

# History of the Sugar Maple Tree Improvement Program Uihlein Sugar Maple Field Station

*Lewis J. Staats, M.E Krasny, and C.Campbell*

Maple producers and rural landowners throughout the maple syrup-producing regions of the Northeast have expressed interest in acquiring improved (i.e., higher sap sugar concentration) sugar maple seedlings for future sap production on abandoned agricultural land, replacement of roadside sugar maples that have declined, and improvement of sugar maple regeneration within existing sugar maple forests. However, the supply of sugar maple planting stock with improved sap sugar concentration has been limited. Requests from maple producers and landowners for this planting stock exceed the current availability of seedlings.

A program designed to locate and replicate sugar maple trees with high sap sugar concentration began in the 1960s under the direction of the USDA Forest Service (USFS). The program began with phenotypic selection by field examination of over 21,000 trees in the Northeast and intensive selection of the best trees. Based on this earlier work by the USFS, the Uihlein sugar maple tree improvement program began with construction of a greenhouse in 1994 at the Uihlein Sugar Maple Field Station to facilitate propagation of sugar maple for current and future programs. After early favorable results were obtained, over 60 individual sources, selected for high sap sugar concentration, have been successfully cloned and propagated.

Clones grown in the Uihlein greenhouse were outplanted in 1996 near the field station at Lake Placid as the initial step for establishing a seed orchard of higher performing individuals. Since that time, the seed orchard has grown in size to nearly 120 trees representing over 50 high sap sugar selections from throughout the Northeast. This number will be increasing as more selections are identified by Cornell and cooperators, propagated, and planted in the orchard. The seed orchard, nursery, and greenhouse were featured when the Uihlein Field Station hosted the New York State Maple Tour in 2000.



Recently-planted seeds



Two year-old seedlings



Uihlein underground storage facility

The program has continued with the establishment and maintenance of clonal orchards in Grand Isle, VT and West Salisbury, CT. As the seed and clonal orchards develop, seed production will become more abundant and will help provide greater availability of improved seedlings for establishing orchards containing high sap sugar-producing maple trees. The clonal material has also allowed expansion and replacement in established clonal orchards. As a result of damage from the January 1998 ice storm, several selections were lost in the Grand Isle clonal orchard. There were replaced in the spring of 1999 with clonal material reserved in the field station nursery.

Techniques for propagating sugar maple clonal material are continually researched in order to increase the success of survival, growth, and vigor of clonal stock for the Cornell program. This methodology is shared with others interested in propagating sugar maple. To this end, less formal outplanting trials have been established with landowners in NY and neighboring states. Additionally, a growing number of improved seedlings have been made available to maple producers in NY and other Northeastern states. Currently a cloned tree, genetically identical to its donor tree (the selected tree from which the cutting is collected) takes three years to grow to a sufficient size for field planting (five feet tall).

In recent improvements, an underground storage facility for overwintering of sugar maple plant material was completed at the Uihlein Field Station in late fall of 2000. All seedling and clonal stock survived in excellent condition for the 2001-growing season. During 2001 and 2002, a SARE agroforestry/forest management grant has provided Cornell researchers further opportunity for sugar maple outplanting research combined with the training of extension agents and cooperating landowners. Maple producers continue to serve as collaborators by identifying, testing and providing new clonal stock. Any individuals interested in becoming involved in this program should contact their extension forester, maple specialist or the Cornell maple program.

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Collecting seeds for the tree improvement program