CRISPR/CAS9-KNOCKOUT OF TRICHOME-REGULATING MYBS IN *POPULUS* ALTER LIGHT SENSITIVITY AND WAX COMPOSITION

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In all habitats, plants face a variety of environmental stresses, and thus, have evolved an array of physiological and transcriptional coping mechanisms. Acting as a physical barrier between plant and its environment, hair-like trichomes act multifunctionally to provide pest defense and UV shielding whilst reducing transpiration rates. Additionally, they can also act as a locale for secondary metabolite synthesis and storage. The role and regulation of trichomes is well studied in herbaceous models, but less so in poplar, a woody perennial with bioenergy importance. Previous research identified the transcription factor PtaMYB186 as a positive regulator of trichome initiation during early stages of leaf development in *Populus tremula* x *P. alba* (IRNA 717-1B4). Here, the CRISPR/Cas9 system was utilized to target *PtaMYB186* and its close paralogs for knockout mutagenesis in poplar. The regeneration of trichomeless mutants confirmed the regulatory roles of the MYB transcription factors during trichome initiation. These trichomeless poplar had increased pest susceptibility, though unexpectedly, growth and leaf transpiration rates were not affected. Additionally, light-regulated genes were found to be differentially expressed and exposing the trichomeless mutants to a high-light environment significantly increased synthesis of anthocyanins, a class of known photoprotective metabolites. Notably, cuticle wax and whole leaf analyses found a complete absence of triterpenes in the mutants, suggesting biosynthesis and storage of triterpenes in poplar occurs in the trichomes. Together, these findings contribute further insights into the multifunctional role of trichomes in poplar as both a pest and light barrier, as well as a site of triterpene biosynthesis and storage.