

The miR159a-CfMYB37 module regulates xylem development in Chinese cedar (*Cryptomeria fortunei* Hooibrenk)

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Abstract: *Cryptomeria fortunei* is the indigenous evergreen coniferous timber species in southern China, valued for its superior wood quality, which frequently finds industrial applications. MiRNAs (microRNAs) can be involved in regulating various aspects of plant growth, and more and more studies have explored miRNAs related to growth and development, but among them, the ones on *C. fortunei* are relatively rare. In this study, we screened miRNAs that were differentially expressed during vascular cambium development, and chose miR159a and *CfMYB37* as candidate genes for cloning and functional validation.

The results showed that miR159a had *CfMYB37* as a target gene and that there was a distinct negative regulatory relationship between miR159a and *CfMYB37* in *C. fortunei*. 35 S::miR159a plants were taller than WT and had thicker stems than WT, and miR159a encouraged the growth of xylem cells and lignin.

While 35 S::mCfMYB37 plants had the opposite phenotype to 35 S::miR159a plants, with considerably lower lignin content and xylem cell layer number compared to WT, 35 S::CfMYB37 plants lacked a distinctive phenotype. This suggests that the miR159-CfMYB37 module can control plant growth and xylem development. For the following investigation of *C. fortunei*'s growth and vascular cambium development as well as the enhancement of its wood qualities, this work serves as a crucial theoretical foundation.