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Exploring the genetic variability of peach skin phenolics and triterpenoids as natural defenses against brown rot

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Abstract:

Brown rot caused by *Monilinia* spp. provokes dramatic losses of peach in all production regions. In this context, the general objective of our work is to develop sustainable ways to fight against this damaging disease.

This study explored phenolic and triterpenoid diversity of fruit skin together with brown rot resistance. A Brazilian peach collection and an interspecific cross between *P. davidiana* and *P. persica*, each of 120 genotyped individuals, have been screened for 3 years, for susceptibility to *M. fructicola* and to *M. laxa* respectively. Some genotypes of the two populations showed low or null infection the 3 years.

Secondary compounds of fruit skin of all genotypes were analyzed two years by HPLC-DAD. Depending on the genotypes, 30 to 40 compounds including triterpenoids, hydroxycinnamic derivatives and flavonoids, were quantified and around 20 were identified by mass spectrometry. Among these, phenolic esters of triterpenoids were identified for the first time in peach fruit.

The correlation of quantitative data between years showed their robustness. A large diversity in contents of the compounds was observed.

The association and QTL analyses proved to be complementary and led to assumptions about the co-locations of loci controlling different traits, especially for compounds with differential levels in the skin of peaches and nectarines. These analyses will help deciphering the genetic control of fruit skin phenolics and triterpenoids and pave the way to the identification of the underlying genes. Detection of loci related to resistance will provide tools for the implementation of marker assisted selection.

Correlations between compounds and infection traits led us to hypothesize that some compounds from peach skin could play a role in the brown rot control. The fungicide activity of these compounds is being tested *in vitro*.

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Key words: Disease resistance, QTL, GWAS, *Monilinia* spp., *Prunus persica*