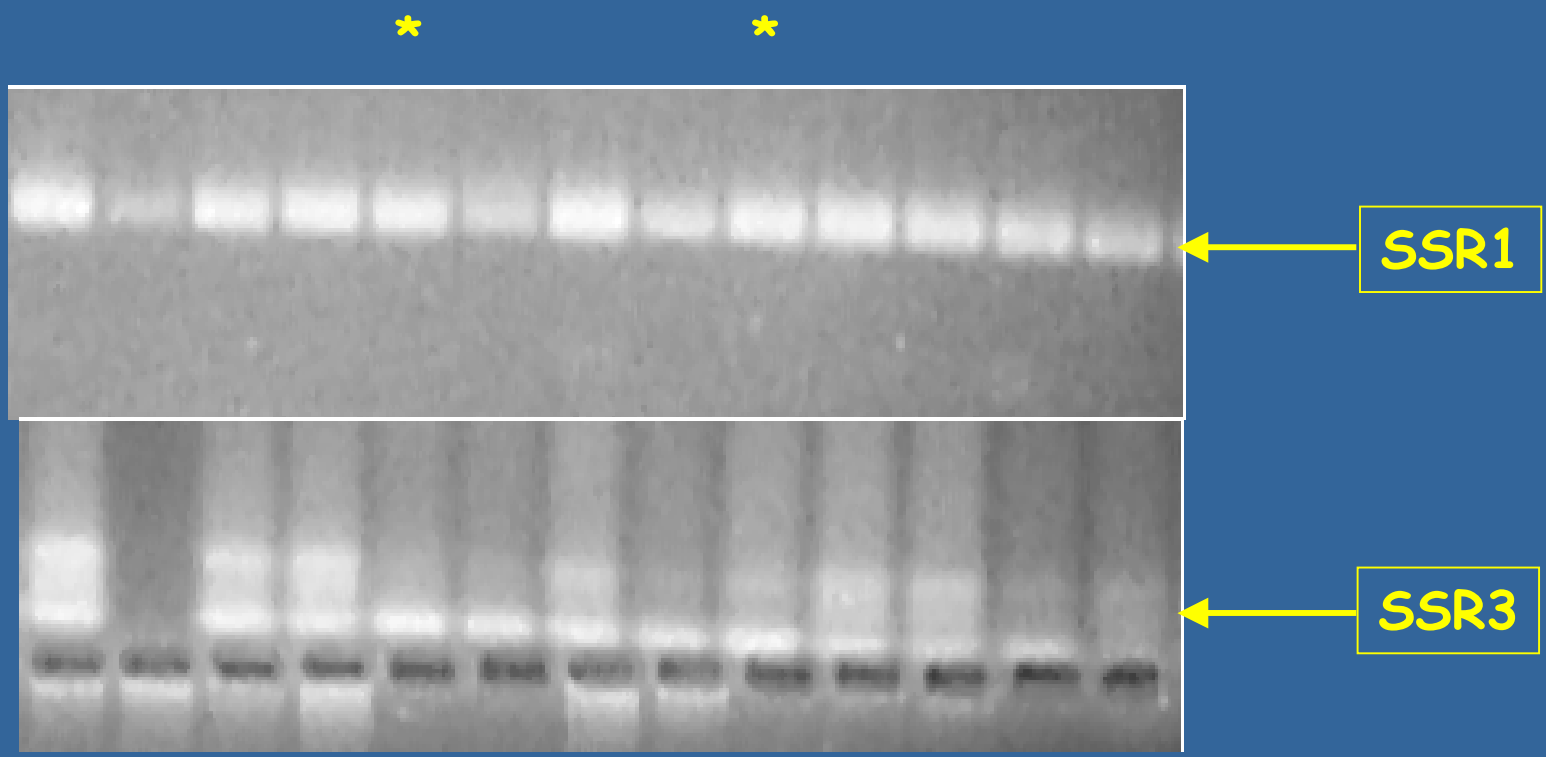
Cross = HAR2 X MC29

HAR2	R5 gene (AAbb)	√	SCR11$_{1500}$
		x	SSR4
MC29	R2 gene (aaBB)	√	SSR1 & SSR2
		x	SSR3

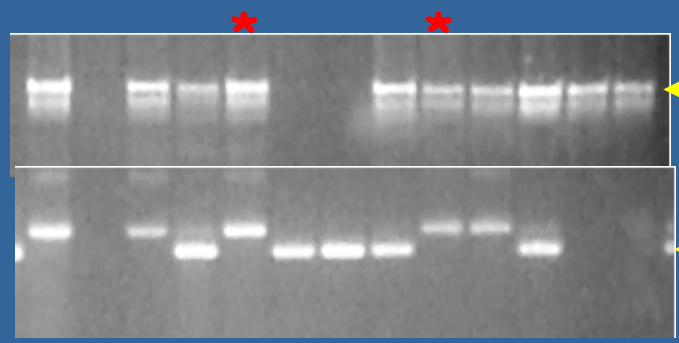
R_5 gene or "AA"



R_2 gene or "BB"

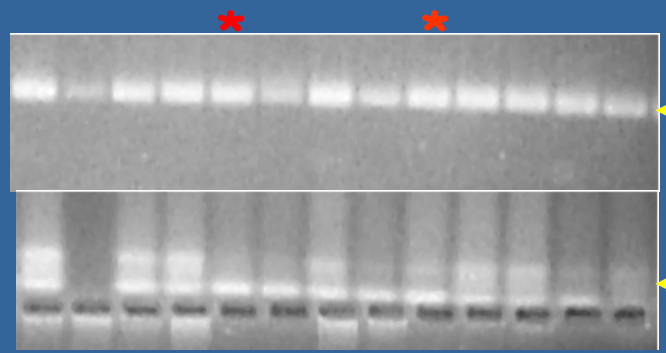


R_5 + R_2 gene:



SCR11$_{1500}$

SSR4



SSR1

SSR3

* AA--

* --BB

Results:

DNA based tags to at least 23 rust resistance genes

- → R_2, R_4, R_5, R_{Adv}, R_{P1}, R_{RD6} and R_{AH52}
- → R_{RO18}, R_{RD4}, R_{RK74}

Two gene crosses are currently being tested with the markers

- Quickly identify individuals to move through to next generation
- Eliminate in early inbreeding generations eg F2 and reduce number of individuals requiring F3 progeny testing
- Use markers to replace pathogen phenotyping at some generations
- Use markers when rust pathotypes do not exist that can discriminate individual genes

Thanks to ....

GRDC

COOPERATIVE RESEARCH CENTRE FOR
Tropical Plant Pathology

Queensland Government
Department of Primary Industries