CHANGE

Global Change and Sustainability Institute

Science CHANGing Policy

Book of Abstracts

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CENSE center for environmental and sustainability research
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Preface

The world faces a series of different global changes, which are complex in nature and require urgent action from Academia, Public and Private Organizations and Governments.
The Institute for Global Change and Sustainability, Associated Laboratory CHANGE, integrates researchers from multidisciplinary areas of expertise that shall enable the development of appropriate solutions targeting the present and future environment and natural resources management, forestry and farming systems, energy and climate, as well as demographic and social challenges.
The Mission of CHANGE is the development of scientifically supported solutions for public policy and governance targeting an environmentally friendly, resource-efficient, and competitive economy, in the context of existent global changes. These should be innovative and up-to-date policies, implemented at multiple scales.
For fulfilling this Mission, the integration of knowledge, synergies and complementary aspects of the research undertaken within the three R&D units, CENSE, cE3c and MED, is fundamental. Innovative solutions for a changing world require often interdisciplinary approaches and combinations of knowledge not seen before. Therefore, we believe that exchange and networking, within the CHANGE community itself, is key in strengthening our skills and competences, and our capacity to respond to changing societal challenges.

The event *Science CHANGing Policy* was a showcase of CHANGE capabilities and a platform to boost the interaction and collaborative work between the researchers from CHANGE.

This event included past, present and future work covering the areas of biodiversity and ecosystem services restoration, promotion of sustainable food and biomass systems, preservation and restoration of natural resources, circular economy and energetic transition and territorial cohesion enhancement.

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CRISPR/Cas13 system: A technology to the successful control of plant viruses

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Abstract

Viruses are among the most important causal agents of infectious diseases, having relatively small genomes that comprise RNA or DNA. They have the ability to rapidly replicate and spread throughout a crop, being very difficult to monitor and causing devastating diseases in many agricultural systems. These can lead to significant losses in crop quality and yield, resulting in extreme economic impacts worldwide and threatening the provision of adequate nourishment for a continuous growing population. There are no efficient chemical products that can eliminate an infecting plant virus without perturbing host cells. Therefore, preventive sanitary measures, such as the use of viral resistant or tolerant plants, are usually the only options. Conventionally, these resistant/tolerant plants were generated through a very time-consuming classical breeding process. However, nowadays, molecular plant breeding plays a key role to prevent and control plant viruses. Clustered regularly interspaced short palindromic repeats (CRISPR) and CRISPR-associated (Cas) proteins systems allowed the development of a new technology that paves the way towards a new horizon for crop improvement. The first CRISPR/Cas systems studied were very useful for DNA-targeting, however, more recently identified types, such as CRISPR /Cas13, can specifically cleave single-stranded RNA in eukaryotic cells. Therefore, CRISPR/Cas13 is a promising tool for engineering plant immunity against a broad range of RNA viruses, which are the most abundant class of viruses in plants. The present work aims to bring together the most up-to-date information on CRISPR/Cas13 system to control plant viruses, discussing the limitations and future challenges for its application to produce virus resistant plants towards a more sustainable agriculture.