CAN SUCROSE PATHWAY MANIPULATION AFFECT REGROWTH OF COPPICED *POPULUS?*

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Perennial woody trees grown for short-rotation bioenergy production are often maintained by coppicing. While it is presumed that non-structural carbohydrate reserves contribute to regrowth, mechanisms for orchestrating remobilization of stored carbohydrates remain poorly understood. Sucrose transport proteins (SUTs) are known for their role in mediating the subcellular mobilization of sucrose from source leaves, yet their involvement in other physiological processes, such as carbohydrate remobilization from sink tissues, remains unclear. Here, we targeted *PtaSUT4* for CRISPR/Cas9-mediated mutagenesis to generate transgenic knock-out (KO) nulls in the *Populus tremula x alba* (INRA 717-1B4) hybrid clone. Amplicon-sequencing confirmed biallelic frameshift mutations in >30 independent transgenic lines; a subset of which was selected for further functional characterization. *SUT4*-KO had no obvious effect on mature plant appearance or growth, but subtle changes to biomass partitioning and metabolism were observed. We then coppiced mature greenhouse-grown poplar to perturb sink-source relations and examine how *SUT4*-KO impacts new vegetative growth. The KO mutants initially exhibited accelerated epicormic bud growth from the stool, but ultimately displayed a decline in new aboveground biomass accumulation after repeated rounds of collection. Metabolic profiling of stool bark and wood during bud flush and regrowth revealed a major shift in primary and secondary metabolism of the mutants. Consistent with vacuolar sequestration in the mutants, sucrose, hexoses, and phenylpropanoid compounds were detected at reduced levels following coppicing and initial bud growth in the mutants. In contrast, the *sut4* mutants accrued elevated levels of amino acids and Krebs cycle intermediates during initial bud burst. This data supports a scenario where carbon was diverted towards primary metabolism to fuel enhanced bud growth in the *sut4* mutants. Collectively, these findings point to a novel role for SUT4 in mobilizing soluble carbohydrates following coppicing and regrowth in *Populus*.