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Chromatin regulation of and by gene islands in plants

Louis-Valentin Méteignier

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Welcome to the 14th International Conference of the French Society of Plant Biology



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INSTITUT DE BIOSCIENCES
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D'AIX-MARSEILLE



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INTRODUCTION

The Organizing Committee, the Scientific Committee, the Federation of the European Societies of Plant Biology, the French Society of Plant Biology and the Biosciences and Biotechnology Institute of Aix-Marseille welcome you to Plant Biology Europe.

This international meeting covers a wide range of Plant Science topics across multiple disciplines and at different scales.

Among the many different themes that are being addressed during the meeting, a particular emphasis is placed on plants and climate changes, algal biology and bioenergy.

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SESSION 18: THE GENETICS OF NATURAL VARIATION OF PLANT- PLANT INTERACTIONS

EVOLUTION OF COOPERATION IN POST-GREEN REVOLUTION DURUM WHEAT CULTIVARS

Michel COLOMBO^{1*}

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In agriculture, intraspecific competition is undesirable, since it drives the evolution of traits toward phenotypic values lowering group performance. Kin selection (KS) theory provides a relevant framework to model these issues. The KS theory aims at understanding the evolution of traits, for which the phenotype of an individual affects both the performance of that individual and the performance of other individuals in interaction. It predicts that a phenotype that decreases individual's performance can be favored by KS if the performance of some other related individuals in interaction is increased by the interaction. The KS theory has been used to explain the evolution of cooperative phenotypes with beneficial effect on group performance. Interestingly, the KS theory has been poorly mobilized in agriculture. In this talk, using the framework of the KS and durum wheat as a model species, we will ask whether post-green revolution breeding has produced more cooperative phenotypes.

CHROMATIN REGULATION OF AND BY GENE ISLANDS IN PLANTS

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In *Arabidopsis thaliana*, small euchromatin islands that contain expressed genes are interspersed within repressive heterochromatin. Until recently, how the expression of euchromatin islands occurred in such a repressive environment remained unknown. We have demonstrated a role for the Topoisomerase VI protein complex in safeguarding the expression of euchromatin island genes by regulating H3K9me2 homeostasis. In *Arabidopsis* and many other plants, island genes can belong to functionally-related pathways such as those involved in the biosynthesis of specialized metabolites. Surprisingly, some plant specialized metabolites share structural similarities with well-known chromatin chemical modifiers, and I will show preliminary results that might involve specialized metabolites in the chromatin-level control of plant immunity and plant-plant interactions.