

GENIUS project - Genome ENgineering Improvement for Useful plants of a Sustainable agriculture

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World agriculture needs to guarantee food security, replace fossil resources, decrease its environmental impact and adapt to a changing global climate. Whereas France and other European countries presently choose to meet the genetic aspect of these challenges by the sole use of conventional breeding, an increasing number of agriculturally important countries enlarge the available gene pool via transgenesis. Despite certain political concerns transgenesis is already an indispensable technology for French seed companies and public scientists to remain competitive at an international level.

Recent scientific advances in the field of transgenesis now provide answers to certain reserves of citizens and blur the border between breeding and transgenesis. In particular the advent of nuclease technology opens the way to extremely precise modifications of plant genomes at pre-determined sites. In this context it is strategic to ascertain top-level know-how in transgenesis in France, to actively participate in the debate of these new technologies and to demonstrate their applicability in a wide range of crop species.

If successful, the project **GENIUS (Genome ENgineering Improvement for Useful plants of a Sustainable agriculture)** will provide French researchers and plant breeders with state of the art know-how, the necessary biological material and connected intellectual property rights for precise genome modifications in a variety of crop species, laying the basis for high throughput functional genomics and efficient plant breeding. Proof of concept will concern disease resistance, salt tolerance, plant architecture and quality traits. Studies on the regulatory, economical and philosophical context will complement the experimental work.

To reach these goals, in an unprecedented effort, GENIUS has assembled a consortium of 15 public and private partners – 10 public research units in biological or social sciences with 5 biotechnology and seed companies. This consortium will create synergy between field- or species-oriented entities into a technology-oriented community.

The project started on September 1st, 2012 and will be developed over a period of 7 years and 4 months.

Mots-clés : Genetically modified crops; site-specific nucleases; Gene targeting.