

A8. Differential expression of genes induced by infestation of Hessian fly in 2RL introgressed wheat line

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Objectives

The objectives of this study were to isolate novel genes induced by infestation of biotype L of Hessian fly larvae in wheat-rye translocation line carrying 2RL and characterize mode of differentially expressed genes between 'Coker797' (non-2RL) and NIL carrying *H21* by infestation of Hessian fly.

Materials and Methods

Plant materials: Coker797 and NIL carrying 2RL

Methods: FISH analysis for identification of 2RL introgression in NIL carrying *H21*

EST analysis for profile of genes induced by infestation of Hessian fly.

SSH method for isolation of novel genes induced by infestation of Hessian fly.

Northern blotting for molecular characterization of differentially expressed three clones (*TaCR1*, *TaLTP3*, and *TaCOMT1*)

Results and Discussion

Biotype L of Hessian fly is recognized as the most virulent form among the sixteen biotypes reported. As a part of approach to elucidate molecular interactions between plants and Hessian fly, cDNA library from NIL with *H21* infested by larvae of biotype L of Hessian fly was constructed for EST analysis. As shown in FISH analysis, introgressed 2RLs were detected in NIL possessing 2RL. Of 1056 sequenced reactions attempted, 919 ESTs produced some length of readable sequences. About 80% (730 clones) of 919 ESTs showed significant similarity with amino acid sequences registered in gene bank and were divided into 13 functional categories. In order to study differentially expressed genes between Coker797 (non-2RL) and NIL carrying *H21* gene, three clones (*TaCR1*, *TaLTP3*, and *TaCOMT1*) were characterized. *TaCR1* encoding cytokinin repressed gene was isolated through SSH method that used NIL infested Hessian fly as tester and Coker797 infested Hessian fly as driver. *TaLTP3* encoding lipid transfer protein was isolated among EST clones. *TaCOMT1* encoding caffeic acid *O*-methyltransferase was isolated through SSH method using the tester NIL infested Hessian fly and the driver NIL non-infested Hessian fly. Three clones were further analyzed for responses to the infestation of Hessian fly and abiotic stresses such as MeJA, SA, ethephon, wounding, and H₂O₂.

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