

Elms for the Twin Cities:
A Selection Guide for Arborists and Urban Foresters

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Why Elms?

For much of the past century, American elms have been a very important part of our urban forest, especially in the Twin Cities. Since the outbreak of Dutch Elm Disease (DED), however, urban foresters and nursery growers have been scrambling to find suitable replacements for these tough specimens. The Minneapolis Park and Recreation Board (MPRB) has been involved in trying out the resistant elm varieties for many years. This interest helped establish a cooperative research project between MPRB and the Urban Forestry & Horticulture Research Institute at the University of Minnesota to evaluate the various elms available in the nursery trade. The goal was to find as many new elm selections as possible and get a feel for their suitability in this northern climate. Since 1999, over 1,000 elms selected from 20+ different varieties have been evaluated. Most have made their way onto the streets and in the parks of Minneapolis and St. Paul.

Variety is the Spice of Life!

Moderation is always a wise choice. Accordingly, most urban foresters are taking a cautious approach to replanting large numbers of any tree in their towns and cities. For example, Minneapolis has approximately 19% ash trees on the streets and is trying to limit the over-planting of any one species or variety. City foresters are conscientious of the role increased tree diversity plays in lessening the effects of disease and insect infestations such as the emerald ash borer (EAB). Species diversity, combined with a good tree inventory, allows for quicker and more efficient planning and response to exotic pest introductions or disease outbreaks. The multi-specific parentage of these elms will contribute high levels of genetic diversity to the urban forest and may help delay major outbreaks and spread of future disease problems and insect infestations.

Maintenance

Elms require unique levels of maintenance for long-term health and function. Many varieties will require frequent pruning visits during their first ten years of life outside of the nursery. Maintenance of strong central leaders is of critical importance, especially for boulevard plantings. In many cases it appears that elm bark beetle feeding sites may create branch inclusions that may tear out under stress. Scouting for these dysfunctional branch attachments is critical when trees are young to avoid “tear-outs” which, in many cases, send an otherwise good tree to the chipper!

Because pruning young elms is so important, we have been examining both historical and modern pruning methods on tree health and performance. By examining historical records and photographs and combining that knowledge with modern scientific research and arboricultural techniques, we have recently released a pruning manual, *Pruning Young Elms*, specifically aimed at maintenance of juvenile elm trees. This book guides the reader through the difficult years after planting a typical elm tree. Please contact Chad Giblin at giblin@umn.edu if you are interested in this publication.

Elm Selections

Accolade™ - *U. japonica* x *wilsoniana*

This Morton Arboretum introduction has been a great selection for many years. This tree has a mature form that is similar to the American elm but is slightly more upright and a bit smaller. Accolade™ has shown excellent performance in winter hardiness tests in the Twin Cities area, and generally outperforms many other varieties in terms of insect resistance as well. In 2004 we discovered two Accolade™ elms that had DED. While this is disconcerting, it was a good reminder of what the term “resistant” means; none of these selections are “immune” to DED. One of the two trees, currently under observation at the U of MN, currently has no symptoms of the disease and continues to grow with incredible vigor!

Danada Charm™ - *U. japonica* x *wilsoniana*

Another Morton Arboretum introduction, Danada Charm™, ranks number one in nursery evaluations in annual percent caliper increase, and number two in stem growth rate. It is literally the fastest growing elm in the nursery! Its leaves are larger than those seen in Vanguard™, Accolade™, and Patriot but are still lustrous and dark green.

Danada Charm™ has only moderate resistance to foliage-feeding insects and so will require careful site selection and scouting for elm leaf beetle and other pests. Nonetheless, after nearly 10 years of evaluations of city trees in Minneapolis, Danada Charm has come out very high in quality and performance. Growth rate continues to be incredible, and it outperforms many other selections in form and condition.

Commendation™ - Complex hybrid with *U. carpinifolia*, *U. pumila*, and Accolade™ heritage

Also introduced by the Morton Arboretum, Commendation™ has been very vigorous in our nursery evaluations. It is reported to have excellent drought resistance and adaptability to tough sites. The ultimate form on this tree is more oval than vase-shaped but is still quite attractive. In nursery evaluations, Commendation™ ranked #3 in both percent annual caliper increase and annual twig growth. This tree should be a good all-around tree for a variety of sites in the urban forest, but, like Danada Charm™, it is susceptible to foliar feeding by insects.

Camperdown - *U. glabra*

This tree is the only true Wych elm or Scots elm (*U. glabra*) evaluated at our research nursery. The first year after planting in fall of 1999, the Camperdown performed quite well, but once “normal” winter temperatures returned this selection suffered severe winter kill and dieback. 90% of these trees were lost in the winter of 2002–2003. There are some specimens planted in Como Park in St. Paul that are doing quite well and, in a park, or landscape setting they might

have the benefit of a unique microclimate or a protective groundcover that was lacking in our research nursery.

