

Here are several major lines of questioning that current data collection protocol for the American chestnut Mega-Transect can help answer.

1) **Modeling population dynamics, especially with relation to land use changes or disturbance.** Major changes in counts in a given section can give researchers an idea of how chestnuts are responding to different environmental factors. Sudden decreases are, of course, suggestive of recent disturbances, but continuous patterns of even gradual increases or decreases can also lead to important information about chestnut responses to the environment (e.g., range shifts with global climate change). As reintroduction efforts increase, managers of chestnut stands can use information from the Mega-Transect to try and mimic natural trends to more efficiently reach specific management goals. Broad-scale analyses such as this one are important on their own, but also have the potential to lead investigators to more local questions. Once a site has been discovered to be “different” for some reason, more local exploration and collection of finer data may reveal additional, meaningful inference.

2) **Increased correlation of current chestnut population with habitat range.** Changes in population structure may reveal interesting and applicable results (as above), but the static snapshots obtained within the transect may be just as important. The general requirements for chestnut growth are well-known and documented through both modern and historic literature. Specific ranges within those requirements, however, are little known because the great collapse of the species coincided with the blossoming of forestry in America. Using modern spatial analysis techniques, counts of chestnuts can be matched against many environmental factors such as land use (current and historic), slope, aspect, soil type and other characteristics, just to name a few.

3) **Discovery of fruiting and/or resistant individual American chestnut specimens.** As part of the National Park Service, the Appalachian Trail has gone largely unmanaged since 1937. Such a situation lends to the potential to actually discover unique and valuable chestnut representatives. Fruit-bearing trees will help add to conservation efforts, both through breeding and collection for *ex situ* conservation orchards. Though relatively rare, some moderately-resistant specimens do exist, but most have been found in fields or small property lots where land owners can easily find them. More could be hiding in our forests and a comprehensive transect such as this is one of the best ways to identify them and, potentially, on what types of site they are mostly likely to be found.

4) **Engagement of community.** Beyond the collection of data, an important, and often overlooked, aspect of the Mega-Transect program is the interaction of hikers within their environment. As knowledge and experience of the American chestnut fades in modern time, keeping some connection with the species will be vital not only to the restoration of that single species, but also to better inform hikers about larger ecological and forestry connections. The American chestnut

is but one species grossly affected by the introduction of a non-native pathogen. In addition, the species' reintroduction will hinge upon the proper understanding of its niche and the greater role it can play in increasing overall forest health once it has regained a footing in its native range.

Additional data collection efforts could help unlock even more questions, but would require increased training and hiker resources. By starting with a baseline of identification and building a strong foundation of citizen scientists in the beginning, additional research modules can be added in the future. For example, examination of blight cankers on trees along the trail can reveal interesting trends in the extent of hypovirulence along the trail and the effect of blight on population dynamics as outlined in number 1 above. Future efforts are planned to train interested individuals on how to sample cankers on trees so they may be tested in labs for virulence and presence of the hypovirus. As interest in and data from the current phase of the American chestnut Mega-Transect project increase, so too will the scientific interaction and opportunities.

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