EXPLORING THE GENETIC CONTROL OF GRAFT INCOMPATIBILITY IN APRICOT (PRUNUS ARMENIACA L.)

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ABSTRACT:

Graft incompatibility between most popular *Prunus* rootstocks and apricot cultivars is one of the major problems for rootstock usage and improvement. Failure in producing long-leaving healthy grafts greatly affects the range of available *Prunus* rootstocks for apricot cultivation. In spite of recent advances related to the molecular mechanisms of a graft-union formation between rootstock and scion, information on genetic control of this trait in woody plants is essentially missing. In previous studies, we established an early anatomical and cytomorphological phenotyping test and determined graft compatibility between different industrial apricot cultivars and commercial rootstock Marianna 2624, an interspecific hybrid *of P. cerasifera* x *P. munsoniana*. Two phenotypically contrast cultivars, graft compatible 'Moniqui (Mo)' and graft incompatible 'Paviot (Pa)', were pollinated to generate a cross potentially segregating for compatibility when grafted on Marianna 2624 rootstock. We observed continuous variation of the morphocytological characters linked to formation of graft union among F_1 progeny that most likely reflects a polygenic inheritance of the trait. To localize genomic regions associated with graft compatibility, we genotyped by sequencing 138 individual from the 'Mo × Pa' cross and constructed high density genetic maps for both parents. The female 'Mo' and male 'Pa' maps were composed of 557 and 501 SNPs organized in eight linkage groups and covered 780.2 and 690.4 cM of genetic distance, respectively. The resulting genetic maps were aligned to the *Prunus* refence map and the *P. persica* v1.0 genome. A two-year phenotypic data for characters associated with graft compatibility were collected and used for mapping quantitative trait loci (QTLs) on the 'Mo' and 'Pa' maps. Several QTLs were identified on different linkage groups. Genomic regions associated with graft compatibility will be described for the first time, and QTLs controlling this trait in apricot will be discussed.