IDENTIFICATION OF NON-HOST RESISTANCE GENES IN WHEAT TO BARLEY YELLOW RUST

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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. Non-host resistance is studied as a possible 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

Pathogen

*Puccinia striiformis* f. sp. *hordei*

Mapping Population

114 F₂ individuals resulting from the wheat cross ‘Lemhi’ x ‘Chinese166’

Molecular Marker Analysis

Linkage Map Construction

JoinMap 3.0

QTL Analysis

MapQTL 4.0

RESULTS

Infection Reaction Types

<table>
<thead>
<tr>
<th>Barley (S)</th>
<th>‘Ch166’ (S)</th>
<th>‘Lemhi’ (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>R</td>
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QTL Identification

<table>
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<th>QTL</th>
<th>Chrom.</th>
<th>LOD</th>
<th>%expl.</th>
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<tbody>
<tr>
<td>Psh1</td>
<td>1DS</td>
<td>7.1</td>
<td>43.5</td>
</tr>
<tr>
<td>Psh2</td>
<td>2BL</td>
<td>9.5</td>
<td>33.2</td>
</tr>
<tr>
<td>Psh3</td>
<td>5AL</td>
<td>2.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Psh4</td>
<td>6AL</td>
<td>4.2</td>
<td>10.9</td>
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</table>

CONCLUSIONS

*Psh1, Psh2, Psh3 and Psh4* are the first non-host resistance QTLs to be mapped in wheat.

BUT...

They express a hypersensitive cell death phenotype, similar to host resistance.

THEREFORE...

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

Ref: Rodrigues et al., 2004. TAG 109:425-432

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