

Thinning alters the expression of the PpeSUT1 and PpeSUT4 sugar transporter genes and the accumulation of translocated sugars in the fruits of an early season peach variety

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Thinning is an agronomic practice that consists in the removal of a certain number of fruits, thereby altering the source-sink equilibrium in the tree and favoring carbon allocation to the remaining fruits. If thinning is performed at the appropriate fruit developmental stage and at an adequate intensity, the remaining fruits will have a larger final diameter and higher soluble solids content. However, the amount of carbon translocated to a fruit depends on the photosynthetic rate in the source leaves, the production of translocation sugars, as well as the fruit sink strength, which is directly related to the phloem unloading. It is not clear which of these steps is altered by thinning. In this work, we evaluated the effect of thinning in an early season peach variety. Photosynthetic parameters, quantification of soluble sugars in leaves and fruits, and the expression of sucrose and sorbitol transporters were evaluated in leaves and fruits during whole fruit development. We showed that thinning was effective in improving final fruit size and sugar accumulation without inhibiting photosynthesis. We also observed a 10-day delay in stone lignification when the trees were not thinned. The stone lignification phase was very short in the thinned treatment, while it seems to last for longer under unthinning. Furthermore, it was shown that thinning affects the expression of translocation sugar transporters genes (PpeSUT1 and PpeSUT4) in both leaves and fruits, which could be increasing the fruit sink strength and subsequently improving translocation sugars transport to the fruit when trees are thinned.