

Genetics and Breeding for PCN Resistance

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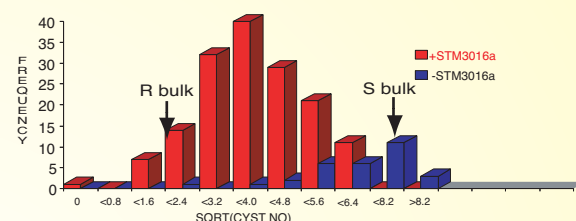


Screening the Commonwealth Potato Collection

The CPC contains 86 *Solanum* species and is held at SCRI. New sources of resistance have been identified. There are different mechanisms of resistance (delayed nematode development, sex ratio differences, no development from the juvenile stage) which means that different strategies have evolved to give certain species resistance to PCN.



Potato plants being tested for resistance to PCN

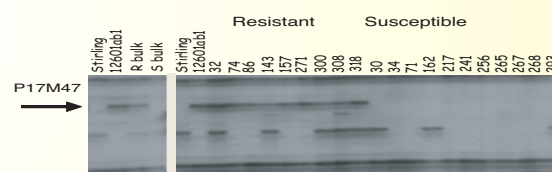


Distribution of PCN cyst number on a population derived from crossing a tetraploid PCN-resistant clone with a PCN-susceptible clone. DNA microsatellite marker STM3016 is associated with the resistance of the individuals in the population.

Genetics and Breeding for PCN Resistance

To speed breeding efforts molecular (DNA) markers are needed that are linked to the resistance trait. Need to identify DNA markers that segregate with PCN-resistance/susceptibility then we have “known” pieces of DNA close to the genetic source of the resistance.

These are used to genetically “map” the region around the source of resistance and identify which chromosome it is on. This process has identified numerous genes and groups of genes that confer different kinds of PCN- resistance to *Solanum* species.



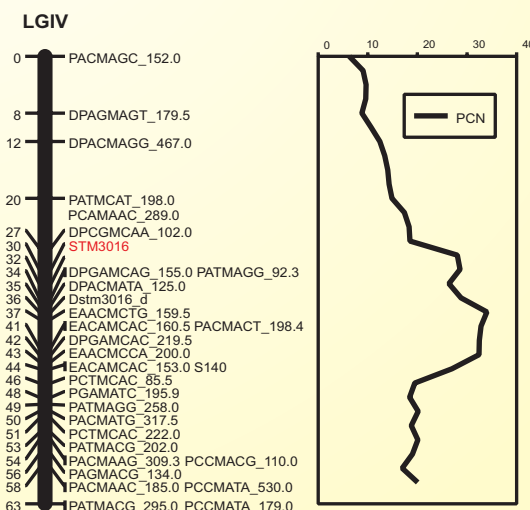
DNA (AFLP) marker that segregates with the resistance or susceptibility of the individuals in the population. This band is probably linked to the region of DNA conferring the resistance.

End Use and Future Developments

Use of known and mapped resistance (e.g. H3) in varieties.

Introgression of effective "new" sources of resistance into cultivated material.

Possible use of potato resistance genes in transgenics.



DNA markers that are located close to one of the regions that confers PCN resistance. The markers can be ordered on the chromosome by comparing their recombination frequencies with all the other markers on that chromosome.

Acknowledgements

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