



Progress Report

Moving Closer to 10,000 Trees

Activities undertaken between December 1, 2014 and October 15, 2015

In the year since launching our very successful “Ten Thousand Chestnut Challenge,” many strides have been made towards achieving our goal.

- We completed the last major step in our new high-production laboratory in the Central New York Biotech Accelerator.
- We staked a claim on a sizable area on the Genetics Field Station, a College property approximately 20 miles south of Syracuse, and began planting trees for a chestnut seed orchard.
- We made a number of crosses including transgenic X wild type, transgenic X backcross trees.
- We developed a whole new approach to the rooting and acclimatization process.

Using this improved procedure on the two lead events, we have:

- Stuck more than 1,500 shoots into expanded Jiffy-7 peat pellets
- Repotted the first 66 plantlets and put them in growth chambers

The new high-production lab

After 3 years of delays since we first stepped into the cavernous empty room that was to become our new chestnut high-production laboratory, it is up and running. The lab is located in a new building about a mile from the main campus. The building is a joint project between SUNY Upstate Medical University and SUNY College of Environmental Science and Forestry. Called the Central New York Biotech Accelerator (BAC), it was designed to attract start-up biotechnology companies to Central New York. We were very fortunate that our not-for-profit program was also given a lab thanks to the efforts of SUNY-ESF. It is a great new home for the American Chestnut Project’s High-Production Laboratory.



Figure 1. The Central New York Biotech Accelerator (BAC) located on East Fayette and Irving Avenue in Syracuse, New York



Figure 2. Our first look at the new high-production lab

In vitro propagation of American chestnut

Starting out with the best quality plant material is the first key element of propagation. In this procedure, we grade the chestnut shoots into three categories: good to root, grow for another cycle, and discarded tissue. In this way, we harvest excellent shoots, leave good but small shoots to grow, and remove callus and poorly growing tissues from the production cycle. By cycling production of the two lead events, a backup, and several control chestnut lines, we are able to produce up to ~1,000 Grade 1

quality shoots per month to begin the rooting and acclimatization steps. Even though less than half of these will survive the rooting process, the methods are continually improving.

Ex vitro rooting of American chestnut

Ex vitro rooting means that the roots are formed on very succulent shoots outside of the sterile tissue culture environment, much like rooting conventional softwood cuttings. For American chestnut, we use peat plugs in high-humidity bins. In ex vitro rooting, the roots that form are true roots, with proper secondary branching and root hairs. We use a commercial rooting gel that contains the plant hormone IBA. Having determined that our ex vitro protocol is no worse, and in many cases better than our in vitro protocol, we have switched exclusively to ex vitro rooting.



Figure 3. The new illuminated shelving, already nearing capacity.

There are currently 1,500 shoots in ex vitro rooting in high humidity bins. Again, we expect that less than half will survive to the next stage, but this will be enough to populate the seed production orchards.

Increasing the production of blight-resistant true seedlings.

We have decided to move toward a seedling based production system for at least part of the 10,000 chestnut trees. We decided on this approach because seedlings grow better than tissue culture derived plantlets for the first year or two. Another reason is to begin increasing the genetic diversity of the trees we release to the public. We are ultimately going to be attempting to restore a keystone species that covered, and usually dominated over 200 million acres of eastern woodlands. That's going to take a lot of trees! Last summer we visited several College properties looking for a good site for a seed orchard. We settled on a site about 20 miles south of Syracuse on the Genetics Field Station. We have begun clearing the site and laying out the design for a seed orchard capable of producing at least 10,000 nuts per year.



Figure 4. Graduate student Tyler Desmarais producing trees for seed orchards. (Inset, a tiny American chestnut shoot stuck in a conventional Jiffy-7 peat pellet)

On behalf of the entire Chestnut Team, thank you for your support.

Chuck Maynard and Bill Powell, Co-directors of the American Chestnut Research and Restoration Project

If you want to learn more about the American chestnut Research and Restoration Project, visit our website by clicking [here](#)