

Overview of Plant Genetic Engineering

By: Patricia Hain* and Donald Lee

Available at: <http://croptechnology.unl.edu/viewLesson.cgi?LessonID=957879329>

Abstract: Genetic engineering of a crop species requires the completion of several major steps and the combined efforts of diverse scientists. These steps include: (i) locating an organism with a specific trait and extracting its DNA; (ii) cloning a gene that controls the trait; (iii) designing a gene to express in a specific way; (iv) transformation of the gene into the cells of a crop plant; and (v) plant breeding to cross the transgene into an elite background. This is lesson one in a 10-lesson series found in the Library of Crop Technology (<http://croptechnology.unl.edu>) designed to teach the basics of the plant genetic engineering process. The objectives of this lesson are as follows.

1. Define genetic engineering.
2. List and briefly explain the five basic steps in the genetic engineering process and describe why each is necessary.
3. Identify the fundamental differences between genetically engineered crops and non-genetically engineered crops.
4. Explain the limitations of traditional breeding that are overcome by genetic engineering.
5. Identify the approximate length of time required to obtain a marketable transgenic crop line (complete the entire crop genetic engineering process).

A bank of quiz questions focused on these objectives is a part of this lesson. The lesson is written to target the educational needs of undergraduate students and advanced extension audiences.

Key Words: plant genetic engineering.

Contact: Patricia Hain, Dep. of Agronomy and Horticulture, 237 Keim Hall, Univ. of Nebraska, Lincoln, NE 68583-0914. *Corresponding author (phain@unlserve.unl.edu).

Development of this lesson was supported in part by Cooperative State Research, Education & Extension Service, USDA under Agreement no. 98-EATP-1-0403 administered by Cornell Univ. and the American Distance Education Consortium (ADEC).