

APOSTART-derived SCAR markers discriminate between apomictic and sexual *Poa pratensis* L. genotypes

E. Albertini, R. Torricelli and M. Falcinelli

Dept. of Applied Biology, University of Perugia, Borgo XX giugno, 74, 06121 Perugia (Italy)

Apomixis is a challenging trait and offers unique opportunities for developing superior varieties since it enables us to develop hybrids or genotypes that breed true regardless of heterozygosity. Apomixis would make it possible to fix the genotype of a superior plant variety bred for a particular environment or market niche so that clonal seeds could be continuously and cheaply produced independent of pollination. If apomixis were well understood and harnessed, it could be exploited to indefinitely propagate superior hybrids or specific genotypes bearing complex gene sets. Until the gene(s) that promote and control apomixis are molecularly understood, this trait can only be introgressed into agricultural crops through traditional breeding methods, most of which are slow and laborious and require progeny tests for the selection of apomictic genotypes after each round of backcrossing

In our previous work by applying the cDNA-AFLP transcriptional profiling technique we isolated messengers from developmental staged inflorescences of *Poa pratensis* L. In particular, more than two thousands transcript-derived fragments were visualized 179 of which were differentially expressed between apomictic and sexual genotypes. A major finding is that most of the genes expressed in florets displayed similar patterns during sexual and apomictic pathways. Of the about 8% of mRNAs differentially expressed between apomictic and sexual genotypes, the vast majority were attributable to genes with a differentiated temporal expression during flowering. As few as 1.6% mRNAs specific to sexual or apomictic genotypes were found, providing that a highly conserved developmental program exist in embryos during zygotic embryogenesis and apomeiotic parthenogenesis. In particular one of these genes (APOSTART) was found to be flower-specific and showed a differentiated expression in reproductive tissues between apomictic and sexual genotypes of *P. pratensis*. We developed a SCAR marker from an APOSTART apomictic-specific allele and then tested for its potential use in MAS programs. APO-SCAR primer pair was first tested on an F₁ population of 68 individuals segregating for the mode of reproduction and on its parental genotypes. The APO-SCAR pair of primers produced a single amplification product of 225 bp, present in the apomictic paternal genotype but absent in the maternal sexual plant.

Project supported by: Fondazione Cassa di Risparmio di Perugia. Project 2008.021.498: Genomica comparativa e funzionale per caratterizzare i geni candidati al controllo delle modificazioni del sistema riproduttivo.