

REPORT FROM THE STREET: ELM REINTRODUCTION

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Since the introduction of Dutch elm disease (DED) to North America, heritage elm preservation was paramount, but elm restoration is held as the long-term solution. Various elm restoration efforts have been advanced and encouraged over the past half century, and all have inspired the euphoria of the “Return of the American Elm.” The changing cast of characters on the public stage of Main and Elm Streets has, however, been met with mixed reviews.

An evaluation of several generations of elm restoration reveals recurring shortcomings in DED tolerance and/or sustainable crown structure and associated maintenance demands. In at least one early case, stature was simply unable to rise to the reputation of the tree.

Initially, ‘Buisman elm’ (*U. minor* ‘Christine Buisman’), though European, was the only elm restoration cultivar available, and was being planted as late as the 1970s in southern New England. Ultimately it lagged behind in size, looked unlike American elm in habit, and fell out of favor.

In the 1980s and 1990s, ‘Liberty elm’ (*U. americana* ‘American Liberty’) held sway, as a group of six cultivars, but was unreliable in terms of DED tolerance, and generally performed no better than background elms. Nonetheless, Elm Research Institute’s promotion continued despite repeated losses to DED. Nineteen years after a 1997 community planting of 35 ‘Liberty elms’ in Sheffield, Massachusetts, 60 percent have been lost to DED.

Elm Watch formed in 1999 to advocate for best elm preservation technology and to promote elm restoration with reliable elm cultivars based on National Arboretum test results. Our objective was to plant “hundred-year trees,” the eventual successors to the Heritage elms we had protected. Due to the high visibility of prominent public plantings, we optimized tree pits, managed the trees over time, and became fully aware of the demands and disappointments of our good work. Comments on particular cultivars below are derived from steep learning curves in service to public trees within the tri-state area of Connecticut, Massachusetts, and New York and thus differ from performance data from hands-off elm plots of the National Elm Trial (NET; Colorado State University, n.d.).

Valley Forge (*U. americana* ‘Valley Forge’). Though the top DED performer in 2001 National Arboretum tests (Townsend and Douglass 2001), ‘Valley Forge’ turned out to be a loser due to awkward branch angles projecting growth in every direction except upward. Even the most skilled and dedicated pruners can barely get the tree through its adolescence, and catastrophic branch failure becomes increasingly probable from year to year. Its very rapid growth rate exacerbates structural problems and the cultivar is not recommended.

Princeton (*U. americana* ‘Princeton’). ‘Princeton’ was found to have a relatively high pruning requirement in the trials at the University of California at Davis (according to the Princeton elm Wiki page) and has moderate DED resistance, though greater susceptibility than would be expected based on a layman’s interpretation of “survival” in 2001 National Arboretum test results (Townsend and Douglass 2001).

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Of some 100 elms planted from 2001 to 2007 within the tri-state area, nine came down with DED, seven died, and two were saved by assiduous pruning. If one can extrapolate 9 percent losses, from about a 12-year interval, one might be left with only a few “hundred-year trees.”

Princeton’s structural vulnerabilities were evident in multiple codominant leaders that needed regular pruning at short intervals, not to exceed 3 years, and preferably 2 years. Otherwise, bark inclusions in acute branch angles, flaunted by Princeton’s characteristic and recurring multi-stem branching patterns (accurately referred to as “cluster crotches”), resulted in high wind vulnerability and increased potential for catastrophic failure. The optimal pruning technique, involving pruning from below as well as pruning from above, can result in good structure, but is rarely implemented in community forestry settings.

New Harmony (*U. americana* ‘New Harmony’). ‘New Harmony’ has good structural potential, due to its tendency to form an upright dominant leader, but any competing leaders with narrow crotches will need reduction cuts or straightaway deletion. Several of the large New Harmony elms at the Northern Research Station were likely planted in tight plots so branch spread may not have been properly expressed. Those narrow crotches, however, were disquieting to observe and in a community planting would have begged early removal.

