

De novo Transcriptome Examination at Mid-stage Developing Ovules of Contrasting Genotypes Reveals Candidate Genes for Small-seeded Fruits in Litchi

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Abstract—Litchi is a sub-tropical fruit crop with genotypes bearing delicious juicy fruits with variable seed size (bold to rudimentary size). Small seed size is a desirable trait in litchi, as it increases consumer acceptance and fruit processing. The biochemical activities in mid-stage ovules (e.g. 16, 20, 24 and 28 days after anthesis) determine the fate of seed and fruit development in litchi. Comprehensive ovule specific transcriptome analysis was performed in two litchi genotypes with contrasting seed size to gain molecular insight on determinants of seed fates in litchi fruits. The transcriptomic data was de-novo assembled in 1,39,608 trinity transcripts, out of which 6,325 trinity transcripts were differentially expressed between the two contrasting genotypes. Differential transcriptional pattern was found among ovule development stages in contrasting litchi genotypes. The putative genes for salicylic acid, jasmonic acid and brassinosteroid pathway were down-regulated in ovules of small-seeded litchi. Embryogenesis, cell expansion, seed size and stress related trinity transcripts exhibited altered expression in small-seeded genotype. The putative regulators of seed maturation and seed storage were down-regulated in small-seed genotype.

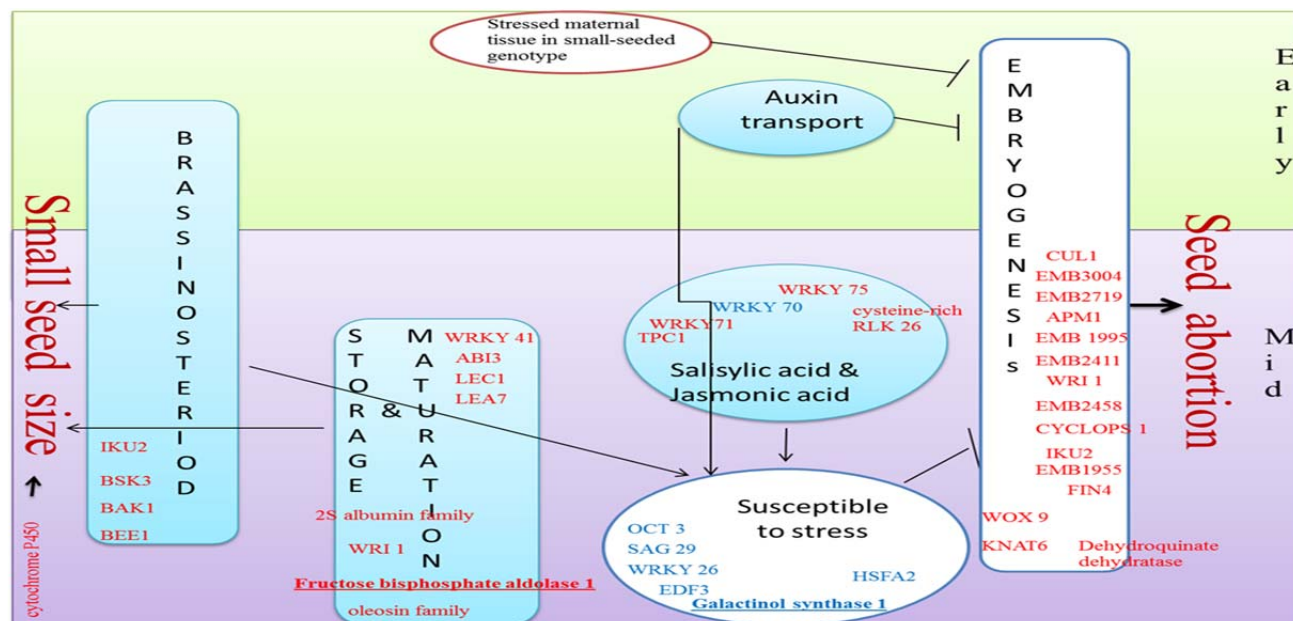


Figure 1: Affected pathways at early and mid stage of small-seeded litchi ovule development pathway. Boxes in blue represents down-regulated pathway in small-seeded genotype. Gene name written in red are down-regulated while in blue are up-regulated in small seeded litchi. Underlined genes are having similar trend of expression at both early- and mid- ovule developmental stages. ← represents regulation; ⊥ represents inhibition.

RECENT PUBLICATIONS

- [1] Pathak, A.K., Singh, S.P. & Tuli, R. Amplified Fragment Length Polymorphism Fingerprinting to Identify Genetic Relatedness among Lychee Cultivars and Markers Associated with Small-seeded Cultivars. *Journal of the American Society for Horticultural Science* **139**, 657-668 (2014).
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- [3] Gupta, Y. et al. *De novo* assembly and characterization of transcriptomes of early-stage fruit from two genotypes of *Annona squamosa* L. with contrast in seed number. *BMC Genomics* **16**, 86 (2015).