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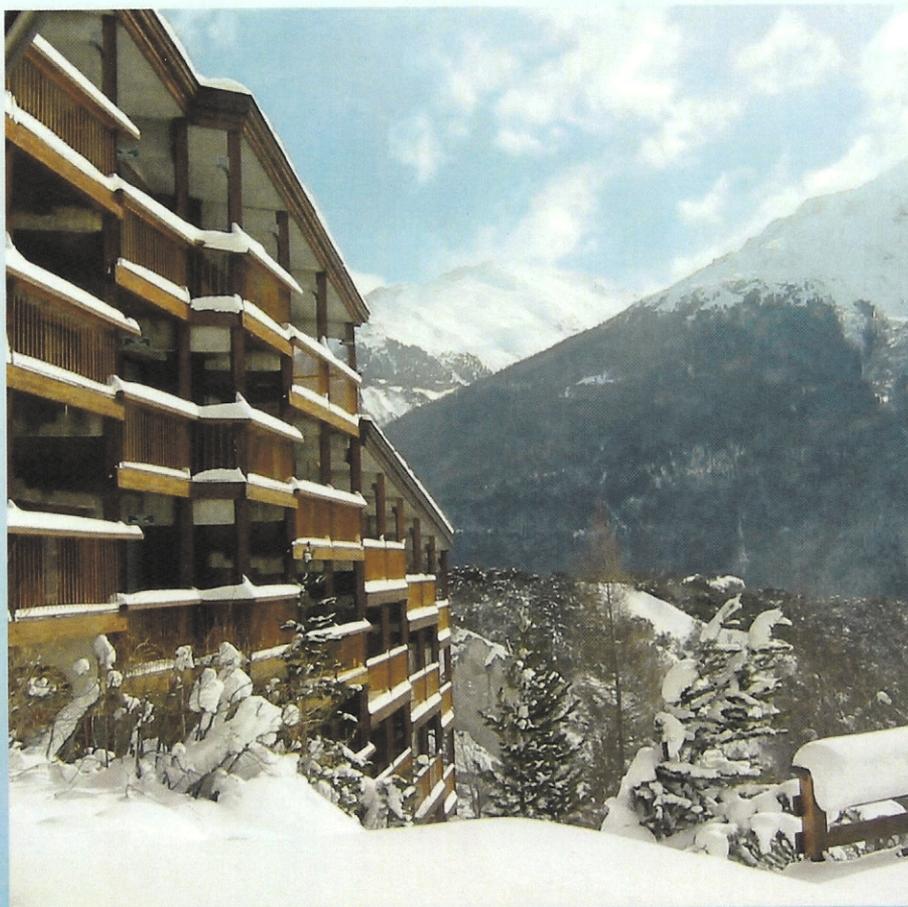
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TILLING in tomato: a reverse genetic approach for functional analysis of eIF4E-mediated resistance and extension of the set of resistance alleles for breeding

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In recent years, the molecular cloning of recessive resistance genes to specific RNA viruses in a range of plant species has led to the identification of a new class of resistance genes corresponding to mutations in translation initiation factors eIF4E and/or eIF4G (Robaglia and Caranta, 2006, TIPS). The key role played by eIF4E in plant resistance was initially demonstrated in *Solanaceae*. In tomato and wild-relatives, a single recessive resistance allele *pot-1* encoding for a eIF4E1 protein was identified in the *Solanum habrochaites* accession PI247087. *pot-1* controls resistance to several potyviruses, including common strains of *Potato virus Y* (PVY) and *Tobacco etch virus* (TEV), and differs from the eIF4E protein encoded by the wild type dominant susceptibility allele by 4 amino acid substitutions (Ruffel *et al.*, 2005). In plants, genes encoding proteins for eIF4E belong to small multigenic families with 1 to 3 genes encoding for proteins of the eIF4E subfamily and 1 or 2 genes encoding for eIF(iso)4E. In species that have not yet been sequenced, such as tomato, the number and sequences of *eIF4E* genes was inferred from EST databases.

In the present study, screening for mutations in three tomato *eIF4E* and 2 *eIF4G* genes was performed. The identified mutants were characterized for potyvirus resistance and mRNA translation to get insights into the molecular mechanisms underlying eIF4E-mediated resistance. The aim is to assess the importance of redundancy among *eIF4E* gene in resistance but also to extend the set of potyvirus resistance alleles available for tomato breeding programs. Detailed analysis of the mutant lines will be presented with particular emphasis on (i) a *eIF4E1* mRNA splice-junction mutant, encoding a truncated eIF4E1 protein, that is resistant to several potyvirus and (ii) phenotypic analysis of double mutant lines.