- ## P0628: Genetics Control of 4-Coumarate Coenzyme A Ligase (4CL) Enzyme Involved in Lignin Biosynthesis of European Black Poplar (*Populus nigra* L.)

European black poplar *(Populus nigra* L.) is considered as one of the most economically significant forest trees with respect to production of wood, pulp, bioenergy and other wood-based products. The content and quality of wood are greatly affected by plant cell wall compositions (cellulose, hemicellulose, and lignin). Although lignin serves as a mechanical barrier as well as protection against pests and pathogens, it emerges as an undesirable polymer for both pulp and bioenergy manufacturing industries because of its by-products which are generated during the removal step of lignin. The 4-Coumarate Coenzyme A Ligase (4CL) is a key regulatory enzyme of the phenylpropanoid pathway that regulates the activation of cinnamic acid, leading to lignin and flavonoid synthesis. With this study, 285 clones with two replications (two ramets per clone) grown in a forest nursery were screened with respect to lignin content and 4CL activity to determine the genetic control of these two traits. The clones highly varied in lignin content and 4CL activity, ranging from 13.24 µg / ml to 48.86 µg / ml in acid soluble lignin, 0.09 to 7.05 units / mg in 4CL specific activity. There is highly significant positive correlation between 4CL activity and lignin content (r = 0.63), whereas low significant negative correlation was found between 4CL activity and diameter growth (r = - 0.22). The results of the study will be further evaluated with respect to the component of total variation attributed to clones, superior lignocellulosic clones and breeding strategies and presented in the poster presentation.

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