

SEEUATOM

Project title: **A systems biology approach to unravel the acquisition of seed quality during fruit ripening in tomato**

Acronym: **SEEUATOM**

Project duration: 36 months – Start date: 1/11/2017 End date: 31/10/2020

Key-words: embryo, endosperm, gene network, locular gel, maternal environment, maturation, testa, transcriptomics, usable plantlets, vigour

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Summary:

Seed vigour is an estimate of how successfully a seed lot will establish seedlings under the wide range of environmental conditions. Seed companies invest considerable resources to produce seeds of high vigour. However, this is very difficult to achieve because seed vigour is a multifactorial trait that is determined by complex gene by environment interactions. Seed vigour traits are sequentially acquired during development via various genetic programs that are poorly understood. In addition, there is increasing awareness that environmental cues perceived by both the mother plant and the developing zygote have dramatic effects on seed quality. Therefore, there is an urgent need for an integrative vision of the elaboration of seed vigour during maturation. This is especially important for high-value seeds such as tomato, a key strategic species for the seed industry being the first source of vegetable worldwide. The aim of the project is to uncover the regulatory genes controlling the acquisition of seed vigour during tomato fruit maturation using a systems biology approach. Along with the physiological characterization of germination and seedling emergence, we will generate detailed tissue-specific transcriptomic maps of seed development subjected to different environments. Gene network approaches and innovative multivariate analyses will be used to enable the identification of key regulatory genes that correlate with seed quality. Also, we will explore how the fleshy fruit tissues surrounding the seeds influence the acquisition of seed vigour.