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Transcriptional profiling of mechanically and genetically sink-limited soybeans

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The absence of a reproductive sink causes physiological and morphological changes in soybean plants. These include increased accumulation of nitrogen and starch in the leaves and delayed leaf senescence. To identify transcriptional changes that occur in leaves of these sink-limited plants, we used RNAseq to compare gene expression levels in trifoliolate leaves from depodded and *ms6* male sterile soybean plants and control plants. In both sink-limited tissues, we observed a deferral of the expression of senescence-associated genes and a continued expression of genes associated with leaf maturity. GO-terms associated with growth and development and storage proteins were over-represented in genes that were differentially expressed in sink-limited tissues. We also identified bHLH, ARF, and SBP transcription factors expressed in sink-limited tissues, while the senescing control leaves expressed WRKY and NAC transcription factors. We identified genes that were not expressed during normal leaf development but that were highly expressed in sink-limited plants, including the *SGR3b* “non-yellowing” gene. These differences highlighted several metabolic pathways that were involved in distinct modes of resource partitioning of leaves with the “stay green” phenotype.