



## Plant Genomics 2019: Advanced Nanomaterials in Agriculture under a Changing Climate- Vasileios Fotopoulos, Cyprus University of Technology, Cyprus

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Agriculture is one of the most vital sectors in world economy as it produces food and provides raw materials for multiple industries. However, global agricultural production is suffering substantial losses due to climate change-related phenomena such as drought and salinity, which lead to tissue damage and, ultimate, major yield losses. The development of sustainable, 'green' technologies is therefore becoming increasingly important. An exciting, GM-free approach for plants to tolerate environmental stresses exists in the form of priming. Chemical priming shows great potential in increasing plant tolerance against these abiotic stresses through effective induction of already established defense pathways. The parallel employment of nanotechnology and its tools can greatly improve the field of plant (chemical) priming, as the effectiveness of chemicals used as agents can be enhanced, thus reducing their environmental load. Recent focus has thus been given to the development and optimization of nanomaterials for application in the agricultural industry towards improved growth, plant protection and overall performance based on their small size, high surface to volume ratio and unique optical properties. Nevertheless, the use of nanomaterials in sustainable agriculture and crop improvement is still at a juvenile phase. It is expected that as the understanding of nanotechnology increases, we will be able to get maximum potential advantages. However, it is necessary to build up a fundamental understanding regarding interaction of nanoparticles and advanced polymers with plants at both cellular and molecular level in order to design 'green' technologies without negative effects on the environment.

This presentation provides an up-to-date description of research activities carried out at the Cyprus University of Technology with the employment of advanced nanoparticles and polymers

applied at plant and seed level, covering technical and biological aspects of this promising approach. This technology offers an attractive alternative to established approaches such as conventional breeding and genetic modification with key advantages, representing a characteristic example of integrative plant physiology where multiple disciplines such as materials science, agriculture and analytical chemistry join forces to develop exciting new tools in modern agriculture.

**Keywords:** nanomaterials; plant priming; abiotic stress; nanoparticles; polymer coatings

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