

Tree Provenance  
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The word “provenance” may be defined as the origin or source. Foresters have stressed the importance of provenance in tree testing for several decades, but applications of provenance in urban forestry have not yet progressed very far. An example is the greatly variable sugar maple, which has a natural geographic range including a large part of eastern North America. The sugar maples that are native to New England have leaf shapes quite different from the leaf shapes of those growing in Iowa. But leaf shape is only the most obvious of a number of dissimilar qualities in these two well-separated areas. The sugar maples of Iowa have thicker, more leathery, and more scorch-resistant leaves than the sugar maples of New England. The heavier root systems of Iowa maples seem to provide an adaptation for good tolerance of the periodically hot and droughty Iowa summers. However, extensive early root development in Iowa sugar maples may be at the expense of top growth. Slow top growth may not have great appeal to the tree grower, but in the long run the well-developed root system may be a valuable physiological asset, especially in terms of the capacity of trees to compete with grass. Because of its evolutionary origin in a part of the nation with cold winters, hot summers, and windy weather, the genetic make-up of Iowa sugar maple may equip it for coping with urban environmental adversities better than most of the sugar maples now being planted. Sugar maples of midwestern provenance appear to have better ecological “credentials” for urban use than those from eastern U.S.

A few years ago, the Plant Clinic received a call from a nurseryman who had purchased 100 Autumn Purple ash trees which had a very successful first season of growth. The problem: the following spring none of the ash trees leafed out. The apparent explanation: the trees came from a nursery in Tennessee. It is likely that the ash understock was grown from ash seeds of Tennessee origin. The original Autumn Purple ash tree was discovered in Madison, Wisconsin many years ago and Autumn Purple trees universally show good winter hardiness. However, the Tennessee understock apparently cannot survive an Illinois winter. The importance of provenance of understock is illustrated by this story. The late Dr. Frank Santamour of the National Arboretum repeatedly emphasized the importance of provenance, especially the geographic origins of understock.

The concept of provenance may also be applied to other parts of the world. China has large areas with climates similar to our Midwestern states. Certain commonly used urban trees have their origins in China. A well-known import from China is Siberian elm (*Ulmus pumila*), which has great vigor and rampant growth, but branches so subject to wind and ice breakage that it's not considered to be a suitable urban tree. But there are many tree species in northern China that have qualities needed for successful performance in urban situations in the U.S. A good example is David elm (*U. davidiana*), native to the northeastern provinces of China which have climate similar to that of northern Illinois. Further matching beyond provenance includes similar rainfall, similar soil conditions, and similar seasonal weather rhythms. There are sometimes unforeseen vulnerabilities and problems that must be examined. In addition, watchfulness for invasive tendencies is a significant consideration and challenge for Arboretum researchers.