

UNIVERSITA' DEGLI STUDI DI MILANO

Dottorato in Biologia Vegetale e Produttività della Pianta Coltivata

XX ciclo

Individuazione e caratterizzazione di geni coinvolti nella nutrizione solfatica e nelle risposte a cadmio delle piante: loro possibile utilizzo per la costituzione di bioindicatori.

In this work the gene trap strategy has been exploited to identify plant sulfur (S) or cadmium (Cd) responsive genes, useful to develop plant bioindicators for monitoring Cd presence and/or S availability in the rhizosphere, and/or plant S nutritional status. A collection of Arabidopsis gene trapping lines (EXOTIC), generated by insertional mutagenesis with a modified maize *Ds* transposable element carrying the promoterless *GUS* gene as a reporter, has been screened searching for lines showing a differential *GUS* expression under S starvation and/or Cd exposure conditions. Four interesting lines have been identified; the more promising one is line 718, showing *GUS* expression in the roots and shoots only when grown under S starvation. The reporter activation resulted specific for S (and not for other nutrients) withdrawal and dependent on the strictness of the imposed nutritional stress. The genomic sequences flanking the *Ds* insertion were identified as the intergenic region between *ATIG12030* and *ATIG12040*. The expression of the flanking genes was not affected by *Ds* insertion, suggesting that the observed behaviours were due to the presence or absence of S in the medium and not to an alteration of the transcriptional responses of the line. Results suggest the usefulness of gene trap approaches to identify DNA sequences able to induce the transcription of a reporter gene under S starvation, and thus exploitable for developing plant bioindicators of S nutritional status.