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# Transcriptomic- and Metabolomic-Changes in the Blades during Sink/Source Transition in Rice Leaves

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The new leaves in rice plant develop every 4 to 5 days during vegetative stage, and, this means their function turns quickly from sink to source. Therefore, it could be easily predictable that the leaves experience a lot of changes from molecular to morphological levels. In the present study, we examined some metabolic process based on transcriptomic- and metabolomic-approaches. The 4$^{th}$ leaves of rice seedlings were divided into three growth transition; i.e. sink (as leaf blade come out from the sheath of previous leaf), sink-source transition (3 days after an emergence), and source (5 days after an emergence). A total of 1,130 differentially expressed genes (DEGs) (656 up- and 474 down-regulated) were identified in the sink vs. sink/source vs. source phase, and the phasic transition-dependent metabolic processes with GO analysis were identified with some high fold change (FC) genes. During sink/source transition, photosynthesis-related genes were highly up-regulated; 1) 3.6 and 4.0 FC of oxygen evolving complex (OEC) genes of PS II (*Os05g0401100* and *Os03g0333400*) and 4.8 and 4.2 FC of Fe-S complex genes of PS I, (*Os07g0489800* and *Os08g0276100*). Considered as source leaves (5 days after), gene expressions in leaf blade seemed to head toward cutin- and suberin-biosynthetic process; 1) 13.8 and 15.9 FC of cutin biosynthetic genes (*Os08g0562500* and *Os11g0679700*) and 13.7 and 11.5 FC of suberin biosynthetic genes (*Os09g0567500* and *Os03g0281900*). Soluble carbohydrates contents from the rice leaf blade were examined. During sink/source transition, monossacharides, glucose, fructose and galactose, showed a trend of decrease, whereas sucrose and raffinose represented the similar- (1.17 and 0.97 FC at 3 days) or increasing-levels (1.87 and 2.90 FC at 5 days), respectively. The microarray- and metabolic-based data implied that carbohydrate metabolism was the dominant process associated with functional leaf blade transition in rice seedlings.

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