

Functional Genomics for crop trait improvement

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The ability to modify genomes and alter gene expression profiles using functional genomics and gene editing tools is one of the most promising advances in agricultural biotechnology. Examples include that crop seed size could be significantly increased by using newly identified gene functions, flower petals could be engineered for cleistogamy in order to limit pollen-mediated gene flow, and tomato fruit lycopene content could be enhanced following the identification of the key carotenoid biosynthetic pathway genes impacting fruit lycopene content. We are also in the process of developing novel biotechnologies such as lipofection and pollen meganofection for protein delivery of the CRISPR-Cas9 system into plants for gene editing. We demonstrated that these functional genomics tools are effective for regulating of targeted transgene expression and precision genome editing in plants.