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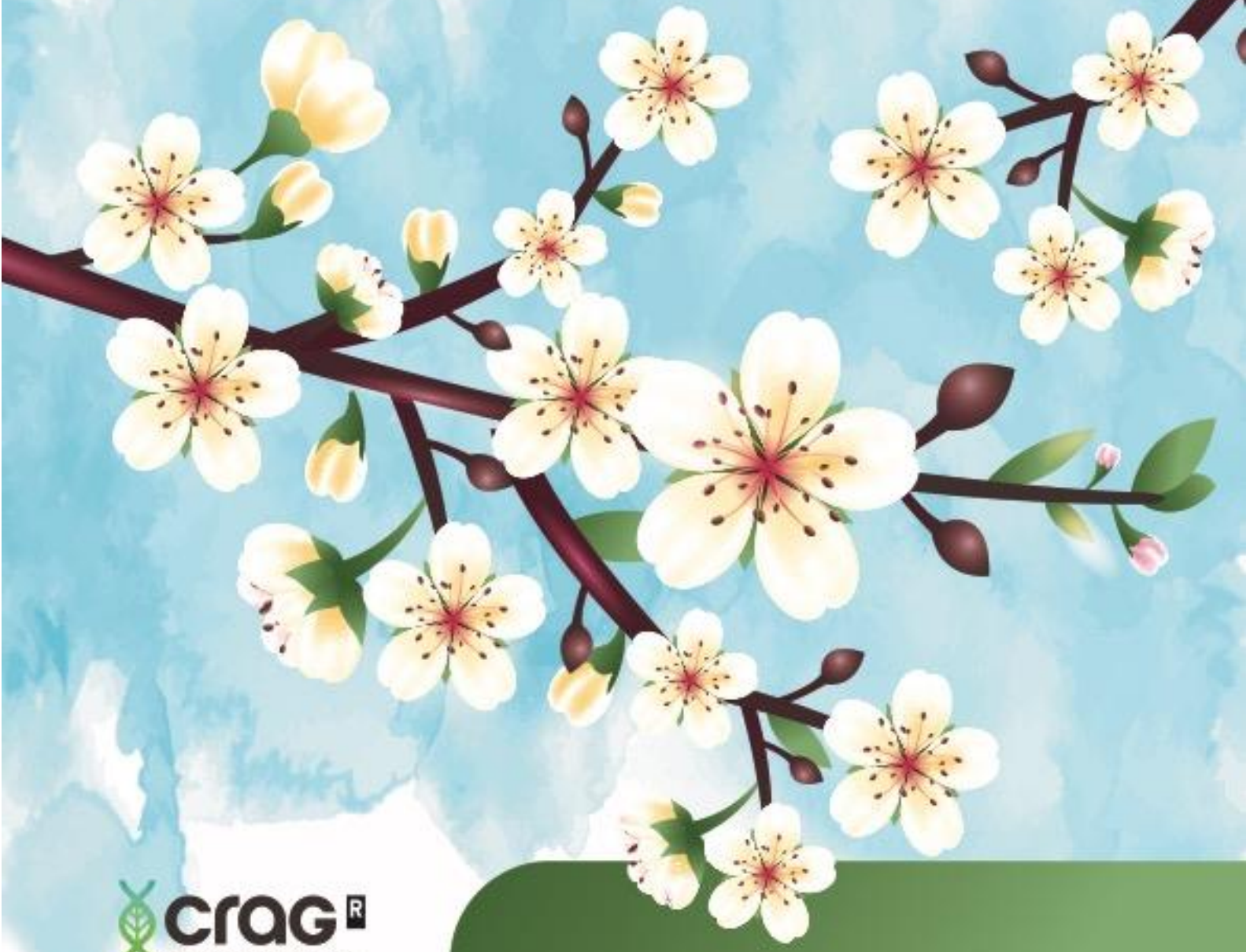

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DECIPHERING THE GENETIC CONTROL OF FRUIT STORABILITY IN PEAR FRUIT THROUGH A MULTI-PARENTAL CROSS DESIGNED BASED APPROACH

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Abstract

Fruit security, a concept promoted by FAO and WHO, is supported by the improvement of the physical availability of a specific commodity and the maintenance of its properties as unaltered as possible. This is particularly relevant for the fruit of pear, which are commonly subjected to an important rate of softening. The degradation of the mechanical polysaccharidic structure leading to a loss of firmness although necessary to establish fruit quality, in parallel strongly limits its storability. To date, several postharvest technologies can effectively address this issue. However, they can be extremely severe, excessively influencing the physiological progression of ripening, which has a detrimental effect on the overall quality of the fruit.

Breeding for novel and ameliorated accessions can be a valid alternative. Nevertheless, the scientific knowledge and genomic/genetic tools available for this species are much behind compared other more investigated Rosaceae crop species. In this work, we employed two population of pear, characterized by a common pedigree, and a multi-parental cross design to dissect the fruit firmness and storability genetic control. The set of QTLs initially mapped by a classical bi-parental approach and further validated by a Pedigree Based Analysis identified a series of major and minor loci associated to both static and dynamic firmness/softening traits. The in-silico gene mining and QTL comparison with other Rosaceae species, especially apple, revealed a unique genetic controlled cell wall dismantling process for pear.