Jefferson Elm (*U. americana* ‘Jefferson’). ‘Jefferson’ is the structural winner and requires one-tenth the pruning compared to Princeton. This triploid elm has a slower growth rate and excellent branch angles. DED tolerance was very high in 2005 National Arboretum test results (Townsend et al. 2005). To confirm DED tolerance, Jefferson elms of increased sizes should be reinoculated before one has full confidence to use it in high visibility public plantings. Consumers need to also be aware that a nursery trade mix-up a dozen years ago still plays out in the marketplace, and ‘Princeton’ elms continue to be sold as ‘Jefferson’ unknowingly by reputable nurseries from New York to Minnesota. The Princeton/Jefferson comparative elm identification guide is available online at trees.umn.edu/elmid.

Because of unresolved DED and elm yellows concerns, American elm cultivars are not recommended for more than singular plantings, according to Elm Watch and Bruce Fraedrich of Bartlett Tree Research Lab (Charlotte, NC). Allee plantings are inconsistent with current sustainable community forestry practices and should be understood as an old-school aesthetic lacking in the diversity required for future resiliency. Monoculture plantings, such as alongside Pennsylvania Avenue in Washington, D.C., have disproportionate vulnerabilities to disease, and because of a poor understanding of pruning goals, uniformity of streetscape design may likely become disrupted over time along that Inauguration Day parade route due to expected failures of major structural leaders.

National Elm Trial (NET) results were inconclusive and provided no data on ‘Jefferson’ due to the cultivar mix-up. Extending the utility of remaining elm plots nationally for further testing, including reinoculation of older elms, such as is planned at the University of Minnesota Elm Research Program, is needed to bring elms back with renewed confidence. The NET did provide evaluations of many elm hybrids, mostly of Asian ancestry, several of them performed very well, and a few can even masquerade as American elm in form, particularly Accolade and Triumph, though smaller in height. It could be argued that those hybrids make better choices for community forestry settings, while American elm research largely remains a work in progress.

Current National Arboretum research on diploid American elms is most intriguing and may introduce a new set of players on the elm stage. U.S. Forest Service research, using crosses of presumed “survivor elms” with elms of measurable DED tolerance may also produce positive results. These research efforts deserve extended funding and should resist the temptations

of premature conclusions and premature releases. Researchers must recognize that cultivars, once released to the trade, can hang around for decades, even if they turn out to be unworthy. Research efforts on both DED tolerance and structure should rather stretch out the testing and provide enough time and space to reveal crown development while creating opportunities for reinoculations at larger diameters, and using various protocols. Bruce Carley and other elm activists appreciate the imperfect elm cultivars as important stepping stones in a long-term process that is still evolving toward a desirable tree and are encouraged to see improved branch structure in crosses such as ‘Valley Forge’ × ‘Princeton.’

Foremost, American elm is notable as a street tree, a public tree, or a commemorative tree, planted with full expectations of a high canopy and presumed longevity. Yes, street trees come and go due to frequently inadequate planting practices and urban abuses, but within that context an elm can only stand among the survivors if structural and DED deficiencies are more fully resolved. We cannot afford another tree with the structural half-life of a Bradford Pear (Valley Forge), nor one with pruning demands that can be expected to span 20 years (Princeton). It is hard to recall another tree that has spawned the publication of its own manual, “Pruning Young Elms: Guiding American, Asian, and Hybrid Elms to Stately Maturity” (Giblin and Gilman 2010). As a bottomland tree in a natural setting the elm can also take its place, but will only be successful there if it can resist unmanaged disease pressures and hold a snow load. But as with the proverbial “tree in the (bottomland) forest,” it may less likely be heard than its more highly visible and audible urban cousins, were it to fall.

Literature Cited

- Colorado State University College of Agricultural Sciences. N.d. **National elm trial**. Ft. Collins, CO: Colorado State University. <http://bspm.agsci.colostate.edu/national-elm-trial/> (accessed November 2, 2016).
- Giblin, C.P.; Gillman, J.H. 2010. **Pruning young elms: guiding American, Asian, and hybrid elms to stately maturity**. Minneapolis, MN: Urban Forestry and Horticulture Research Institute. 96 p.
- Townsend, A.M. and Douglass, L.W. 2001. **Variation among American elm clones in long-term dieback, growth, and survival following *Ophiostoma* inoculation**. Journal of Environmental Horticulture. 19: 100-103.
- Townsend, A.M.; Bentz, S.E.; Douglass, L.W. 2005. **Evaluation of 19 American elm clones for tolerance to Dutch elm disease**. Journal of Environmental Horticulture. 23: 21-24.

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