PBG 431 Plant Genetics recitation

Transgenic trees and genome editing

A direct manipulation of DNA to obtain a desirable phenotype in a particular organism is known as genetic engineering. To start applying this technology, scientists must identify the gene of interest in a particular organism. Understanding promoters and coding regions is absolutely necessary to obtain successful transformation and gene expression. Several methods (agrobacterium and gene gun) have been developed to transfer the transgene into a cell. Moreover, how and where this gene is incorporated into the genome is important for gene expression. Evaluation of transgene in transformed plants can be achieved using specific molecular markers. Once a transformed plant is developed, green house and field evaluations are require, as are ecological and biosafety assessment. This transformation process requires tissue culture methods.

Genome editing involves inserting, deleting or replacing DNA sequence that is already present in the organism of interest. This technique involves recognizing the target sequence, breaking the target gene sequence using nucleases, and a reassembly of the chromosome.

1. Suppose you are a tree breeder. Why are genetic engineering and genome editing such attractive and potentially useful technologies in trees as compared to annual plants?