

**ABSTRACT: The American Chestnut Foundation's Backcross Breeding Program**

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The American Chestnut Foundation was incorporated in 1983 to pursue an insight of Dr. Charles Burnham, plant geneticist at the University of Minnesota. Dr. Burnham's reading of the chestnut literature persuaded him that blight resistance from Chinese chestnut was simply inherited (2 or 3 genes) and incompletely dominant. Therefore he believed that the best strategy for creating a blight-resistant American chestnut tree was to use backcross breeding. Resistant Chinese chestnut trees (*Castanea mollissima*) are initially crossed to American chestnut trees (*Castanea dentata*) to create an F1 tree. This F1 is then crossed to American chestnut to create Backcross1 trees, which have on average 75% American chestnut genes. This process is repeated 2 more generations to produce Backcross3 (BC3) trees, which should be about 94% American in genotype. These BC3 trees are then intercrossed to produce a BC3F2 generation, among which should be trees that are homozygous for the blight resistance genes and thus have a high level of blight resistance and be true-breeding for the trait. These selected BC3F2 trees form the parents of a seed orchard to produce the Foundation's first BC3F3 seed for testing over a wide area. We expect the first BC3F3 seed to be available for testing by 2007.

The Foundation is also concerned about preserving as much of the genetic diversity of the American chestnut tree as possible. Chapter breeding programs are making crosses to local chestnut populations from Maine to Tennessee. There are still millions of American chestnut trees alive in the Appalachians, although only a small proportion of them flower in any given year. The backcross breeding program is aided by the fact that chestnut trees grow rapidly (up to 6 feet a year) and under the right conditions they can flower at an early age (fourth or fifth year of growth from seed).

More information about the Foundation's breeding and educational programs can be found at its web site: <http://www.acf.org>