Cathedral – *U. pumila* x *japonica*

Cathedral is another long-time favorite DED-resistant selection introduced by the University of Wisconsin. Due to its vase-like form in the nursery, this variety was selected by the University of Minnesota to replace American elms lost on the Northrop Mall on the Minneapolis Campus. This selection requires a lot of attention in the nursery and is quite prone to develop branch inclusions. Timely structural pruning will prevent most problems.

Cathedral has good resistance to elm leaf beetle and other chewing insects. However, it appears to be a favored food source for leaf hoppers and other, related, insect pests. There are numerous Cathedral elms on many of the toughest sites in Minneapolis and St. Paul. These trees continue to thrive in spite of pollution, urbanized soils, and drought.

Discovery – *U. japonica*

Like Accolade™, the Discovery elm has been around awhile, and many are already familiar with its characteristics. It is much slower growing than most of the other varieties, but still packs on stem caliper at a good rate. Some sources suggest its ultimate form may be vase-like, but, in our experience, it has been fairly upright.

This tree appears to be quite hardy in St. Paul, and there are a number of these already growing in the Minneapolis Parks system as well. Even though it is fairly slow growing, this selection requires a fair amount of crown thinning as a young tree. Because of this very dense crown, co-dominant leaders are also quite common. Like Accolade and Cathedral, Discovery is extremely drought tolerant and is performing very well in city evaluations.

Frontier – *U. carpinifolia* x *parvifolia*

Frontier has simply spectacular deep burgundy fall color. Its big drawback for Minnesota is poor winter hardiness. In the nursery setting there has been severe twig dieback almost every winter. This was confirmed after trying new selections on their “own roots” in the winter of 2004-2005. The tree sometimes “bounces back” but it lacks the form and integrity required in most urban forest settings. This is one selection that is currently not recommended for the Twin Cities.

Homestead – Complex hybrid with *U. pumila*, *U. carpinifolia*, and *U. hollandica* heritage

Homestead is another nice tree introduced by the elm breeding program at the U.S. National Arboretum. While its leaves are smaller and the form isn’t at all like an American elm, it still proved to be quite tough and vigorous at the nursery. Homestead is very similar to Siberian

elm (*U. pumila*) in form and leaf characteristics. It did suffer some sunscald and cambial damage the winter of 2000-2001 in nursery evaluations, but it didn't appear to be adversely affected by it in the long term. This tree is fairly easy to find in the trade. Townsend and Douglass (2004) report that, in their research, 10% of Homestead clones died the second year after DED inoculation. There have been a few, unconfirmed reports of DED on these trees in the trade, but these have been rare. In our nursery trials, this selection was one of the favored food sources for elm leaf beetle (ELB).

New Horizon – *U. pumila* x *japonica*

The New Horizon elm is a product of a cross between *U. pumila* and *U. japonica* and is another introduction from the University of Wisconsin. It has many of the desirable features required for growth in the urban forest: fast growth, good insect resistance, and good DED resistance. In some cases, co-dominant leaders and heavy side-branches can develop quickly on this variety, so higher levels of maintenance are required, especially in young trees. Like the Homestead elm, New Horizon appears to be favored by ELB and has shown moderate feeding in our research plots.

Patriot – *U. wilsoniana* x 'Urban'

This is another newer selection out of U.S. National Arboretum breeding program. Patriot has outstanding summer foliage that is quite glossy and very dark green. Its form generally has been upright in the nursery, but photos of more mature trees show that it has a form very similar to that of *U. americana*. This tree is somewhat hard to find in the trade, but numbers have been increasing over the last few years. In studies by Townsend and Douglass (2004), Patriot showed 100% survival 7 years after DED inoculation. This tree should be on every urban forester's "Top 10" list!

Pioneer – *U. glabra* x *carpinifolia*

Pioneer is sold as a USDA Hardiness Zone 5 tree, and many may pass it over on that account. It has proven to be quite hardy since 1999 in St. Paul. Pioneer's form is quite different from the American elms, but it is *very* easy to train as a young tree. Pioneer has very deep green summer foliage color and a unique leaf shape reminiscent of true Wych elms. Recent evaluations in Minneapolis have found many Pioneer elms with considerable winter injury, notably over the winter of 2005-2006. Most trees appear to have recovered, but this may be why it has been marketed as a Zone 5 tree.

