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Genome ENgineering Improvement for Useful plants of a Sustainable agriculture

Nogué Fabien¹, Vergne Philippe², Chèvre Anne-Marie³, Chauvin Jean-Eric³, Bouchabké Oumaya¹, Déjardin Annabelle^{4*}, Chevreau Elisabeth⁵, Hibrand-Saint Oyant Laurence⁵, Mazier Marianne⁶, Barret Pierre⁷, Guiderdoni Emmanuel⁸, Mathis Luc⁹, Sallaud Christophe¹⁰, Matt Mireille¹¹, Pierron Jean-Philippe¹², Bonnel Eric¹³, Foucrier Séverine¹⁴, Toppan Alain¹⁵, Trannoy Laure¹⁶, Rogowsky Peter²

¹ INRA UMR1318 IJPB Institut Jean-Pierre Bourgin, Versailles, France

² INRA UMR0879 RDP Reproduction et Développement des Plantes, Lyon, France

³ INRA UMR1349 IGEPP Institut de Génétique Environnement et Protection des Plantes, Rennes, France

⁴ INRA UR0588 AGPF Amélioration, Génétique et Physiologie Forestières, Orléans, France

⁵ INRA UMR1345 IRHS Institut de Recherche en Horticulture et Semences, Angers, France

⁶ INRA UR1052 GAFL Génétique et Amélioration des Fruits et Légumes, Avignon, France

⁷ INRA UMR1095 GDEC Génétique Diversité et Ecophysiologie des Céréales, Clermont-Ferrand, France

⁸ CIRAD UMR108 Amélioration Génétique et Adaptation des Plantes méditerranéennes et tropicales, Montpellier, France

⁹ Collectis, Paris, France

¹⁰ Biogemma, Chappes, France

¹¹ INRA UMR1215 GAEL Laboratoire d'Economie Appliquée de Grenoble, Grenoble, France

¹² Faculté de Philosophie de l'Université Jean Moulin Lyon 3, Lyon, France

¹³ Germicopa, Quimper, France

¹⁴ Société Nouvelle des Pépinières & Roseraies Georges Delbard, Malicorne, France

¹⁵ Vilmorin & Cie, Chappes, France

¹⁶ INRA Transfert, Paris, France

* annabelle.dejardin@orleans.inra.fr

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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 and horticultural species (wheat, maize, rice, oilseed rape, tomato, potato, poplar, apple, rose), 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.

Competing interests

The authors declare that they have no competing interests.

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