

NON-HOST RESISTANCE: IS IT REALLY A DURABLE FORM OF RESISTANCE?

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INTRODUCTION

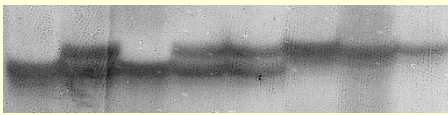
Yellow rust, caused by *Puccinia striiformis* West., is an important foliar disease of wheat and barley throughout the world, and the development of resistant cultivars is the most economical and environmentally friendly method of control. Breeding for resistance to yellow rust has, for decades, been based on the use of race-specific resistance genes, which have shown to be short-lived. Non-host resistance is studied as a possible source of durable resistance. The clarification of the nature of non-host resistance genetics is of major importance in order to determine the value of pursuing non-host resistance genes as a source of durable resistance. Two major genes, as well as an undetermined number of minor genes, for non-host resistance to the barley-attacking form of yellow rust, *P. striiformis* f. sp. *hordei*, had previously been detected in the wheat cross Lemhi x Chinese166. In the present study we quantified and mapped the QTLs (quantitative trait loci) for non-host resistance to *P.s.* f.sp. *hordei* in this cross.

METHODS

Plant Inoculation and Disease Phenotyping

F₂ population resulting from the wheat cross 'Lemhi' x 'Chinese166', inoculated with *P. striiformis* f. sp. *hordei*

Molecular Marker Analysis

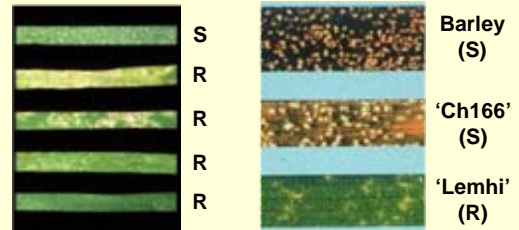


Linkage Map Construction

QTL Analysis

RESULTS

Infection Reaction Types



QTL Identification

QTL	Chrom.	LOD	%expl.
<i>QPsh.jic-1D</i>	1DS	7.1	43.5
<i>QPsh.jic.2B</i>	2BL	9.5	33.2
<i>QPsh.jic.5A</i>	5AL	2.1	5.1
<i>QPsh.jic.6A</i>	6AL	4.2	10.9

CONCLUSIONS

QPsh.jic-1D, *QPsh.jic-2B*, *QPsh.jic-5A* and *QPsh.jic-6A* were the first non-host resistance QTLs to be mapped in wheat.

BUT...

They express a hypersensitive cell death phenotype, similar to host resistance. Furthermore, they map to segments of the wheat genome where other host resistance genes (*Yr* genes) and QTLs had previously been mapped, suggesting structural and functional similarity between host and non-host yellow rust resistance genes.

THEREFORE...

Would non-host resistance genes, such as these, be a durable source of resistance for our crop species???

Acknowledgments