Princeton – *U. americana*

Princeton is a true American elm that was selected for "superior horticultural qualities" *prior* to the DED epidemic (Stennes, 2003). This tree is slightly more upright than many of the seedling American elms around and it is this habit that requires a little more attention to pruning during

formative years as side branches develop quickly and may become included or dysfunctional very quickly. Outbreaks of Japanese beetles will result in heavy feeding on most young American elms, including Princeton and Valley Forge. Long-term effects of this feeding are currently unknown for our region. Other areas in the USA report recovery after a new flush of foliage.

Princeton is not patented and can be legally propagated by anyone! In propagation studies at the U of MN, this tree is quite easy to clone using summer softwood cuttings. This tree received a lot of press coverage in 2007 and since has seen wider availability at a major home-improvement store locally. Like most American elms, young Princetons will require a heavy dose of structural pruning to establish good form.

Prospector – *U. wilsoniana*

Prospector is a straight Wilson elm (*U. wilsoniana*) selection out of the U.S. National Arboretum with excellent DED resistance and fairly good insect resistance. Like Cathedral, Prospector appears to be a favored food source for leaf hoppers which results in distorted foliage by mid-summer. This selection also has some hardiness issues like those observed in Frontier. It performs well during the growing season, with extremely high vigor, but lacks the hardiness of some of the other selections. This tree also has some problems with stem breakage due to bark inclusion.

Triumph™ - *U. japonica* x *wilsoniana*

Triumph™ is another new selection out of the Morton Arboretum in Illinois. Its parentage includes Vanguard™ and Accolade™. If you are looking for a tree with larger leaves than Accolade™, this might be the one! It has been relatively carefree in the nursery setting and has all the qualities of Accolade™ without many of the drawbacks like branch inclusion, breakage and so forth. It is reported to have less resistance to foliage feeders like the elm leaf beetle, however. This selection has also shown excellent performance on brownfield sites. Several have been on Nicollet Island in Minneapolis for ten years now and show great promise for tough urban sites!

Valley Forge – *U. americana* ‘Valley Forge’

Valley Forge is a true American elm introduction from U.S. National Arboretum with outstanding DED resistance. This tree has a lot of well-earned notoriety for being hard to manage in the nursery! Once it gets into larger stem caliper ranges it seems to “settle down” a little and take on a more manageable form and habit. If you are interested in trying this tree, be ready to devote enough time to pruning it for long-term health and branch structure. It is reported to be 96% resistant to DED in inoculation studies and appears to be fully hardy in USDA Hardiness Zone 4. Also note susceptibility to Japanese beetle feeding, noted above under Princeton.

Vanguard™ - Complex hybrid with *U. japonica* and *U. pumila* heritage

Vanguard™ is another Morton Arboretum selection that is extremely vigorous. This tree follows closely behind Danada Charm™ in annual growth rate. It has a fairly upright form in the nursery and the leaves are similar to American elm in size and color. While this is a tough tree and grows very quickly, it also has some problems with poor branch architecture. Vanguard tends to form co-dominant leaders while juvenile, so it's important to establish and maintain strong central leaders to make sure these trees maintain a form suitable for urban and community plantings. This tree has also had some problems with foliar leaf diseases in the spring. These usually don't cause any long-term problems but may create aesthetic issues early in the season.

New American Elms – *U. americana*, Red Elms – *U. rubra*, and Rock Elms – *U. thomasi*

Work is continuing in cooperation with Dr. Robert Blanchette's Forest Pathology Lab on evaluations of potentially resistant American, red, and rock elm selections. We currently have several American, red, and rock elm clones that are undergoing inoculation experiments to determine DED-resistance.

Selected references

- Biggerstaff, C., J.K Iles, and M.L. Gleason. 1999. *Sustainable urban landscapes: Dutch elm disease and disease-resistant elms*. SUL-4. Iowa State University
- Dunn, Christopher P. (ed.). 2000. *The Elms: Breeding, Conservation, and Disease Management*. Kluwer Academic Publishers. Boston. USA.
- Kuser, J. and N. Polanin. 2001. Comparative test of six DED-tolerant elms: a preliminary report on nursery performance. *Journal of Arboriculture* 27(5). International Society of Arboriculture, Champaign, IL.
- Miller, F. 2002. *New elms for the landscape and urban forest*. The Morton Arboretum, Lisle, IL.
- Santamour, F.S., Jr. and S.E. Bentz. 1995. Updated checklist of elm (*Ulmus*) Cultivars for use in North America. *Journal of Arboriculture* 21(3). International Society of Arboriculture, Champaign, IL.
- Stennes, Mark. 2003. Good news for the American elm. *Shade Tree Advocate* 5(4). Minnesota Shade Tree Advisory Committee, St. Paul, MN.
- Townsend, A.M. and L.W. Douglass. 2004. Evaluation of elm clones for tolerance to Dutch elm disease. *Journal of Arboriculture* (30)3. International Society of Arboriculture, Champaign, IL.