Final Report

Grants supporting the projects titled "Maintenance of Backcross orchards to access the integration of host resistance and hypovirulence." TACF funding for this report includes three annual grants of $2731.00, $2150.00, and $2070.00.

This project was initiated in April 2005 in collaboration with colleagues from The American Chestnut Foundation. Plantings were established that year with help from the Meadowview Farm crew. The research planting consists of six replicate plots that include backcross lines (B_2F_2, B_3F_2 and B_2F_3), obtained from the Meadowview Farm as well as American, Chinese and European chestnuts. Many of the trees in the six plots now range in height from 1-to-6 meters. As of May 2014 survival was: American lines (63%); Backcross lines (71%); Chinese lines (93%) and European lines (44%). An ancillary aspect of this project is that the experimentation will provide a comparative test of the resistance/susceptibility of the three chestnut species and the various backcross hybrids in the plantings.

Monies from these grants have been used as follows:

Maintenance Component: Competing vegetation is the most significant problem affecting tree growth. The plantings are on an old farm site, so that competition from grass and other weedy vegetation remains a significant problem. Included in the list of maintenance issues are:

- Multiple applications of herbicide to control vegetation
- Insecticide sprays for Ambrosia and Japanese beetle control as needed
- The application of high nitrogen fertilizer (slow release) in the spring and a second late season application
- Watering when drought conditions develop
- Mulching to help retain soil moisture and control weeds

Research Component: Hypovirus treatment was initiated in 2013 and included:

- Yearly measurement of the diameter, height and infection status of all trees within each of the three virulent (control) and three hypovirulent plots
- Annually, the five largest trees of each species or hybrid group in each plot have been inoculated with a virulent strain (Weekly) of C. parasitica
- Wild-type cankers that arise in the hypovirulent plots have been treated during the growing season with a mixture of isolates infected by two CHV1 hypoviruses (Euro 7 and WK2) and two CHV3 hypoviruses (GH2 and County Line)
- Sampling of new infections that arise has been made to verify the infecting strain and to determine whether they have acquired hypovirus

Analysis and Reporting:

Growth and survival measurements taken at the end of each growing season are being used as one measure of the effect of the virulent and hypovirulent infections on each of the species or TACF hybrids. Additionally, the development of infections that arise from inoculations as well as those that develop naturally will be assessed by measuring their size, evaluating their morphology and by culturing the infecting strains to determine whether they are virulent or hypovirulent. As the experiment has progressed, periodic reports have been made to TACF and the regional chestnut research group (NE-1333). Because the project is long-term final results will not be published for 4-5 years.

Budget Dialogue:

Monies requested by the three grants were used to support part-time undergraduate students who have helped provide maintenance of the planting from April-November. Students also have assisted Double/MacDonald by sampling cankers, plot inventory and data recording. Monies also were used for mulch, fertilizer and herbicides. WVU has contributed the salaries of the principal investigators and the field and laboratory facilities to conduct the experimentation.

The project will continue and was awarded additional support in 2014 by an additional $3100.00 grant.