ENGINEERED MINICHROMOSOMES IN PLANTS

The use of genetically modified crops is constantly finding new areas of application, including the production of compounds with therapeutic value. Current technology for producing transgenic crops relies on random integrations that can have variable expression and could potentially disrupt the endogenous genes. Also combining multiple transgenes requires a lengthy crossing scheme and can bring along linked genes from one variety into another.

The current invention developed by researchers at the University of Missouri is a technology that will allow continued addition of transgenes as the need arises in the future using engineered plant minichromosomes. Artificial chromosome platforms in maize were produced by telomere-mediated truncation while simultaneously adding sequences that will permit amendments to the chromosome indefinitely. Such engineered minichromosomes have the potential to be used as a vector for efficient stacking of multiple genes for insect, bacterial and fungal resistances together with herbicide tolerance and crop quality traits unlinked to endogenous genes in a circumstance that would foster faithful expression. The collection of transgenes on minichromosomes might be combined with haploid breeding techniques to facilitate their transfer among diverse lines of a crop. A toolkit of lines that will permit additions and subtractions of genes from engineered minichromosomes is being assembled. Because of the near universality of the telomere sequence in the plant kingdom, engineered minichromosomes should be able to be produced easily in most plant species by this technique.

POTENTIAL AREAS OF APPLICATIONS:

- Stack multiple transgenes on an independent chromosome with potentially no limit to number.
- Facilitate transfer of transgenes into different varieties of a crop species by combining them with haploid breeding procedures.

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