

DESCRIBING AND CLONING LESION MIMIC MUTANTS IN BARLEY

ROSIGNOLI S., VARDANEGA I., CORNETI S., TUBEROSA R., SALVI S.

DISTAL, University of Bologna, Viale Fanin 44, 40127 Bologna (Italy)

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Lesion mimic (LM) mutants are characterized by necrotic spots on leaves and/or inflorescences and have been described in several species (*Arabidopsis*, maize, rice, etc) including barley. In these mutants, necrotic spots develop without any external triggers (parasitic infections, physical damages or climatic events) and are due to genetically-controlled dysfunctional processes. Often, LM mutants show phenotypes resembling plant defense-related processes similar to the hypersensitive response (HR). For these reasons, LM mutants can potentially be informative in the dissection of plant responses to pathogens. As a matter of fact, some LM mutants (*mlo*, *necl*) showed enhanced disease resistance.

By screening the TILLMore mutant collection (> 3,000 lines, in ‘Morex’ genetic background, mutagenized by NaN₃. Talamè et al. 2008, PBJ 6:477-485), we collected 40 LM mutants showing obvious and heritable lesion mimic (ie. leaf necrotic) phenotypes. Mutants phenotypes ranged from small black necrotic spots, to larger (10 mm or more) spots of varying pigmentations. Two representative LM mutants are being studied in more details. LM#599 shows large ‘orange’ spots. LM#4118 produces small dense necrotic spots on leaf blades, with spots density related with leaf age. These two mutants were crossed out (with Barke cv.) and their Mendelian inheritance verified in F₂ populations. Bulk segregant analysis based on high density SNP array enabled to map LM#599 ‘orange’ on chr. 6H, at 47.5-52.5 cM and LM#4118 on chr. 1 at 61.5-70.3 cM. Whole genome shot-gun sequencing (ILLUMINA) of the two mutant lines is being carried out in order to identify mutated candidate genes at target positions and to proceed to gene cloning.