EPICLONES

Project title: ENVIRONMENTAL EPIGENETIC VARIANTS AS CLONAL MATERIAL IN HORTICULTURE

Acronym: EPICLONES

Project duration: 24 months – Start date: 01.10.2017 End date: 30.09.2019

Key-words: Urban horticulture, environmental stress, Epigenetic, vegetative propagation, mother-plants

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Summary:

Context: Crop adaptation to stress-inducing environment is a key issue in the general context of climatic change but also to face the increasing demand for plants adapted to urban adverse growth conditions. Genetic selection of new varieties through crossing of parental lines is the classical way to improve plants, but it is a long process. New methods for crop improvement are therefore search for.

Goals: The aim of the Epiclones project will be to assess whether plants can be acclimated to an adverse environment through prior culture of successive vegetative generations under stressful conditions and selection of the best resistant plants at each generation. The reasoning behind is that stress may imprint epigenetic changes in plant genome that may remain stable through vegetative propagation and confer plants a better and long lasting adaptation to adverse growth conditions. The goal of the project will then be to assess whether such acclimation and epigenetic changes can occur through such a strategy and bring about increased resistance.

Methodology: Petunia "star" variety will be cultured under hydric stress condition (one of the most important stress in urban environment) and successive cutting-derived generations cultured similarly. Performances of the different generations to resist hydric stress will be evaluated through several phenotypic characters, physiological and molecular analysis and compared to performances of the initial mother-plants and of clones that were propagated under no stress. Petunia plants will also be cultured *in vitro* in the presence of a de- methylating agent, known to induce epigenetic changes in genomes and subjected to hydric stress using polyethylene glycol-rich medium. These *in vitro* plants will then also be examined concerning their resistance to hydric stress. The study of the global level of DNA methylation as well as of the methylome sequences of some of the Petunia plants that were subjected to hydric stress both in the growth chamber and *in vitro*, will finally allow to determine whether correlations exist between epigenetic changes and plant acclimation to hydric stress, as well as to assess the stability of such epigenetic changes through successive clonal generations.