ARABIDOPSIS THALIANA PLANTS OVEREXPRESSING RAMOSA1 GENE SHOW AN INCREASE IN ORGAN SIZE DUE TO CELL EXPANSION

CASSANI E.*, LANDONI M.**, BERTOLINI E.*, PANZERI D.*, PILU R.*

*) Dipartimento di Produzione Vegetale - University of Milano, Via Celoria 2, 20133 Milano, (Italy)
**) Dipartimento di Scienze Biomolecolari e Biotecnologie - University of Milano, Via Celoria 26, 20133 Milano (Italy)

ramosa1 gene, Zea mays, Arabidopsis thaliana, cell expansion, flower size

The structure of the plant inflorescence and flower is an important agronomic and ornamental trait studied for its potential economic applications. In particular, the capacity to modify flower size has always been a breeder’s goal. Genetic and molecular studies have shown that the Zea mays gene ramosa1 (ra1) is involved in inflorescence branching regulation. In fact the ra1 loss of function mutation causes extra branching of the inflorescence.

In this work we suggest a possible utilization of the ramosa1 maize gene as a tool to modify inflorescence architecture and flower size in transgenic plants. In fact overexpression of this gene in Arabidopsis plants promotes an increase in reproductive organs size. Pollen, seeds, cotyledons, leaves and roots are also larger than those of the wild type. Analysis of organs from transformants showed that cell expansion was increased without apparently affecting cell division.

The results that we obtained support the evidence for a phenomenon based mainly on cell expansion that may be mediated in some way by the up-regulation of genes involved in cell expansion regulation.

Further studies will be necessary to understand the interaction between the ra1 exogenous gene and the final target genes in Arabidopsis plants and the behaviour of the ra1 gene when overexpressed in other plant species.

Finally, it has not escaped our notice that the ra1 gene may become an useful tool for manipulations of plant size and architecture especially in ornamental plants.